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3.3.2 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during year

Supporting Documents

Sr. No	Name of the teacher	Title of the book/chapters published	Page no
1.	Dr. Mangesh Dushing	Stereochemistry Formations & Configurations	1-72
2.	Dr. P.T. Nikam	E-Commerce: Theory & Practical	73-380

Arts, Commerce & Science College Nandgaon (Nashik)

Principal
Arts, Commerce & Science College
Nandgaon, Dist. Nashik (M.H.)

STEREOCHEMISTRY
Conformations and Configurations
(For HSC and BSc Students)

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STEREOCHEMISTRY
Conformations and Configurations
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Preface

I am extremely cheerful to introduce the book "Stereochemistry – Conformations and Configurations (for HSC and BSc students)" to the students and teachers offering subject chemistry. Stereochemistry is the study of three-dimensional structures of molecules. To determine the cause of chemical reaction, it is essential to have the complete understanding of stereochemistry.

In this book, three dimensional illustrations, figures, representations and numbers of examples are included to make the reading quite interesting and understandable. I sincerely hope that the method of presentation in the book will be helpful to the students and teachers learning the subject independently. We hope that this book will cater the exact requirements of the students.

Almost all the basic aspects and concepts related to stereochemistry required for the undergraduate and postgraduate study are included in this book. The concepts are illustrated and elaborated with necessary examples. While preparing the book, I have referred numbers of standard books.

I wish to put on record my indebtedness to authors of these books. I would like to place on record my deep sense of gratitude towards Respected Dr. S. I. Patel, Principal, Arts Science and Commerce College, Nandgaon for encouraging me to write the book. I am very much thankful to my colleagues Dr. N. K. Pawar, Prof. S. S. Saundankar, Dr, K. R. Khandare, Dr. Bhagvat Chavare, Dr. Tidar, Dr. V. B. Sonawane, for valuable suggestions.

I would like to acknowledge the support received from Deepa Arts, Nashik in preparation of manuscript of this book. It gives me a great pleasure to acknowledge the love and support of my family members, my wife Swati and daughter Ojal to finish this task.

I believe that a man would do nothing if he waited until he could do it so well that no one would find fault with what he has done. Despite of my sincere efforts, there may have some errors in the book, which might be escaped from my notice. I shall be glad and appreciated to receive constructive suggestions to improve the book.

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Dr. Mangesh Dushing

STEREOCHEMISTRY
Conformations and Configurations
(For HSC and BSc Students)

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Contents

Stereochemistry

Stereochemistry is the branch of chemistry that deals with description of spatial arrangement of atoms in molecules and its relation to the properties of the compound. The study of stereochemistry begins with the phenomenon of isomerism. In this book, we are going to study basic stereochemistry up to graduation level.

1. Isomerism

In the study of organic chemistry, we countered with many cases when two or more compounds same molecular formula. These compounds having same molecular formula but differ from each other in physical or chemical properties, are called as isomers and the phenomenon is called as isomerism. Since isomers have the same molecular formula, the difference in their properties must be due to arrangement of atoms within the molecule.

There are two main types of isomerism

A. Structural or constitutional isomerism
B. Stereoisomerism

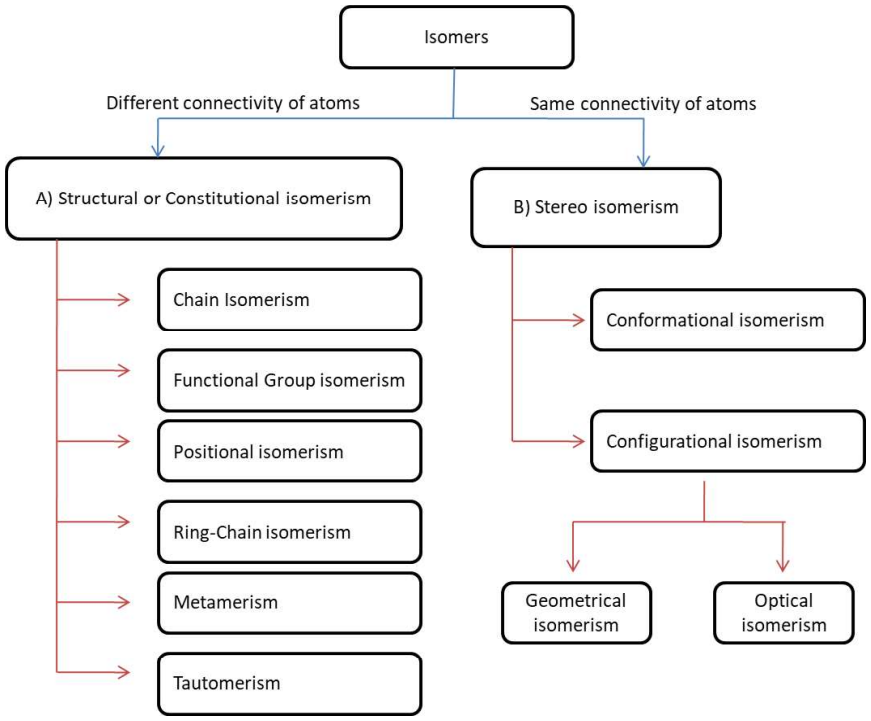


Fig: Classification of isomers

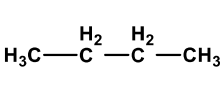
A) Structural / constitutional isomerism: When the isomerism is due to difference in arrangement of atoms within the molecule, without any reference in space, called as structural isomerism. In other words, the phenomenon of existence of two or more compounds with the same molecular formula but differing in structure (their atoms are joined in different connectivity) is known as structural isomerism and the compounds are called structural isomers.

Depending on the nature of structural difference in isomeric compounds, structural isomerism is further classified into six classes.

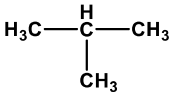
i. Chain isomerism
ii. Functional group isomerism
iii. Positional isomerism
iv. Ring-chain isomerism
v. Metamerism
vi. Tautomerism

i. Chain isomerism: if different compounds of the same class of organic compounds, having the same molecular formula, differ in the structure of carbon chain, they are called chain isomers.
Examples of this type of isomerism are:

a) n-Butane and iso-butane (Mol. Formula: C_4H_{10})

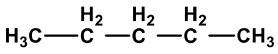


n-Butane

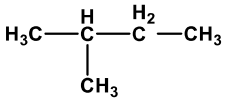


iso-Butane

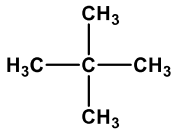
b) n-Pentane, iso-pentane and neo-pentane (Mol. Formula: C_5H_{12})



n-Pentane



iso-Pentane

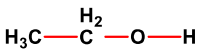


neo-Pentane

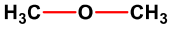
ii) Functional group isomerism: Different compounds, with same molecular formula but different functional group are known as functional group isomerism.

For example.

a) Ethyl alcohol and dimethyl ether (MF: C_2H_6O)

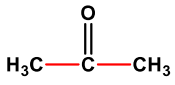


Ehtyl alcohol

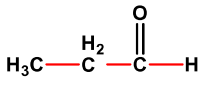


Dimethyl ether

b) Acetone and propionaldehyde (MF: C_3H_6O)

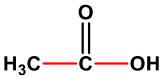


Acetone

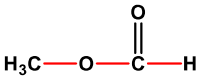


Propionaldehyde

c) Acetic acid and methyl formate (MF: $C_2H_4O_2$)



Acetic acid

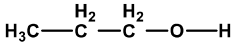


Methyl formate

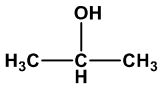
iii) Positional isomerism: If different compounds, belonging to same homologous series, with same molecular formula but differ in the position of the same functional group on the carbon chain, the compounds are called as positional isomers.

Examples of this type of isomers are:

a) 1-Propanol and 2-Propanol (MF: C_3H_8O)

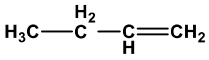


1-propanol

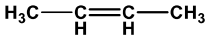


2-propanol

b) 1-Butene and 2-Butene (MF: C_4H_8)

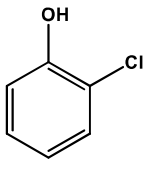


1-Butene

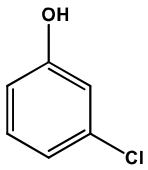


2-Butene

c) 2-Chlorophenol and 4-chlorophenol (MF: C_6H_5OCl)



2-Chlorophenol

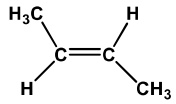


3-Chlorophenol

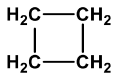
iv) Ring-chain isomerism: Compounds with same molecular formula but differ the linkage of carbon atoms, isomers either have open chain or closed ring, those isomers are called as ring-chain isoemers.

Examples of this type of isomers are:

a) 2-Butene and Cyclobutane (Mol. Formula: C_4H_8)

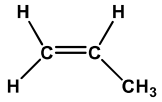


2-Butene

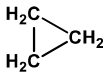


Cyclobutane

b) Propene and Cyclopropane (Mol. Fomula: C_3H_6)



Propene

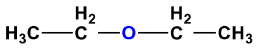


Cycloprapane

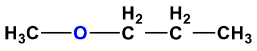
v) Metamerism: This type of isomerism is due to the unequal distribution of carbon atoms on either side of functional group in the molecule of compound belonging to same homologous series. The individual isomer is called as metamer.

Examples:

a) Diethyl ether and Methyl-propyl ether (mol. Formula: $C_4H_{10}O$):

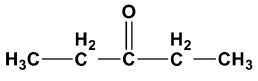


Diethyl ether

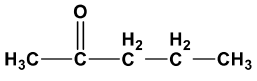


Methyl Propy ether

b) 3-Pentanone and 2-Pentanone (mol. Formula: $C_5H_{10}O$):

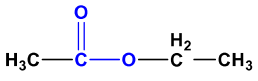


3-pentanone

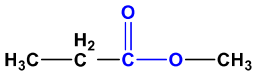


2-Pentanone

c) Ethyl acetate and Methylpropanoate (Mol. Formula: $C_4H_8O_2$):



Ethyl acetate

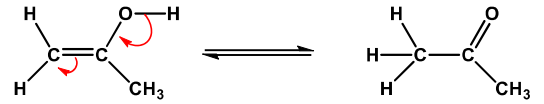


Methyl propanoate

vi) Tautomerism: The isomers, which are inter convertible and coexist with each other, at equilibrium, are called as tautomers and this phenomenon is called as tautomerism. In most of the cases, tautomerism is due to shifting of hydrogen atom one atom to other with the rearrangement of single and double bonds.

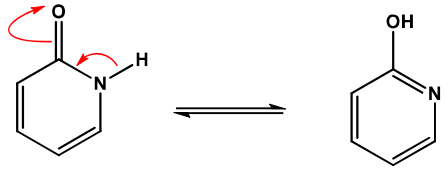
For examples:

a) Propenol (enol form) and Acetone (keto form) [MF: C_3H_8O]:



Propenol (enol form) Acetone (keto form)

b) Pyridinone and Pyridinol (MF: C_5H_5NO)



pyridin-2(1*H*)-one pyridin-2-ol

B) Stereoisomerism: The compounds, which have same molecular formula and same connectivity but differ in the three-dimensional orientations of their atoms or groups in space, called as stereoisomers and the phenomenon is stereoisomerism. In other words, stereoisomerism is exhibited by such compounds, which have same molecular formula but different configuration.

Stereoisomers are not structural or constitutional isomers; they have the same molecular formula and sequence of bonded atoms (constitution).
It is sub-divided into following two types –

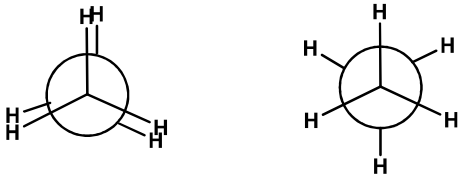
i) Conformational isomerism
ii) Configurational isomerism

i) Conformational or Rotational Isomerism

The stereoisomers, which have different spatial arrangement of atoms or groups about C-C single bond and can be obtained by rotation of C-C single bond, are called as conformational isomers (conformers) or rotational isomers (rotamers) or conformations and the phenomenon is conformational or

rotational isomerism.

We get number of different arrangements while rotating C-C single bonds around its axis, but mainly two important types of conformations of ethane i.e. eclipsed and staggered conformations represented by Newman projection formula are as shown below.



Eclipsed Staggered

Conformations: The conformational or rotational isomers are the conformations. These are non-isolable and easily inter-convertible from one form to other as the energy barrier between them is rather very small.

ii) Configurational isomerism

The stereoisomers, which cannot be converted into one another by rotation around a single bond. The structures of the compounds differencing in the arrangement of atoms or groups around the particular atom in the space.

The two main types of configurational isomers are geometric isomers and optical isomers.

a) Geometrical Isomerism

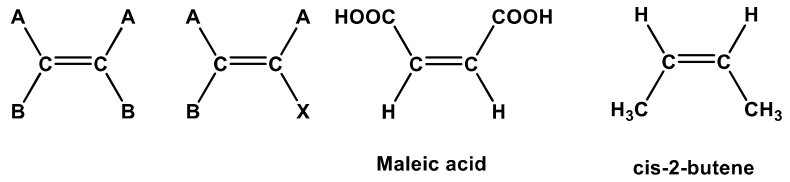
The stereoisomers which have different geometrical arrangement of atoms or groups due to restricted rotation about the carbon-carbon double bond (C=C) are called as geometrical isomers and the phenomenon is geometrical isomerism.

There are two types of geometrical isomers.

Cis Isomer - The geometrical isomer in which similar atoms or groups are at the same side of restricted bond (C=C) is called as cis geometrical isomer or cis isomer.

Example …

Maleic acid and ci-2-butene

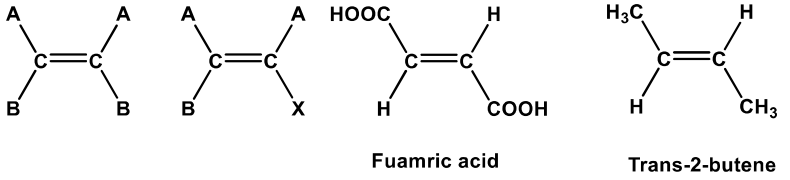


Maleic acid cis-2-butene

Trans Isomer - The geometrical isomer in which similar atoms or groups are at the diagonally opposite side of restricted bond (C=C) is called as trans geometrical isomer or trans isomer.

Example …

Fumaric acid and trans-2-butene



Fuamric acid Trans-2-butene

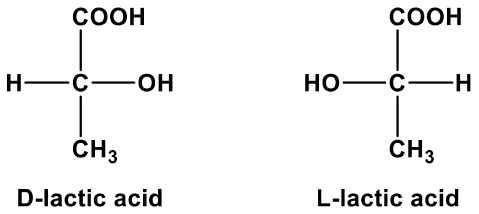
b) Optical isomerism

The stereoisomers, which have different arrangement of atoms or groups about chiral or asymmetric center and hence differ in optical properties, are called as optical isomers and the phenomenon is optical isomerism.

It may also defined as the stereoisomers which rotate the plane polarized light to some extent in opposite direction about chiral or asymmetric center are called as optical isomers and the phenomenon is optical isomerism.

Optical isomerism arises due to the chirality or asymmetry of molecule. It is generally observed in compounds, which have at least one chiral or asymmetric carbon atom. The carbon with four different atoms or groups attached to it is called as chiral or asymmetric carbon.

Examples …
d-Lactic acid and *l*-Lactic acid



Configurations: The optical and geometrical isomers are the configurations. These are isolable and not easily inter-convertible from one form to other.

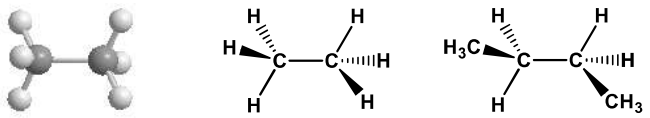
2. Projection Formula:

Before we discuss the details of isomerism let us first learn how a formal two-dimensional representation of a three-dimensional structure of the molecule obtained by projection of bonds (symbolized as lines) onto a plane with or without the designation of the positions of relevant atoms by their chemical symbols. A projection formula which indicates the spatial arrangement of bonds is called a projection formula or stereo-chemical formula. Examples are wedge and dotted line formula, Fischer projection formula, Newman projection formula and sawhorse projection formula.

a) Wedge and dotted line formula:

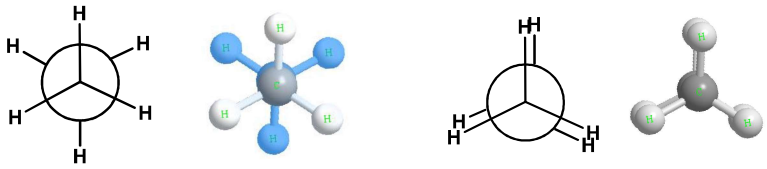
In this representation, one of the C-C bonds is in the plane of the paper. The other bonds to carbon atoms are classified into three types.
The bonds, which lie in the plane of the paper, are indicated by normal line (—).

The bonds projecting towards the observer or above the plane represented by wedge or thick bond (▬).
The bonds projecting away from the observer or below the plane represented by dotted line (-----).



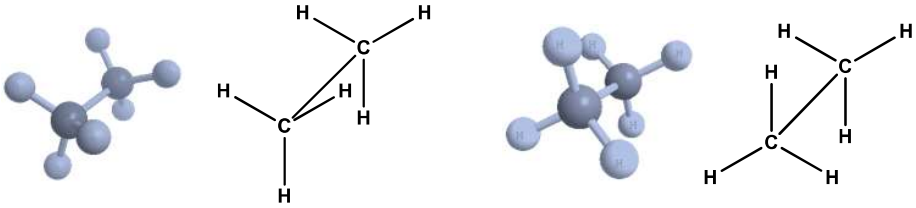
b) Newman projection formula:

The molecule is viewed along the C-C single bond axis keeping one carbon atom in front of us. Front carbon atom by circle point and remaining three bonds drawn up to the center of the circle point making an angle 120° which each other. Rear carbon atom is exactly behind the front carbon and represented by a circle the remaining three bonds drawn up to the edge/periphery of the circle.



c) Saw horse projection formula:

a. The bond between the carbon atoms is diagonally, implying that it runs downwards through the plane of the paper and is slightly elongated.
b. The substituents on each of the carbons are then projected on the plane of paper making an angle 120° with each other.
c. The substituents thus can be represented as Eclipsed or Staggered.



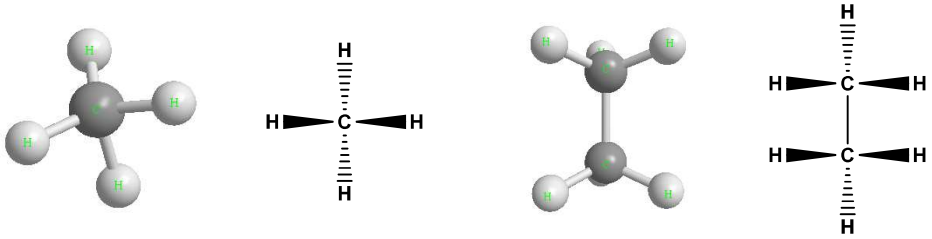
Eclipsed ethane

Staggered ethane

d) Fischer projection formula:

The molecule is oriented in such a way that the carbon chain becomes vertical.

Horizontal bonds are towards the observer or above the plane while vertical line groups are away from the observer or below the plane.



Methane Ethane

3. Conformational isomerism:

The isomers which, can be obtained by rotation about C–C single bond, are called as conformers or conformations and the phenomenon is known as conformational isomerism. All conformations have identical structural formula but different arrangement of atoms or group of atoms in space.

e.g. ethane (C_2H_6), propane (C_3H_8), butane (C_4H_{10})

(Note: Conformational isomers are normally best seen using Newman Projections, so this structural representation will be used in this section)

A) Conformational isomerism of ethane (C_2H_6 i.e. CH_3-CH_3)

Pitzer (1936): postulates that there is potential energy barrier, which causes restriction of rotation.

The term torsional strain is used for the repulsion felt by boding electrons on the substituent when it passes close to the bonding electrons of next substituents.

Dihedral angle: The angle between non-bonded atoms or different groups. Dihedral angle changes from 0° to 360° by rotation along C-C single bond.

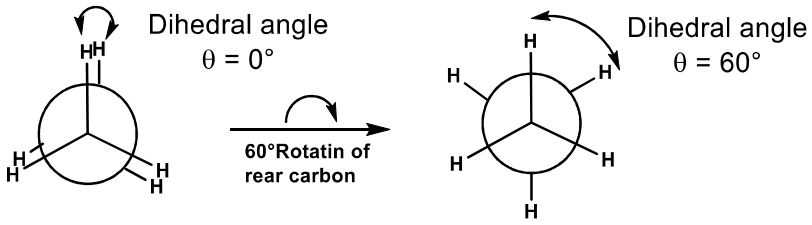


Fig: Eclipsed to Staggered by rotation of one carbon with angle 60º.

Calculations of relative potential energies:

We should be able to calculate the relative stability orders. For this it is necessary to find out the magnitude of the interactions of different groups

in any conformations. As the staggered conformations of ethane is considered with zero potential energy and eclipsed conformation is 3.0 kcal/mole. In this way we can calculate relative potential energies of the molecules as shown below.

Table: Energies of interactions of different groups

Interactions (dihedral angle 60°)	**Relative Energy**	**Interactions (dihedral angle 0 °)**	**Relative Energy**
1. H-H Gauche	0	1. H-H Eclipsed	1
2. CH_3-H Gauche	0	2. CH_3-H Eclipsed	1.3
3. CH_3-CH_3 Gauche	0.9	3. CH_3-CH_3 Eclipsed	2.1 – 4.0

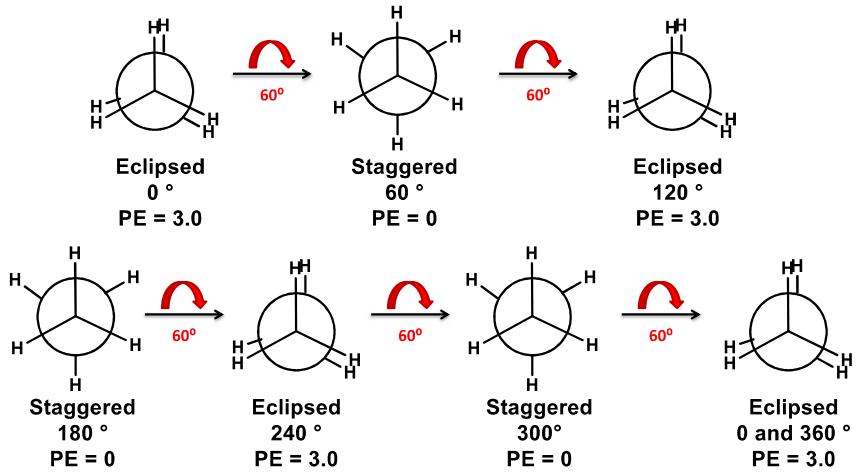
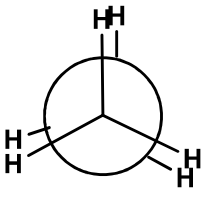


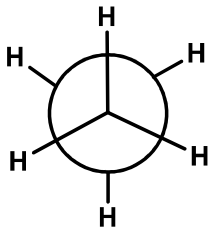
Fig: Conformation or ethane (C_2H_6)

i. Eclipsed conformations: C-H bond of the front carbon are eclipsed with C-H bonds of rear carbon atom. In this conformation two hydrogen atoms are maximum close to each other (i.e. dihedral angle 0°, 120°, 240°, 360°) is called as eclipsed conformation. As the C–C bond undergoes rotation such that the molecule goes from a staggered to an eclipsed conformation, the molecule experiences strain. This type of strain is called



torsional strain. The sigma bonding electrons along C-H bonds, which are closer, will repel each other this is called as nonbonded torsional interaction; because of this internal energy of the molecule rises to maximum hence, eclipsed conformation is unstable. The energy of the eclipsed conformation is higher by 3.0 kcal/mole than the staggered conformation.

ii. Staggered conformation: The lowest energy conformation of ethane is called the 'staggered' conformation, in which all of the C-H bonds on the front carbon are positioned at dihedral angles of 60°relative to the C-H bonds on the back carbon making C-H bonds maximum away from each other (i.e. dihedral angle 60°, 180°, 300°). In this conformation, hydrogen atoms are maximum apart from each other therefore staggered conformation is more stable and hence more preferred conformation.



iii. Potential energy diagram:

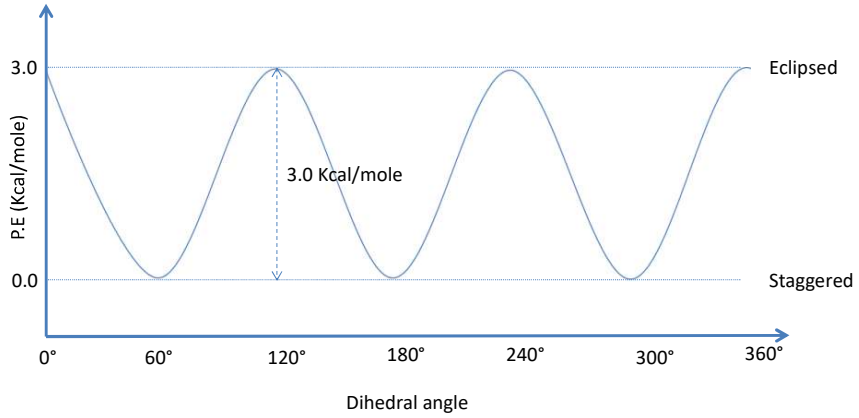


Fig: Potential energy changes with dihedral angle

- All eclipsed conformations have same energy same stability similarly all staggered conformations have same energy and hence same stability.
- Eclipsed conformation has higher energy that staggered Conformation. Hence staggered conformation is more stable
- Energy barrier between these two is very small i.e. 3.0 Kcal/mole
- At room temperature the KE of molecule is much higher (20

Kcal/mole). Therefore, ethane molecule continuously interchanges between these two conformations. Hence

Eclipsed and staggered conformations of ethane cannot be separated from each other.

B) Conformational isomerism of propane (C_3H_8 i.e. CH_3-CH_2-CH_3)

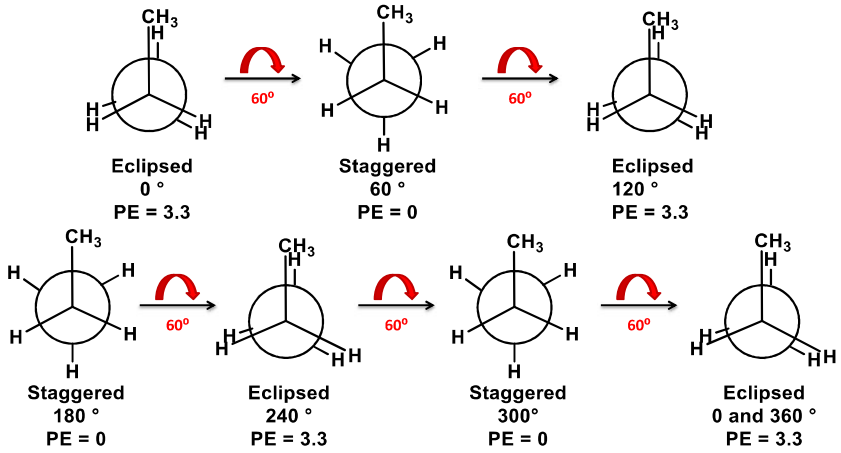


Fig: Conformation or propane (C_3H_8)

Propane is the next member of the alkane family. Conceptually, propane can be viewed as ethane with one methyl substituent. Propane also exists in two forms i.e. eclipsed and staggered conformations.

The various types of conformations of ethane having different spatial arrangement of H and $–CH_3$ group about C-C single bond are represented by Newman projection formula as shown below.

Instead of analyzing both C-C bonds at the same time, it is more convenient to look at a single C-C and generalize the behavior of the remaining methyl group. The Newman projections show that propane has a set of eclipsed and staggered conformations similar to ethane.

i. Eclipsed conformations: C-H bond of the front carbon are eclipsed with C-H bonds of rear carbon atom. In this conformation bonds are maximum close to each other (i.e. dihedral angle 0°, 120°, 240°, 360°) is called as eclipsed conformation. In eclipsed conformation, bonds of back carbon atom lie exactly behind the bonds of front carbon atom.

We know from ethane, that each C–H/C–H eclipsing interaction 'costs' about 1.0 kcal/mole, so we can assign a value of about 1.3 kcal/mole

to the C–C/C–H eclipsing interaction in propane because the size of methyl group (-CH_3) is much larger than that of H atom and hence some steric strain is also added in the eclipsed conformation of propane. Each eclipsed conformation now consists of two eclipsed C-H bonds and one C-H eclipsed with a C-CH_3 bond. The energy barrier for propane in between eclipsed and staggered conformation is 3.3 kcal/mole.

ii. Staggered Conformation: The lowest energy conformation of propane is called the 'staggered' conformation, in which the C-CH_3 bond on the front carbon are positioned at dihedral angles of 60° relative to the C-H bonds on the back carbon making C-H bonds maximum away from each other (i.e. dihedral angle 60°, 180°, 300°). In this conformation, methyl group and hydrogen atoms are maximum apart from each other therefore staggered conformation is more stable with 0.0 kcal/mole potential energy and hence more preferred conformation.

iii. Potential energy diagram:

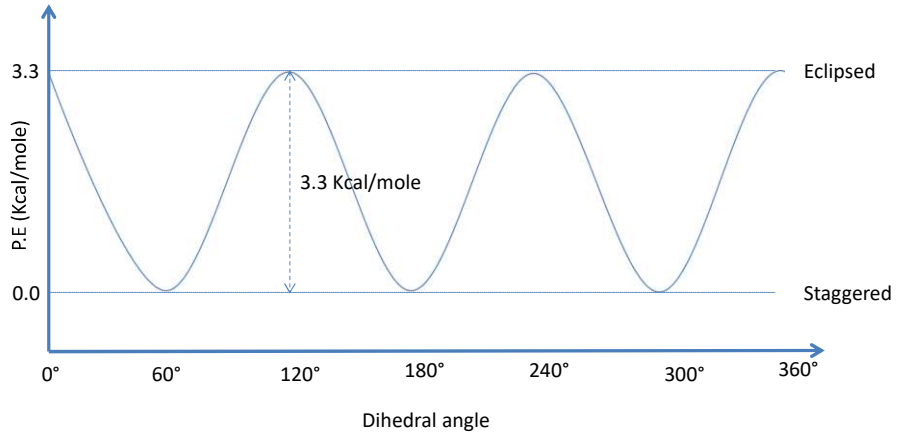


Fig: Potential energy changes with dihedral angle

All eclipsed conformations have same energy same stability similarly all staggered conformations have same energy and hence same stability.

Eclipsed conformation has higher energy that staggered Conformation. Hence staggered conformation is more stable

Energy barrier between these two is very small i.e. 3.3 Kcal/mole

At room temperature, the potential energy of molecule is much higher (20 Kcal/mole). Therefore, propane molecule continuously interchanges between these two conformations. Hence, eclipsed and staggered

conformations of ethane cannot be separated from each other.

C) Conformational isomerism of n-butane (C_4H_{10})

When one hydrogen atom on each carbon of ethane is replaced by methyl groups then we get n-butane; can be considered as di-substituted ethane. Butane, C_4H_{10}, has many conformations since its dihedral angles could vary across three C-C bonds. We focus on the central C2–C3 bond and treat the end carbons generally as methyl groups. Conformation of butane is more complex than ethane or propane. For ethane or propane, the three eclipsed forms are identical in energy, as are the three staggered forms. These structures are degenerate. Such degeneracy is broken in butane, which has two different eclipsed conformations and two different staggered conformations. These conformations differ by the relative positions of the two methyl substituents.

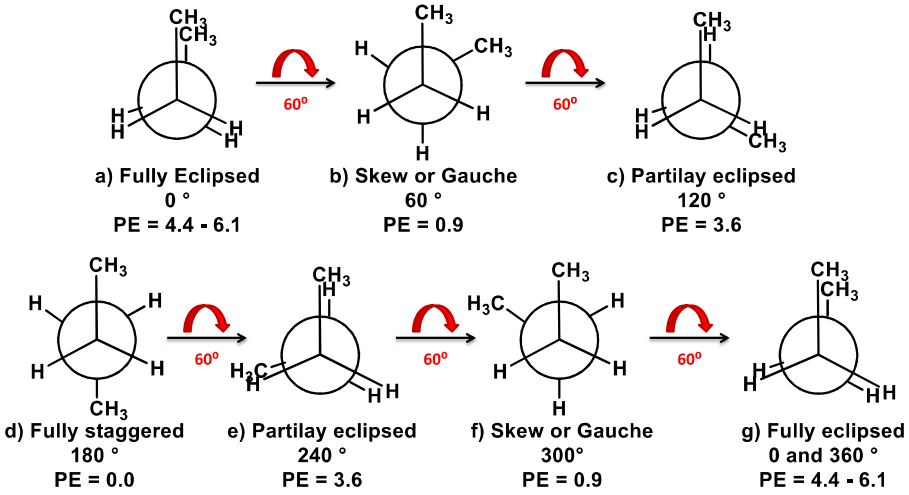


Fig: Conformation or propane (C_4H_{10})

i. Fully eclipsed conformations:

In this form the large sized $-CH_3$ groups are eclipsed (i.e. dihedral angle 0° & 360°). Hence, there will be large strong non-bonding repulsions i.e. torsional strain between them. Similarly, there are steric interactions between two bulky methyl groups. Therefore its high-energy conformation having least stability. We know from ethane that each C–H/C–H eclipsing

interaction increases potential energy with 1.0 kcal/mole. About 2.1−4.0 kcal/mole to the C–CH_3/C–CH_3 eclipsing interaction in butane because the size of methyl group (-CH_3) is much larger than that of H atom and hence, some steric strain is also added in the eclipsed conformation of butane. The potential energy of this conformation will high i.e. around 4.4-6.1 kcal/mole.

ii. Skew or Gauche conformation:

In this form methyl groups are closer to each other making an angle 60° to each other (i.e. dihedral angle 60° & 300°) is called as skew or gauche conformation. The torsional strain becomes small; i.e. 0.9 kcal/mole.

iii. Partially eclipsed conformation:

In this form two CH_3,H eclipsing and one H,H eclipsing interaction (i.e. dihedral angle 120° and 240°) is called as partially eclipsing. Energy of this should be less than that of fully eclipsed conformation. Its potential energy is 3.6 kcal/mole.

iv. Fully staggered or anti conformation:

In this form Methyl, groups making an angle i.e. dihedral angle 180°; the resulting conformation is called as fully eclipsed conformation. All hydrogen atoms and methyl groups are maximum apart from each other. Therefore, the torsional strain and steric strain are minimum. Hence, this is most stable conformation with 0.0 kcal/mole energy and the most preferred conformation of n-butane.
From this, we can write the stability order for conformations of n-butane as follows

Fully staggered > skew/Gauche > Partially staggered > Fully eclipsed
0.0 kcal/mole > 0.8 – 0.9 > 3.4 – 3.6 > 4.4 – 6.1

v. Potential Energy diagram:

Most conformational interconversions in simple molecules occur rapidly at room temperature. Consequently, separation of conformations from each other is not possible.

Four types of specific conformers require special nomenclature terms such as *fully eclipsed*, *gauche, partially eclipsed* and *fully staggered or anti*.

Conformers may also be designated by dihedral angles. In the butane conformers shown above, the dihedral angles formed by the two methyl groups about the central double bond are 0º, 60º, 120º & 180º.

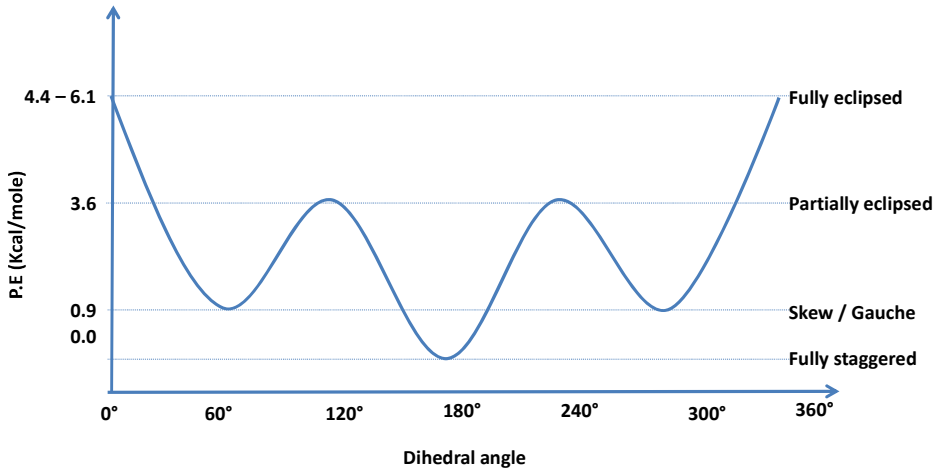


Fig: Potential energy changes with dihedral angle

Staggered conformations about carbon-carbon single bonds are more stable (have a lower potential energy) than the corresponding eclipsed conformations. The higher energy of eclipsed bonds is known as **eclipsing strain**.

In butane, the gauche-conformer is less stable than the fully staggered conformer by about 0.9 kcal/mole. This is due to a crowding of the two methyl groups in the gauche structure, and is called **steric strain** or **steric hindrance**.

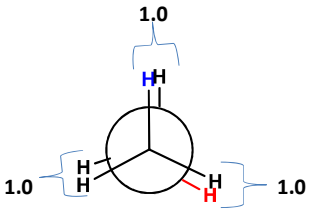
Butane conformers with dihedral angle 60 º & 120 º have non-identical mirror image structures in which the clockwise dihedral angles are 300º & 240º respectively.

4. Calculations of relative potential energies:

While studying the conformations of aliphatic hydrocarbons we should be able to calculate the relative potential energies of different conformations of any molecule so that we can determine their stability orders. For this, it is necessary to find out the magnitude of the interactions of different groups in any conformation. We should able to draw particular conformation properly and calculate the energies of each conformation by using values from table given below.

Table: Energies of interactions of different groups

Interactions (dihedral angle 60°)	Relative Energy	Interactions (dihedral angle 0°)	Relative Energy
1. H-H Gauche	0	1. H-H Eclipsed	1
2. CH_3-H Gauche	0	2. CH_3-H Eclipsed	1.3
3. CH_3-CH_3 Gauche	0.9	3. CH_3-CH_3 Eclipsed	2.1 – 4.0



Eclipsed ethane

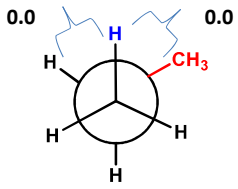
Examples:

Eclipsed ethane

Each H, H eclipsing = 1.0 kcal/mole

3 (H, H eclipsing) X 1.0 = 3.0 kcal mole

∴ Total potential energy = 3.0 kcal/mole



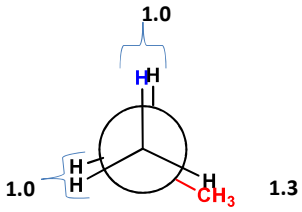
Staggered propane

Staggered propane

Each H, H gauche = 0.0 kcal/mole

Each H, CH_3 gauche = 0.0 kcal mole

∴ Total potential energy = 0.0 kcal/mole



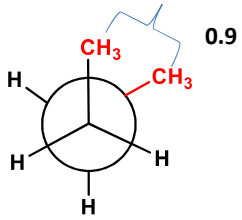
Eclipsed propane

Eclipsed propane

Each H, H eclipsing = 1.0 kcal/mole

Each H, CH_3 eclipsing = 1.3 kcal mole

∴ Total potential energy = 3.3 kcal/mole



Gauche butane

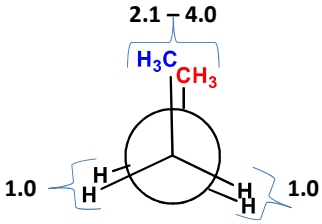
Gauche butane

Each H, H gauche = 0.0 kcal/mole

Each H, CH_3 gauche = 0.0 kcal mole

Each CH_3, CH_3 gauche = 0.9 kcal mole

∴ Total potential energy = 0.9 kcal/mole



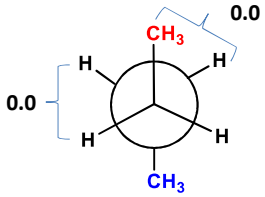
Fully eclipsed butane

Fully eclipsed butane

Each H, H eclipsing = 1.0 kcal/mole

Each CH_3, CH_3 eclipsing = 2.1 – 4.0 kcal mole

∴Total potential energy = 4.1 – 6.0 kcal/mole



Fully staggered butane

Fully staggered butane

Each H, H gauche = 0.0 kcal/mole

Each H, CH_3 gauche = 0.0 kcal mole

∴Total potential energy = 0.0 kcal/mole

5. Geometrical isomerism:

The isomers, which possess the same structural formula but differ in the spatial arrangement of the groups around the double bond, are known as geometrical isomers and the phenomenon is known as geometrical isomerism. The C-C double bond is rigid i.e. rotation about the carbon-carbon double bond is restricted and gives rise to geometrical isomerism. This isomerism is shown by alkenes or their derivatives.

When similar groups lie on the same side of the double bond, it is cis-isomer (Latin on this side); while when similar groups lie on opposite sides, the isomers are trans-isomer.

Examples:

trans-2-butene
bp = +1°C

cis-2-butene
bp = +4°C

Fumaric acid (trans)
bp = 287°C

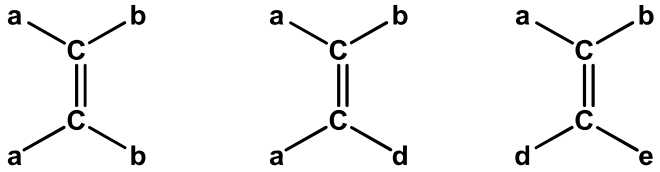
Maleic acid (cis)
bp = 130°C

These are pairs of isomers indicated by their different physical constants. They are not mirror images of each other and hence they are diastereomers. Particular types of diastereomers which are existed due to restricted rotation about double bonds are called as geometrical isomers.

Remember that geometrical isomerism is possible only when each of

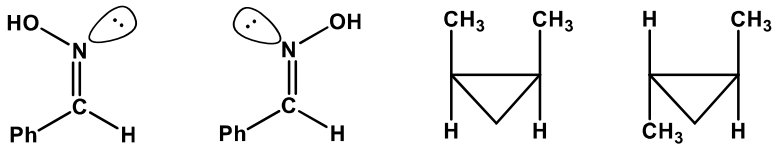
the double bonded carbon atom has two different groups. Thus, compounds of following type will show geometrical isomerism

Note that similar atoms (groups) on one or both of the carbon atoms (Caa = Cab or Caa = Cbb or Cbd = Caa) then those compounds will not show geometrical isomerism.



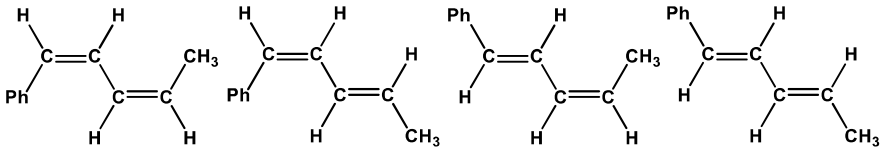
Geometrical isomerism is also shown by compounds containing C=N or aliphatic cyclic compounds.

Examples



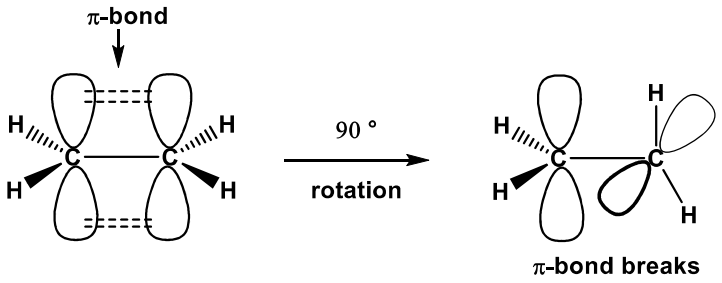
Syn (cis) aldoxime Anti (trans) aldoxime cis trans (1,2-dimethylcyclopropane)

Number of geometrical isomers present in a molecule is given by 2^n where n is the number of double bonds. e.g. 1-phenyl-1,3-pentadiene can exist in $2^2 = 4$ isomeric forms.



cis, cis cis, trans trans, cis trans, trans

a) Cause of Geometrical Isomerism: The geometrical isomerism is caused by the restricted rotation about the double bond. In alkenes the bond is formed by the lateral overlap of atomic p-orbitals which are perpendicular to the plane of the sigma bonds. For the conversion of cis isomer into trans isomer, one of the carbon atom must be rotated by 180^o about the sigma bond. This rotation will decrease the overlap and thus pi-bond breaks. This requires energy around 60-70 Kcal/mol and this energy barrier restricts the rotation about the double bond. Hence, all the groups position will fixed w.r.t double bond that causes geometrical isomerism.



b) "E" and "Z" isomerism:

This of configurational isomerism was developed in 1968. This system is known as E-Z system of nomenclature and is based upon the sequence rules of Cahn, Ingold and Prelog can be called as CIP rules.

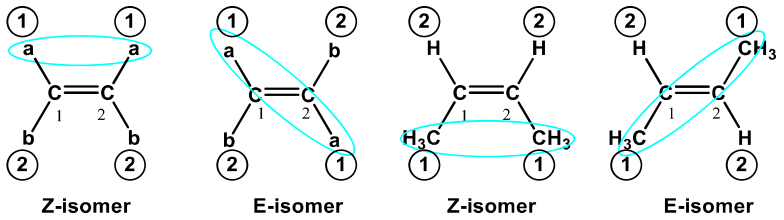
In this system, the configuration of geometrical isomers is decided on the basis of following rules.

1. Locate the double bonded carbon atoms in molecule (geometrical isomer).
2. Assign priority separately to the different atoms or groups attached to each double bonded carbon atom as per the priority rules given below.
3. If molecule contains more number of double bonds then configuration at each double bond is to be specified independently.

Z-Configuration: The configuration in which higher priority atoms or groups attached to each double bonded carbon atom are at same side of double bond (C=C) is called as Z-configuration (Z : Zusamen i.e. together / same side).

E-Configuration: The configuration in which higher priority atoms or groups attached to each double bonded carbon atom are at diagonally opposite side of double bond (C=C) is called as E-configuration (E : Entgegen i.e. opposite side).

Examples



Important note: cis isomer may have E or Z configuration similarly trans isomer may have E or Z configuration.

c) Rules for assignment of priorities:

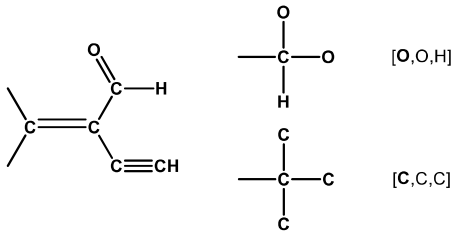
1. Atomic number: Priority depends on atomic number. The atoms or first atom of the group directly attached to the double bonded carbon of higher atomic number gets first priority and lower atomic number get second priority.
e.g. $_{58}I > _{35}Br > _{17}Cl > _{16}S > _{9}F > _{8}O > _{7}N > _{6}C > _{1}H$

2. Atomic mass: If two atoms are the isotopes of the same element then the atom of highest mass number should give higher priority.
e.g. $_1H^1 > _1H^2 > _1H^3$ or $_{17}Cl^{37} > _{17}Cl^{35}$

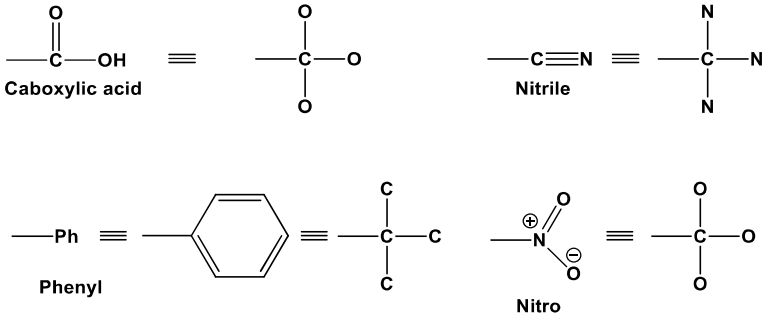
3. Next atom: If both atoms attached to the double bonded carbon are same, then we compare next atoms attached to those first atoms.
e.g. **–**CH_2-CH_3 and **-**CH_3
Here for both ethyl and methyl groups, first atoms are same i.e. carbon and their attachments (next atoms) are [**C**,H,H] and [**H**,H,H] with atomic numbers **6**,1,1 and **1**,1,1 respectively. (We should know the proper bonding of each group. We must write these next atoms with decreasing atomic numbers). First next atom of ethyl group is carbon having higher atomic number i.e. $_6C$ will get first priority as compare to methyl group with next atom is having less atomic number i.e. $_1H$.

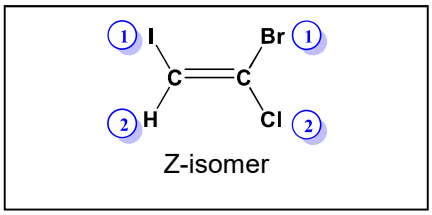
4. Next to next atom: If key atoms have same atomic number and their attachments are also same then the key atoms with next or second attachments of higher atomic number atoms have higher priority.
e.g. **-**CH_2-CH_2-Br > **-**CH_2-CH_2-Cl Here for both bromo-ethyl and chloro-ethyl groups, key atoms are same i.e. carbon and their attachments are also same i.e. C,H,H. Their next attachments are [Br,H,H] and [Cl,H,H] with atomic numbers 351,1, and 171,1, respectively. First next atom of ethyl group is bromine having higher atomic number i.e. $_{35}Br$ will get first priority as compare to ethyl group with next atom is having less atomic number i.e. $_{17}Cl$.

5. Groups containing multiple bonds: If the group directly bonded to the olefinic carbon contains double or triple bond, it is considered to be equivalent to two or three single bonds with the same atom respectively and then the sequence order is decided.



$_8O > _6C$
$\therefore$ -CHO > -C≡CH

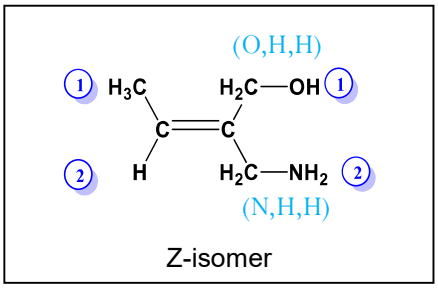




Solved examples:

Priorities at **C1**: I > H; **C2:** $_{35}$Br > $_{17}$Cl

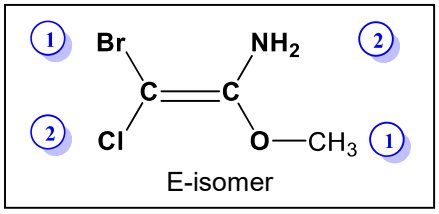
In this molecule, highest priority groups are on the same side of the double bond and hence it has Z-configuration.



Priorities at **C2**: -**C**H_3 > -**H**;

C3: -CH_2**O**H > -CH_2**N**H_2 (first atoms are Carbons same in both groups hence next three atoms are attached to that carbon atoms are considered for priorities)

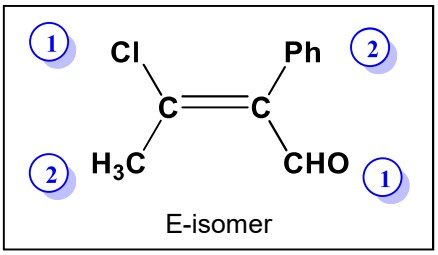
For this molecule first priority are on the same side of the double bond and hence is has Z-configuration.



Priorities at **C1:** -Br > -Cl;

C2: -**N**H_2 > -**O**CH_3

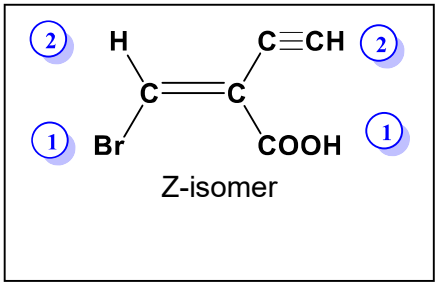
In this molecule highest priority groups are on the opposite side of the double bond and hence it has E-configuration



Priorities at **C2:** -**Cl** > -**C**H_3

C3: -**Ph** > -**CHO** (first atoms are Carbons same in both groups hence next three atoms are attached to that carbon atoms are considered for priorities i.e. [**O**,O,H] > [**C**,C,C].

In this molecule highest priority groups are on the opposite side of the double bond and hence it has E-configuration

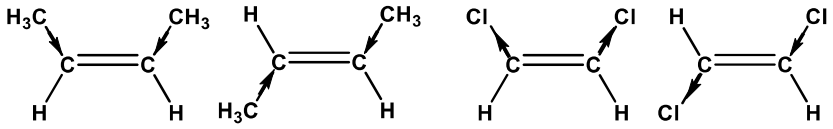


Priorities at C1: -**Br** > -**H**;
C2: -**C**≡CH > -**C**OOH (first atoms are Carbons same in both groups hence next three atoms are attached to that carbon atoms are considered for priorities i.e. [**O**,O,O] > [**C**,C,C].
In this molecule highest priority groups are on the same side of the double bond and hence it has Z-configuration

d) Physical properties of geometrical isomerism:

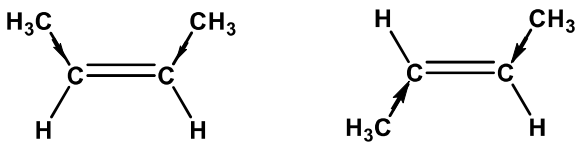
Geometrical isomers have different physical properties such as melting points, boiling points, refractive indices solubilities, densities etc. Geometrical isomers can be distinguished and separated from each other on the basis of these different physical properties.

i. Dipole moments: Generally, cis-isomers have greater dipole moment as compare to trans-isomer. In case of cis-isomers similar groups being on the same side, the electronic effect are additive; while in case of trans-isomer similar groups are on the opposite side, the electronic effect cancel each other.



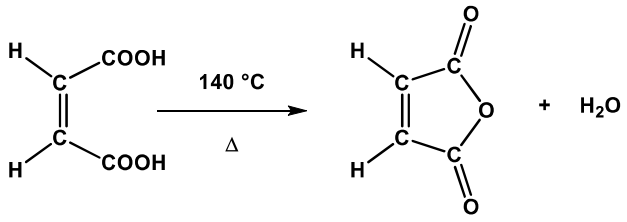
Cis-2-butene	trans-2-butene	Cis	trans
= 0.4 D	= 0.0 D	= 1.85 D	= 0.0 D

ii. Boiling Points: Generally, a cis-isomer has higher boiling point as compared to the trans-isomer. This is because of higher dipole moment and higher polarity in the molecule, which acts as the binding force and is responsible for higher boiling point of cis isomer. Boiling point of cis-2-butene 277 K while trans-2-buteneboils at 274 K.

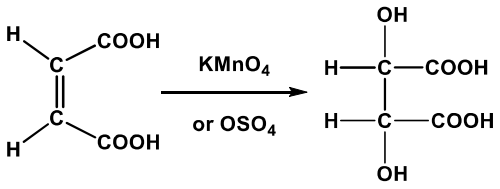


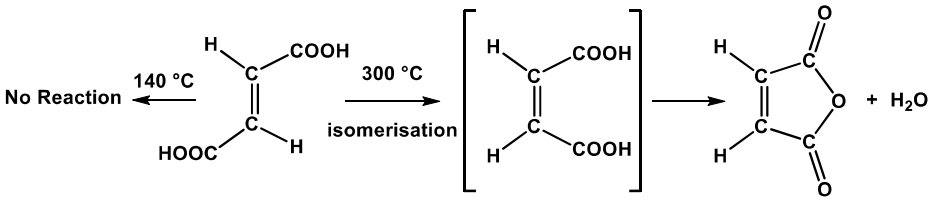
Cis-2-butene	**trans-2-butene**
bp = 277 K	**bp = 274 K**

iii. Formation of cyclic compounds: The cis and trans not only differ in their physical properties but also in their chemical reactivities. Generally, the cis isomer readily undergoes cyclization while trans isomer cannot cyclize under identical condition. For example, maleic acid readily loses water when heated to about 140 °C, to give an anhydride; while fumaric acid does not give anhydride at this temperature. Rather it must be heated 300 °C to get same anhydride. Hydrolysis of anhydride yields only maleic acid.



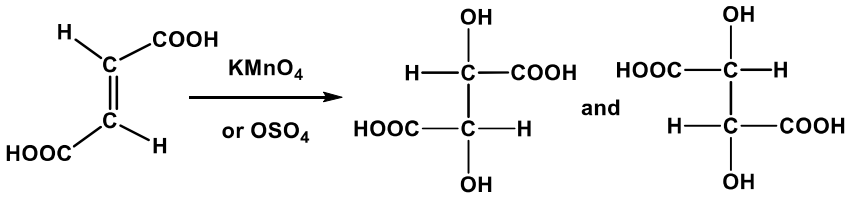
Maleic acid (cis) Maleic anhydride





Fumaric acid (trans) Maleic acid (cis) Maleic anhydride

iv. Formation of optical isomers: Maleic acid and fumaric acid both on treatment with $KMnO_4$ or OsO_4, yields optically inactive product tartaric acid. Maleic acid yields meso tartaric acid while fumaric acid yields racemic (*dl*) tartaric acid.



Fumaric acid (trans) (± or dl) tartaric acid

6. Optical isomerism:

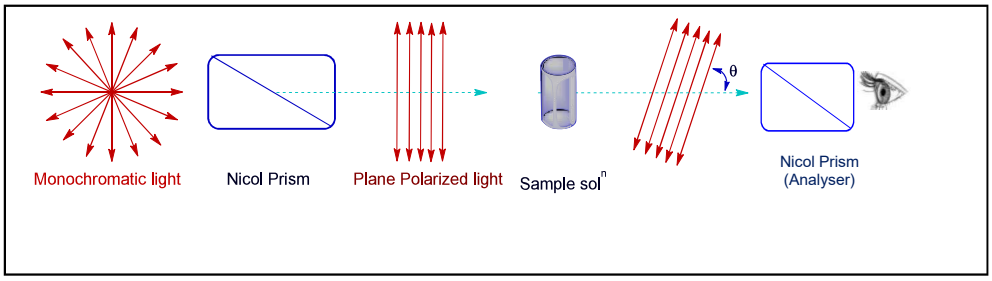
It may also defined as the stereoisomers which rotate the plane polarized light to some extent in opposite direction about chiral or asymmetric center are called as optical isomers and the phenomenon is optical isomerism. This property of the substance to rotate the plane of plane polarized light is known as optical activity.

The stereoisomers, which have different arrangement of atoms or groups about chiral or asymmetric center and hence differ in optical properties are called as optical isomers and the phenomenon is optical isomerism.

a) Optical activity:

Ordinary light has vibrations taking place in perpendicular to the direction of propagation of light in all the possible planes. If we pass ordinary light through nicol prism, vibrations in all planes except one are cur off. This light coming out or nicol prism has all vibrations only in one plane. Such light is called as plane polarized light.

When a plane polarized light is passed through the solution of such substances, the light coming out of the solution is found to be in a different plane. The plane of polarized light is rotated. Such substances, which rotate the plane of plane polarized light when placed in its path, are known as optically active substances and the phenomenon is called as optical activity. The angle of rotation (α) of plane polarized light is known as optical rotation.



The substances which rotate the plane of plane polarized light to the clockwise or right direction are known as dextrorotatory or having (+) rotation and those rotate the plane of plane polarized light to the anticlockwise or left direction are known as laevorotatory or having (-) rotation. Substance which does not rotate the plane of plane polarized light are said to be optically inactive substances.

The optical rotatory powers (angle of rotation) of two isomers are equal in magnitude but opposite in sign (direction). An equimolar mixture of such two isomers, therefore will not rotate the plane of plane polarized light at all; this mixture is said to be Racemic mixture or racemic modification.

The instrument used for measuring optical rotation is called polarimeter. It consists of a light source, two nicol prisms and is between a tube to hold the solution of organic substance. The schematic representation of a polarimeter given below

b) Specific rotation: Angle of rotation of plane polarized light of optical rotation (α) of an organic substance depends not only on the type of molecules but also varies with the concentration of molecules and the length of polarimeter tube containing it. Simultaneously it depends on temperature, wavelength of light and nature of solvent used.

The optical activity of a substance is expressed in terms of specific rotation. $[\alpha]_{\lambda}^{t}$ which is a constant quantity, characteristics of a particular substance,

$$[\alpha]_{\lambda}^{t} = \frac{\alpha}{l \times c}$$

Where,

α = observed rotation in degrees

l = length of polarimeter tube in decimeter

c = concentration of substance in gm per ml of solution

t and λ signify the temperature and wavelength of light used.

When $l = 1$ *and* $c = 1$, $[\alpha]_{\lambda}^{t} = \alpha$

"Specific rotation is thus defined as the optical rotation produced by a compound when plane polarized light passes through one decimeter length of solution having concentration one gram per milliliter."

Usually the monochromatic light used is D line of sodium (λ = 590 nm). Thus specific rotation of cane sugar can be expresses as

$[\alpha]_{D}^{25^{\circ}C} = +66.5\ ^{\circ}$(water)

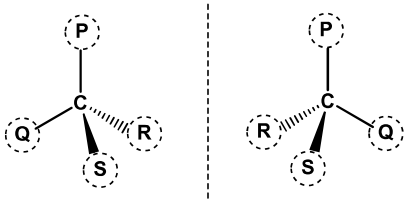
In this expression D stands for D line sodium, 20 ℃ is temperature

of measurement, +ve sign shows the dextrorotation and water is a solvent used.

c) Enantiomers:

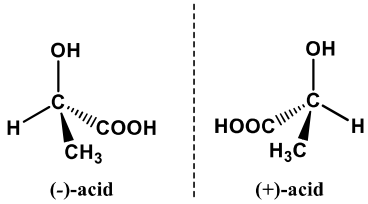
Louis Pasture, while studying the crystallography of salts of tartaric acid made a peculiar observation. He observed that optically inactive sodium ammonium tartarate existed as a mixture of two different types crystals, which were mirror images of each other. With the help of hand lens and pair of forceps, he carefully separated the mixture into two different types of crystals. These crystals were mirror images of each other and were called enantiomorphs and the phenomenon as enantiomorphism. Although the original mixture was optically inactive; each type of crystals when dissolved in water, were found to be optically active. Moreover the specific rotation of the two solutions were exactly equal but of opposite sign i.e. one solution rotated the plane polarized light to the right or clockwise while the other to the left or anticlockwise and to the same extent. Two types of crystals of solutions were identical in all other physical and chemical properties. Isomers, which are non-superimposable mirror images of each other are called as enantiomers.

According to Van't Hoff and Le Bell the four valencies of a carbon atom are directed towards corners of regular tetrahedron at the center of which lies the carbon atom. Consider a compound C_{PQRS} having four different groups P, Q, R and S attached to a carbon atom. This compound can be represented by two models, which look like mirror images of each other.



It is important to note here that these two molecules cannot be superimposed on each other i.e. they will not coincide in all their parts. We may turns them in as many ways as we like but we find that though two groups of each may coincide, the other two do not. Hence, these must represent two isomers of formula C_{PQRS}. Lactic acid $CH_3CHOHCOOH$, exists as two optically active isomers which are enantiomers i.e. mirror images of each other. Mirror images of the two compounds are represented as below.

The carbon atom, to which four different groups are attached, is known as asymmetric or chiral carbon. It is denoted by asterisk or stars trick (C*).



Equimolar mixture of (+)-acid and (-)-acid forms racemic mixture (±)-acid, optically inactive.

Enantiomers of Lactic acid
Optically active

If two of the groups attached to carbon are same, we shall observe that it is possible to superimpose the mirror images on each other. Such compound will not show optical isomerism or enantiomerism.

Hence, non-superimposability of the mirror images is responsible and essential for the type of stereoisomerism known as enantiomerism.

The term optical isomerism is used for the existence of stereoisomers, which differ in their behavior towards the plane polarized light. Thus, enantiomeric molecules are always non-superimposable mirror images of each other. The non-superimposabilty of mirror images arises due to chiral or asymmetric nature of molecule. A molecule is said to be chiral if it has no plane of symmetry and is therefore non-superimposable on its mirror image.

It may be concluded with the remarks that chirality is the fundamental condition of enantiomerism or optical isomerism.

7. Chirality

For the chirality of molecule -

1. The molecule must contain asymmetric carbon atom or chiral center i.e. carbon attached to four different groups or atoms.
2. The molecule should not have any element of symmetry i.e. plane of symmetry, simple and alternating axis of symmetry or center of symmetry).
3. The molecule should not superimpose on its mirror image.
4. The number of optical isomers are given by rule 2^n, (where n = no. of chiral centers. If compound contains one chiral center and hence there are only ($2^n = 2^2 = 2$) optical isomers.
5. The molecules containing one asymmetric carbon are chiral, the molecules containing two asymmetric carbons and no element of symmetry are again chiral but the molecules containing two asymmetric carbons and have the element of symmetry are achiral. Chiral molecules are optically active.

a) Properties of enantiomers:

1. They have identical physical but differ in direction of rotation of plane polarized light. Though the two enantiomers rotate the plane polarized light in opposite direction, the extent of rotation is the same.
2. They have identical chemical properties except towards optically active reagents. The rates of reaction of optically active reagents with two enantiomers differ and sometimes one the enantiomer does not react at all.
3. In biological system (-) or l-glucose is neither metabolized by animals nor fermented by yeast whereas (+) or d-glucose undergoes both these processes and plays in important role in animal metabolism and fermentation.
4. When equal amount of enantiomers are mixed together an optically inactive racemic mixture denoted (±) or dl is obtained.

b) Configuration

We have studied that, enantiomers have same physical and chemical properties; and although they are non-superimposable, their structures are identical, all the bond energies, bond angles and bond lengths are also same. Then how to differentiate those isomers from each other?

The arrangement of atoms that characterizes a particular stereoisomer is called its configuration.

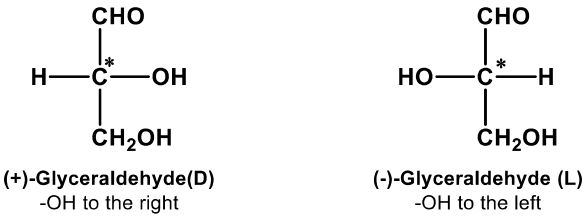
Two systems have been developed for studying the configuration of organic compounds; Relative configuration and Absolute configuration.

Relative configuration:

As early as 1890, while working in the sugar and amino acid chemistry; Sir Emil Fischer felt the requirement of establishing configurational relationship among members of a family of compounds. He established the relative configuration term. The configuration, which determine by the configuration of a molecule with that of some arbitrary chosen reference molecule is known as relative configuration. To specify the relative configuration at asymmetric carbon atom, the most common method used is D and L configuration. This is an old convention system for denoting configuration.

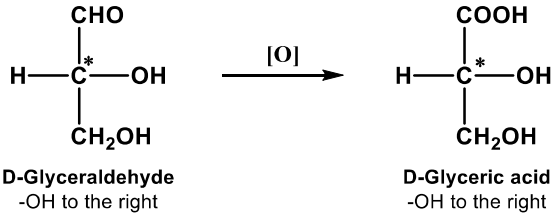
c) D and L Configuration

The reference compound chosen was glyceraldehyde. The (+) and (-) enantiomers were arbitrary assigned for configuration shown in Fischer projection.

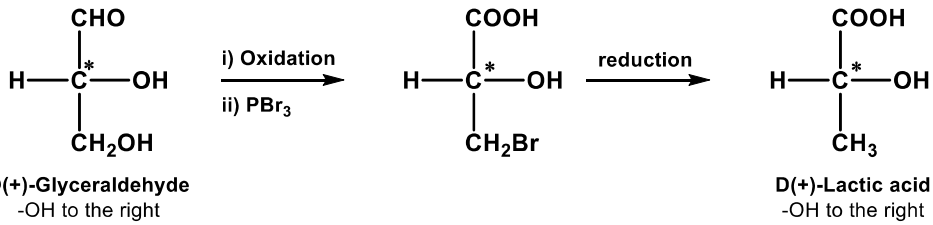


The configuration of the compound, which was taken as an arbitrary standard. (+)-glyceraldehyde, having the –OH group on the right and the hydrogen atom on the left, -CHO and -CH_2OH groups being at the top and bottom, respectively, was arbitrary given the configurational symbol D. the mirror image compound (-)-glyceraldehyde, in which the –OH group is on the left and hydrogen on right was given configuration , L.

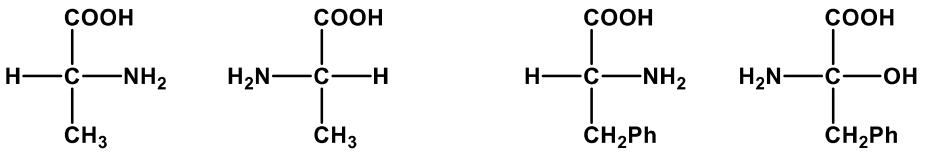
Any compound that can be prepared from, or converted into (D)(+)-glyceraldehyde will belongs to the D-series, and similarly any compound that can be prepared from, or converted into, L(-)-glyceraldehyde will belongs to the L-series. For example D(+)-glyceraldehyde can be converted to glyceric acid by simple oxidation and thus the configuration of glyceric acid obtained must be D.



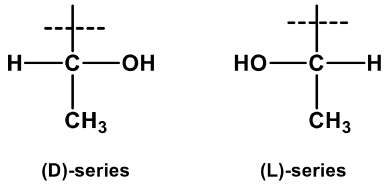
Similarly, lactic acid obtained from D(+)-glyceraldehyde in the following way is also assigned D-configuration.



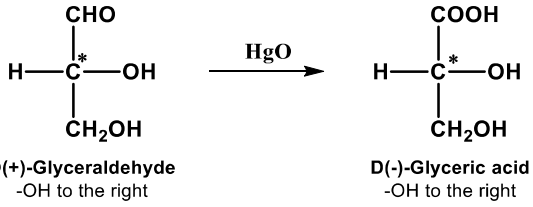
The D and L configuration nomenclature is applicable to the molecules where –OH is replaced by -Cl, -Br, -I, $-NH_2$, $-SO_3H$, and –SH.



In case of compounds having more than one asymmetric carbon atom, the configuration of lowest asymmetric carbon atom relative to glyceraldehyde unit should be considered. For this, the asymmetric carbon atom of glyceraldehyde unit is always drawn at the bottom and the rest of the part is drawn above this unit.



Remember that there is no relation between configuration (D or L) of a compound and its specific rotation i.e. a compound belongs to D-series can be (+) dextrorotatory or (-) levorotatory. e.g. D (+) glyceraldehyde on oxidation using HgO gives D (-) glyceric acid.



d) Absolute configuration (R/S system of nomenclature):

The D and L system of relating the configuration has a basic limitation that it is difficult to apply to the molecules having complicated structure and more than one asymmetric centers. These difficulties are removed by this system derived by Cahn, Ingold and Prelog in 1951. Which is based on the three dimensional formula.

It may also defined as the description, which gives arrangement of

four groups in space attached to the chiral center, is known as absolute configuration.

R and S Configuration

To specify the absolute configuration at asymmetric carbon atom, the most common method used is R and S configuration. The letter R stands for rectus i.e. right handed or clockwise and S stands for sinister i.e. left handed or anticlockwise.

e) In this system of assigning configuration involves following steps.

1. Identify the asymmetric carbon atom (C^*) in molecule and four different atoms or groups attached to it.
2. The four atoms or groups attached to the chiral carbon are assigned a sequence of priorities (1,2,3,4) by applying rules known as priority rules given below.
3. Position the lowest priority i.e. 4, down and away from the observer or going behind the plane and the remaining three groups comes up or above the plane.
4. Now look those three groups according to decreasing priority order (1>2>3). If you are moving clockwise manner, assign the configuration S to the chiral centre. If you are moving anticlockwise manner, assign the configuration R to the chiral centre.

f) Priority or sequence rules (CIP rules)

1. **Atomic number:** Priority depends on atomic number. The atoms or first atom of the group directly attached to the double bonded carbon of higher atomic number gets first priority and lower atomic number get second priority.
   e.g. $_{58}I > _{35}Br > _{17}Cl > _{16}S > _{9}F > _{8}O > _{7}N > _{6}C > _{1}H$

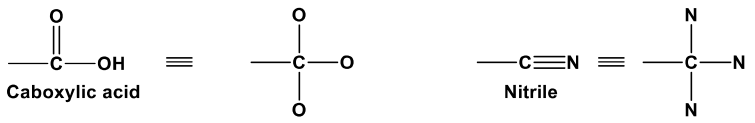
2. **Atomic mass:** If two atoms are the isotopes of the same element then the atom of highest mass number should give higher priority.
   e.g. $_1H^1 > _1H^2 > _1H^3$ or $_{17}Cl^{37} > _{17}Cl^{35}$

3. **Next atom:** If both atoms attached to the double bonded carbon are same, then we compare next atoms attached to those first atoms.
   e.g. **–C**H_2-CH_3 and **-C**H_3
   Here for both ethyl and methyl groups, first atoms are same i.e. carbon and their attachments (next atoms) are [**C**,H,H] and [**H**,H,H] with atomic numbers **6**,1,1 and **1**,1,1 respectively. (We should know the proper

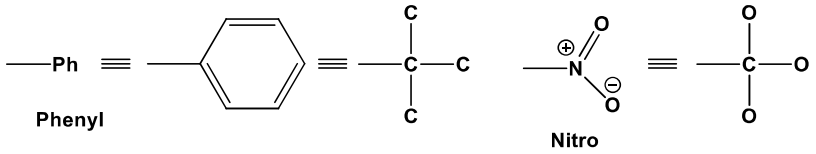
bonding of each group. We must write these next atoms with decreasing atomic numbers). First next atom of ethyl group is carbon having higher atomic number i.e. $_6$C will get first priority as compare to methyl group with next atom is having less atomic number i.e. $_1$H.

4. **Next to next atom:** If key atoms have same atomic number and their attachments are also same then the key atoms with next or second attachments of higher atomic number atoms have higher priority.
   e.g. **-C**H_2-CH_2-Br > **-C**H_2-CH_2-Cl Here for both bromo-ethyl and chloro-ethyl groups, key atoms are same i.e. carbon and their attachments are also same i.e. C,H,H. Their next attachments are [Br,H,H] and [Cl,H,H] with atomic numbers 351,1, and 171,1, respectively. First next atom of ethyl group is bromine having higher atomic number i.e. $_{35}$Br will get first priority as compare to ethyl group with next atom is having less atomic number i.e. $_{17}$Cl.

5. **Groups containing multiple bonds**: If the group directly bonded to the olefinic carbon contains double or triple bond, it is considered equivalent to two or three single bonds with the same atom respectively and then the sequence order is decided.



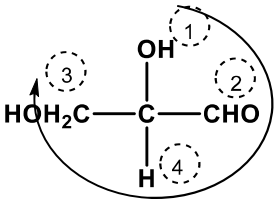
When a compound is represented by the Fischer projection formula, the configuration can be easily determined without constructing the model. To determine whether the eye travels clockwise or anticlockwise, we have to place the group or atom of the lowest priority at the bottom of the Fischer



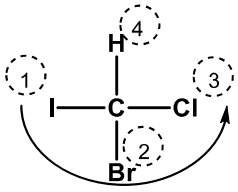
projection formula. The following situations arise:

The atom/group of lowest priority is at the vertical line: In such case, simply rotate the eyes in order to decreasing priorities. The configuration is R if the eyes travels in clockwise direction and S if the eyes travels anticlockwise direction.

e.g. Glyceraldehyde has R configuration while bromochloroiodomethane has S configuration.



(R)-Glyceraldehyde



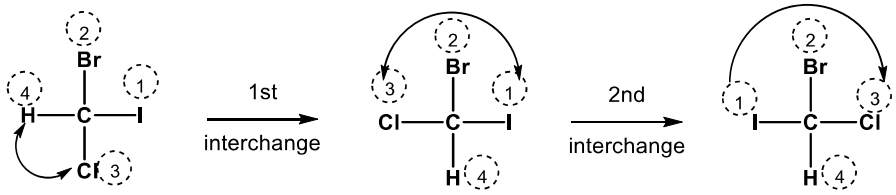
(S)-Bromochloroiodomethane

The atom/groups of lowest priority is at the horizontal line: In such case, it is necessary to rearrange by changing the position of groups as shown below.

If we interchange position of any two groups, once we get the enantiomer of starting. We must have to interchange twice, to get the original isomer.

The first interchange is to bring the lowest (4^{th}) priority group at the bottom. The second interchange is bring second (2^{nd}) priority group at the top. If 2^{nd} priority group is already on the top and two interchanges are must, then exchange the positions of 1^{st} and 3^{rd} priority groups.

e.g. bromochlroiodomethane; priority order is –I > -Br > -Cl > -H

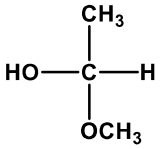


Enantiomer

Clockwise
R-configuration

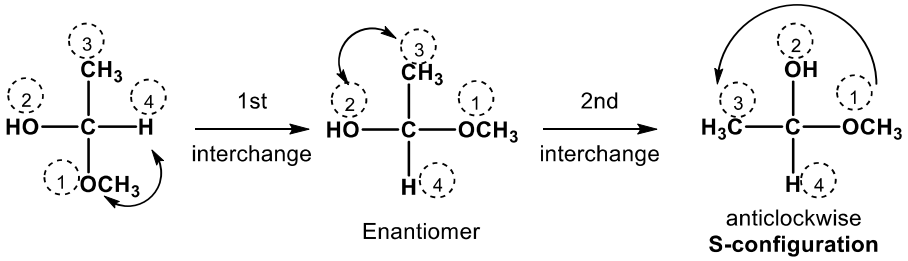
In this example, 1^{st} exchange is to make 4^{th} priority group at the bottom, so we exchanged positions of 3^{rd} and 4^{th} priority groups. 2^{nd} exchange should be to bring 2^{nd} priority group at the top but it is already on top position, so we exchanged positions of 1^{st} and 3^{rd} priority groups to bring original isomer. Now if on looking at first three priority groups (1,2,3) our eyes moves clockwise direction is called as R configuration.

Examples: 01

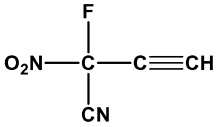


First atom of group	-OCH_3	-OH	-CH_3	-H
At. No.	8	8	6	1
Next atoms	C	H	-	-
Priority order	1	2	3	4

Priority order: -OCH_3 > -OH > CH_3 > H

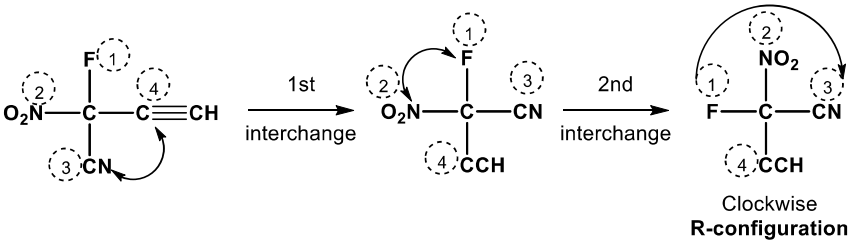


Examples: 02

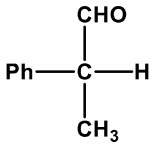


First atom of group	-F	-C≡CH	-CN	-NO_2
At. No.	9	6	6	7
Next atoms	-	[C,C,C]	[N,N,N]	-
Priority order	1	4	3	2

Priority order: -: -F > -NO > -CN > -C≡CH

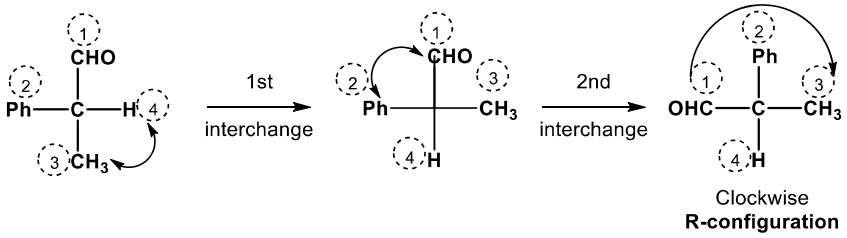


Examples: 03



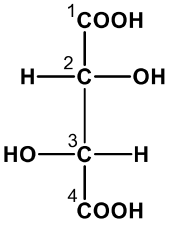
First atom of group	-CHO	$-CH_3$	-H	-Ph
At. No.	6	6	1	6
Next atoms	[O,O,O]	[H,H,H]	-	[C,C,C]
Priority order	1	3	4	2

Priority order: -: -CHO > -Ph > $-CH_3$ > -H

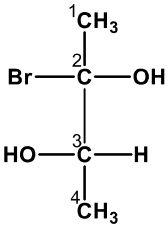


8. Compounds containing two chiral centres:

Now we will learn optical isomerism in compounds, which contains two chiral centres. According to Van't Hoff's rule, we would expect four optical isomers (i.e. $2^n = 2_2 = 4$, where n = number of chiral centres). There are two types of compounds which contains two chiral centres: 1) similar chiral centres (A,A Type) and 2) different chiral centres (A,B Type).
Now we will learn one by one.



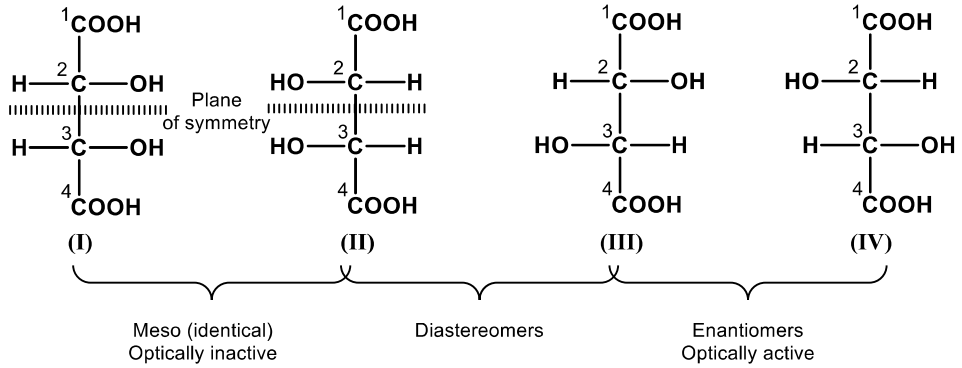
C3 = -COOH, -OH, -H & -CH(OH)COOH
C2 = -COOH, -OH, -H & -CH(OH)COOH
A,A Type
Both chiral centres having same atom/group



C2 = -Br, -OH, -H & $-CH(OH)CH_3$
C3 = $-CH_3$, -OH, -H & $-CBr(OH)CH_3$
A,B Type
Chiral centres having different atom/group

A. Similar chiral centres (A,A Type): Tartaric acid is an example of compounds with two similar chiral carbon atoms. Here the four groups attached to (C2 and C3) are the same. Various configurations of tartaric acids are:

There are maximum four isomers are possible of tartaric acid.



Observations:

1. The structures (I) and (II) are mirror images of each other but also they are superimposable, hence they are not enantiomers, rather they are identical moelcules.
2. If we rotate structure (I) by an angle of 180º, we get structure (II); hence, structure (I) and (II) represents the same structure, i.e. same molecule.
3. Structures (I) and (II) possesses a plane of symmetry and a molecule is achiral even though it possesses two chiral centres. Here the rotation due to one chiral centre is compensated (cancelled) by rotation due to another chiral centre and compound is optically inactive. Such compound is called as meso compound.
4. Structure (III) and (IV) of tartaric acid are enantiomers, they are mirror images of each other. There is no plane of symmetry in either of them. Therefore, both (III) and (IV) are optically active but display the optical activity in opposite directions.
5. Structure (II) and (III) are not mirror images of each other. Hence, they are not enantiomers. Such pairs of compounds having the identical molecular formula and identical groups are called diastereomers. Similarly, structures (II) and (IV) are also form a pairs of diasteromers.

Meso compound:

The compounds, which possesses intramolecular plane of symmetry, those compounds are called as meso compounds. Meso form of compound is optically inactive form, in spite of the presence of asymmetric carbon atoms in it. This is because there is a plane of symmetry and internal

compensation of optical rotation.

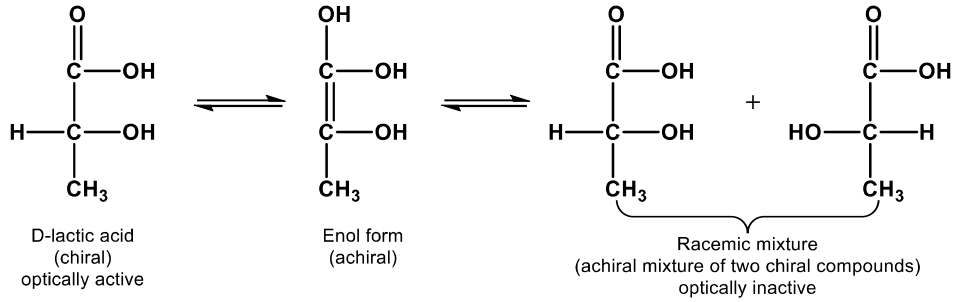
In general, the compounds having two similar chiral centres (i.e. A,A Type) will give rise to only three stereoisomers i.e. one pair of enantiomers and meso isomer.

Racemic mixture (Racemic modification):

Racemic modification is the term used for a mixture of equal amounts of enantiomers. A racemic mixture is optically inactive because of external compensation. The optical activity caused by one enantiomer is neutralised by the racemic mixture may also be denoted by the letters R and S. for example (±)-tartaric acid.

When chiral compound is synthesised from an achiral reagent, a racemic variety of product is obtained. For example, when propionic acid is brominated, 2-bromopropionic acid (a chiral product) is obtained. Two enantiomers (+) and (-) 2-bromopropionic acids are formed in equal quantities and the product is a racemic mixture. It is optically inactive.

Racemisation: under suitable conditions, most of the optically active compounds can lose their optical activity without undergoing any change in their structure i.e. the two enantiomeric forms are convertible into each



other so that the final result is racemic modification. The transformation of an optically active enantiomer into the optically inactive racemic modification under the influence of heat, light or chemical reagent is known as racemisation. Thus if the starting material is the (+) form, then after treatment, half will be converted in to (-) form. If the starting material is (-) form, half will be converted into (+) form. For example. (+) or (-) lactic acid on warming with sodium hydroxide gets converted into racemic lactic acid.

Physical properties of isomers:

1. The physical properties of enantiomers are identical.
2. The physical properties of diastereomers are different.

3. The physical properties of racemic mixtures differ from the physical properties of the meso compounds and the original single enantiomers.
4. A meso form is optically inactive and racemic mixture is also optically inactive.

The following table shows properties of isomers of tartaric acid.

Sr. No.	Isomer	Specific rotation	Solubility in water (g/100ml)	m.p. ^{o}C	K_a
1.	d-tartaric acid	+11.9	146.5	170	$9.4X10^{4}$
2.	l-tartaric acid	-11.9	146.5	170	$9.4X10^{4}$
3.	Meso tartaric acid	0.0	119.5	240	$9.4X10^{7}$
4.	Racemic mixture	0.0	24.0	206	$9.4X10^{4}$

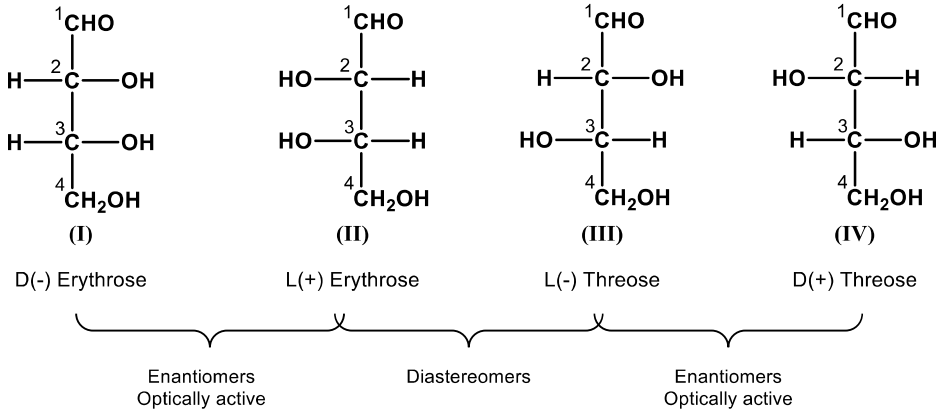
Racemic mixture and the meso compounds distinguished as follows:

Racemic mixture	Meso compounds
Mixture of two equimolar enantiomer.	One pure compound having two plane of symmetry
Optical rotation due to one chiral molecule is compensated by its enantiomer. (External Compensation).	Optical rotation due to one chiral centre is compensated by another chiral centres present within the molecule. (internal compensation).
Components of the mixture can be separated.	Separate one compound, so two chiral parts can't be separated.
Mixture of chiral compounds	Achiral compound
The melting point of racemic mixture is higher that the pure isomer.	The melting point of the meso form is lower that the d or i-isomer.
E.g. (±)-lactic acid	E.g. tartaric acid

B. Similar chiral centres (A,B Type):

Two asymmetric carbon atoms are said to be dissimilar when atoms or groups attached to one asymmetric carbon atom are different from those attached to the other. Compounds of this type exists in $2^n = 2^2 = 4$ stereoisomers.

Consider example of 2,3,4-trihydroxy butanal i.e. aldotetrose



Observation:

1. The structures (I) and (II) are nonsuperimposable mirror images, so these are a pair of enantiomers. Similarly, structures (III) and (IV) are another pair of enantiomers. These two pairs of enantiomers give rise to two racemic modifications.
2. The structures (II) and (III) are not mirror images of each other. Such type of stereoisomers are called which are not mirror images are called as diastereomers. Similarly, (I) and (III), (I) and (IV), (II) and (IV), are the other pairs of diastereomers.
3. Therefore, compound having two dissimilar (unequal) chiral centres on adjacent carbon atom gives rise to four pairs of diastereomers.
4. Diastereomers can be defined as those stereoisomers, which are not mirror images of each other.

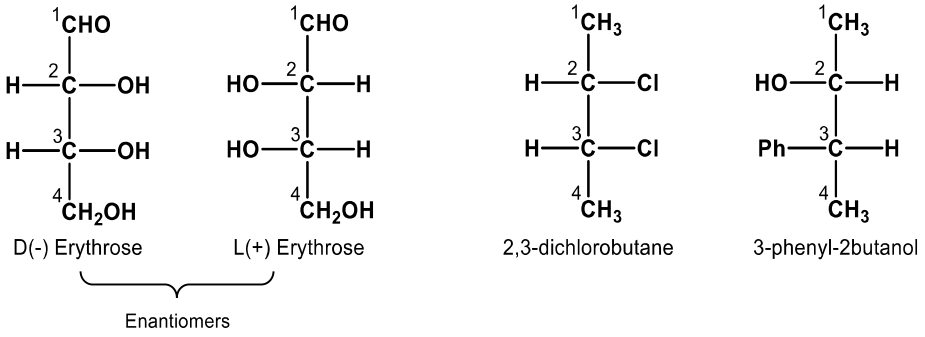
Properties of diastereomers:

1. Unlike enantiomers, diastereomers have different physical properties and they may rotate the plane of plane polarized light in the same or different directions and to different exatent.
2. They show similar, but not identical, chemical properties (as they contains the same functional groups). Rate of reactions of diastereomers with a given reagent are generally different.
3. They have different physical properties like m.p., b.p., densities, refractive indices, specific rotations, solubilities etc. in a given solvent.
4. They can be separated by techniques like fractional crystallization, fractional distillation, and chromatography.

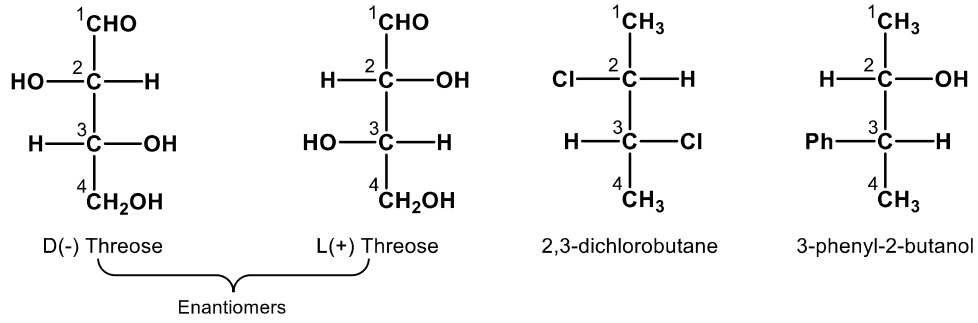
Erythro and Threo isomers:

Erythro and threo are common terms in stereochemistry used for naming molecules with two stereogenic centers. The names derive from the sugars erythrose and threose.

When two common substitutes, in case above example of 2,3,4-trihydroxy butanal (i.e. aldotetrose) the H and OH groups, of the stereogenic centres are on the same side, we have the sugar erythrose and when they are on opposite sides, it is the threose. Threose and erythrose exist in two enantiomeric forms, which are designated as D and L enantiomers.



This approach for naming chiral compounds became quite general and spread outside of carbohydrates. The configuration of any molecule with two stereogenic centers can be classified as erythro or threo.



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Erythro isomer: In the Fischer projection formula, if two identical groups at two adjacent chiral centres are on the same side, then the isomer is called as erythro isomer.

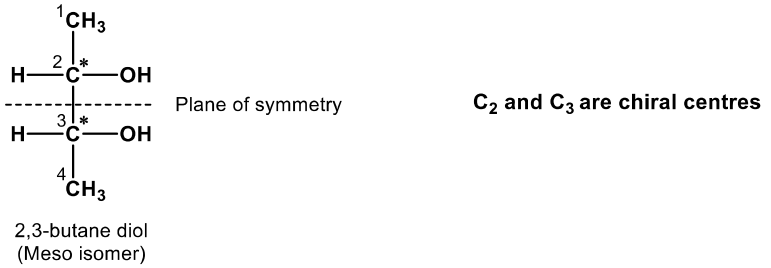
Threo isomer: In the Fischer projection formula, if two identical groups or atoms at two adjacent chiral centres are on the opposite side, then the isomer is called threo isomer.

Absolute configuration (R and S) for compounds containing two chiral centres:

In these compounds, configuration at each centre is determined separately and then overall configuration of the molecule determined, from which the optical activity of the molecule decided.

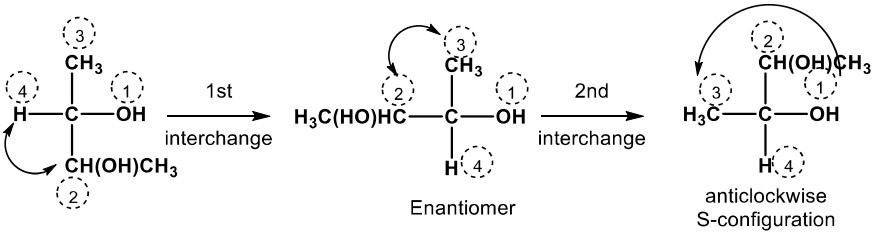
Similar chiral centre (A,A type)

e.g. 2,3-butane diol

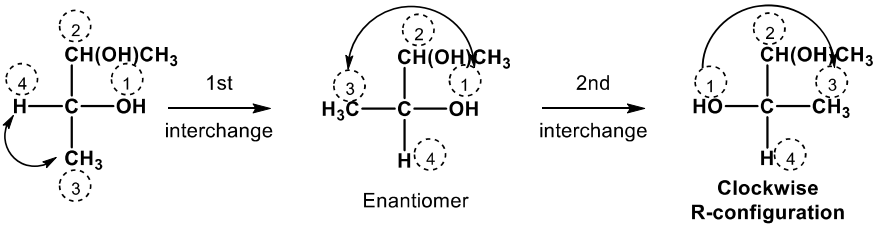


Absolute configuration at C_2:

Priority order at C2: -OH > -CH(OH)CH_3 > -CH_3 > -H



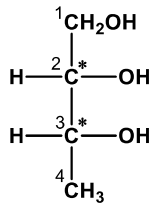
Priority order at C3: -OH > -CH(OH)CH_3 > -CH_3 > -H



Thus this structure has the configuration 2S and 3R.

Dissimilar chiral centre (A,B type)

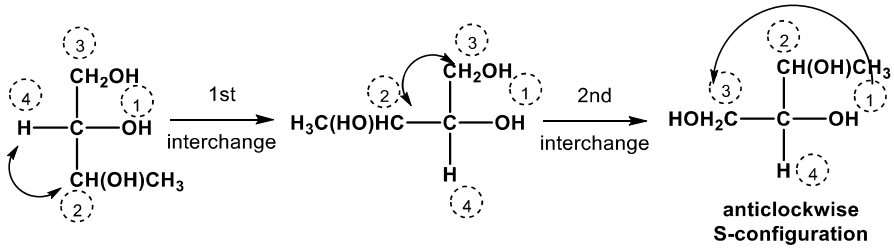
e.g. 2,3,4-trihydroxy butanal (aldotetrose)



Butan-1,2,3--triol

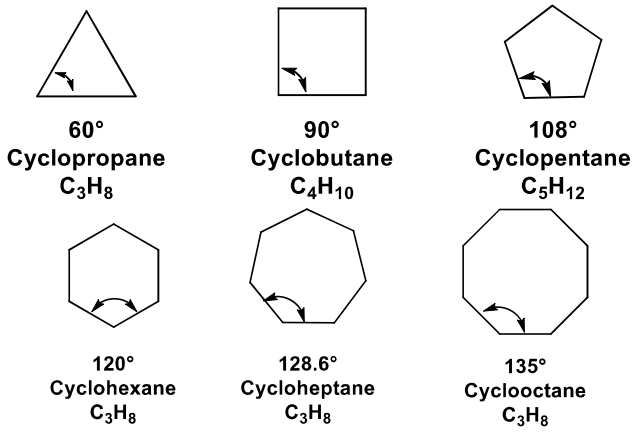
C_2 and C_3 are chiral centres

Absolute configuration at C_2:
Priority order at C2: -OH > -$CH(OH)CH_3$ > -CH_2OH > -H
Priority order at C3: -OH > -$CH(OH)CH_2OH$ > -CH_3 > -H



9. Isomerism in cycloalkane:

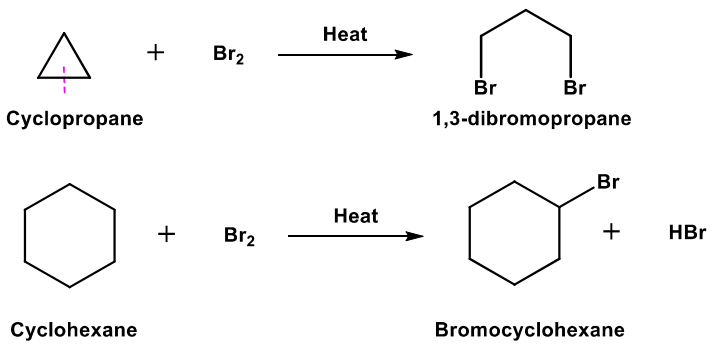
Cycloalkanes are cyclic compounds containing closed saturated hydrocarbon chains. They are also called alicyclic compounds and resemble alkanes in many respects. For example cyclopropane, cyclobutane etc. They



can be express by a general molecular formula (CH2)n where n is 3,4,5…
Nomenclature: IUPAC systems of nomenclature of cycloalkanes are given below.

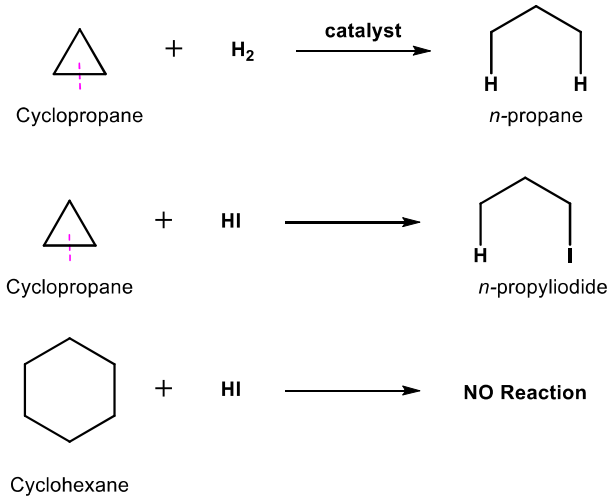
Cycloalkanes are saturated compounds like alkanes and therefore, exhibit substitution reactions. However, cycloalkanes having ring of 3- or 4-carbon atoms are unstable and tends to from open chain aliphatic compounds by the addition of the reagent. Thus, they exhibit the chemical properties of both alkanes and alkenes.

a) Reactions with halogens: generally cycloalkanes undergo free radical substitution with halogens at temperature or in the presence of light, e.g.,



Whereas in case of cyclopropane, bromine and chlorine in the presence of break the ring system and give open chain addition products. For example,

b) Reactions with hydrogen: When heated with hydrogen in the presence of nickel, cyclopropane and cyclobutane give addition products whereas higher members do not give this reaction.



c) Reactions with halogen acids: Generally, cycloalkanes do not react with halogen acids. However, cyclopropane and cyclobutane add on halogen acids to give open chain alkyl halides.

Hence it may be pointed that cyclopropane is the most reactive cycloalkane because it exhibits many addition reactions accompanied by ring cleavage. Then comes cyclobutane, which shows some addition reactions. The rest of the cycloalkanes do not form addition products. In this way, cyclopropane undergoes and cyclobutane shows properties similar to those of alkenes. Cyclobutane undergoes addition and ring opening reaction at much slower rate than that of cyclopropane and requires conditions that are more vigorous.

In order to provide an explanation as to why these cycloalkanes behave differently; Adolf Von Baeyer in 1885 proposed a theory popularly known as 'Baeyer Strain Theory'.

A) Baeyer Strain Theory:

According to Le Bel and Vant Hoff, the for valencies of a carbon atom are directed towards the corners of a regular tetrahedron and hence, the angle between any two valencies (any bonds) in 109.5º. Baeyer held

that any deviation from this position leads to a strain in the molecule resulting in the decrease of the stability of the molecule.
In the light of this concept, Baeyer gave a theory, which is known as Baeyer's Strain Theory.

a) The main points of the theory are as given below:

- The carbon atoms constituting the rings lie in the same plane. Hence bonds angles between the adjacent carbon atoms of the ring no longer remain 109.5. Different rings have different values of this angle. e.g., the cyclopropane ring is triangular having bond angle in 60^{o}.
- Any deviation, positive or negative from the normal tetrahedral bond angle of 109.5^{o} during the formation of ring creates a strain in the molecules is called as angle strain, which makes the molecule unstable.
- The larger deviation from the normal angle (i.e. 109.5^{o}). The greater is the strain and thus lesser is the stability. However is should be noted that the sign of deviation does not make any difference.

b) Angle strain: Baeyer has assumed that rings are planer polygons and he calculated the angles strains for various cycloalkanes (see table given below).

$\therefore$ Angles strain = Tetrahedral angle – Internal angle
= 109.5 – internal angle
e.g. cyclopropane:
= 109.5 – 60 = 49.5^{o}

Table: Angle stains in various cycloalkanes

Cycloalkane	No. of ring carbons	Internal angle	Angle strain
Cyclopropane	3	60	109.5 – 60 = 49.5
Cyclobutane	4	90	109.5 – 90 = 19.5
Cyclopentane	5	108	109.5 – 108 = 1.5
Cyclohexane	6	120	109.5 – 120 = 10.5
Cycloheptane	7	128.6	109.5 – 128.6 =19.1
Cyclooctane	8	135	109.5 – 135 = 25.5

It is clear from the above data that angle strain decrease as we move from cyclopropane to cyclopentane. This predicts ease of formation and

stability of the compound from cyclopropane of cyclopentane. This is actually found to be so.

However, the stability of cyclohexane and higher members cannot be examined by the angle strain values. According to angle strains, cyclohexane and higher members should be quite unstable as there is a lot of strain in the molecule. However, this is not true. Actually, cyclohexane and higher members are not planer molecules. Different carbon atoms in such molecules lie in different planes, thereby relieving the strain.

c) Relative stabilities of cycloalkanes with heat of combustion:

Heat of combustion may be defined as the quantity of heat evolved when one mole of the compound is burnt in excess of air (i.e. completely oxidized).

$(CH_2)_n + 3/2(nO_2) \rightarrow nCO_2 + nH_2O + Heat$ (where n is size of the ring)

When long chain organic compound undergoes combustion, the heat of combustion available for each $-CH_2-$ group is found to be157.4 kcal/mol. Relative ring strain = 157.4 – Heat of combustion per $-CH_2-$ group

Table: Heats of Combustion and relative strain for cycloalkane

Cycloalkane	Ring size	Heat of combustion (kcal/mol)		Relative ring strain
		Total	Per $-CH_2-$ group	
Cyclopropane	3	499.8	166.6	9.2
Cyclobutane	4	656.2	164.0	6.6
Cyclopentane	5	793.5	158.7	1.3
Cyclohexane	6	944.4	157.4	0.0
Cycloheptane	7	1108.2	158.3	0.9
Cyclooctane	8	1268.8	158.6	1.2

Heat of combustion per CH_2 group gives a fair idea of the relative stabilities of cycloalkanes. If the heat of combustion is large, the compound contains more energy and is therefore less stable.

With this principle, let us examine the stabilities of cyclopropane, cyclobutane and cyclopentane. Heat of combustion of cyclopropane is 166.6 kcal/mole. It is 9.2 kcal/mol more than that of open chain alkane. Thus, it is less stable than the open chain alkane by this amount.

In the case of cyclobutane, the heat of combustion is more by an amount 6.6 kcal/mol as compared to open chain alkane. Thus, cyclobutane is less stable than open chain alkanes but it is more stable than

cyclopropane. Cyclopentane having heat of combustion 158.7 kcal/mol is more stable than cyclobutane. The relative stabilities of first three members of cycloalkanes is decreasing order given an under.

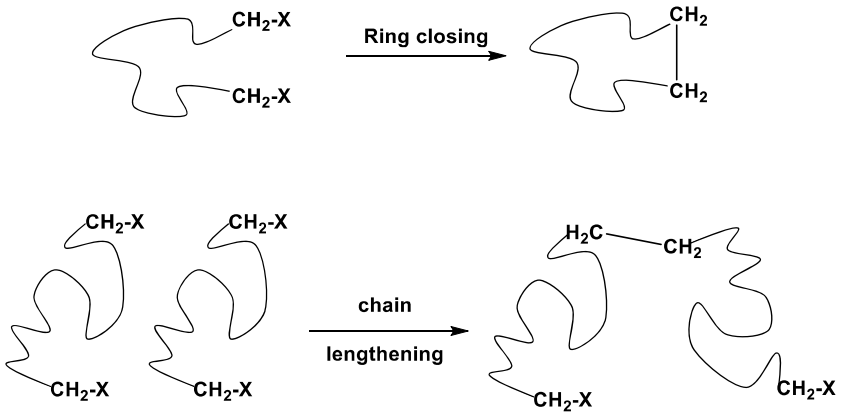
Cyclopetane > Cyclobutane > Cyclopropane

On having a look at the heat of combustion of cyclohexane and higher members, we observe that the values do not differ much. Thus, higher members are expected to display almost uniform stability, which is confirmed by their reaction.

d) Why Baeyer's strain theory failed?

Non planer rings of cyclohexane and cyclodecane

The first false assumption he made was that, all ring compounds were planer. However, the ring atoms are folded in such a way that of regular tetrahedral angle (109.5º) is maintained and hence free from angle strain. For example the angle of regular hexagon is 120º and that of regular decagon 144º. But the molecule has avoided angle strain by undergoing folding. Thus, cyclohexane and cyclodecane rings are not flat, but are folded or nonplanar to make each bond angle of carbon can be 109.5º.



Process (I) Ring closing; Process (II) Chain lengthening

The second false assumption he made was that, cyclic compounds, which are difficult to synthesis, are unstable. But a compound is difficult to synthesis does not means to that, it is unstable.

To obtain a cycloalkane from a linear compound, it is necessary that

the terminal groups of the linear compound should sufficiently close to each other so that ring closure can take place. In the case of a large hydrocarbon chain, the possibility that end carbons will caome sufficiently closer and form the closed ring is very small. That is why higher cycloalkanes are difficult to synthesis.

It may be noted, that during the synthesis of cyclic compounds, two processes are competing with each other. Process I is the ring closure by the coming together of the end groups and process II is chain lengthening by the interaction of end group one molecule with of the other molecule showed as above. It is amazing that, once formed, these higher cyclic compounds are as stable as their straight chain counterparts.

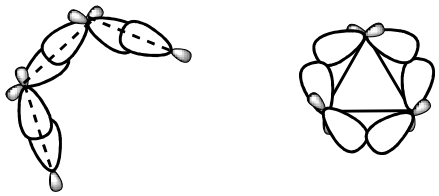
B. Conformation of cyclic compounds:

Conformation: Structures containing different arrangement of atoms of a molecule in space can arise by rotation about single bond are called conformers.

Before discussing the conformations of cyclohexane is more details, we will first discuss in general the factors affecting the stabilities of conformations.

Following factors plays vital role in the stability of conformations.

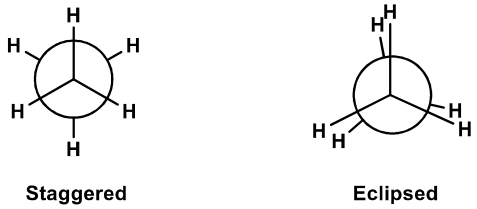
a) Angle strain: every atom has the tendency to have the bond angles that match those of its bonding orbitals. If there is any deviation from this normal bond angle, the molecule suffers from angle strain. Conformations suffering from angle strain are found to be less stable. In cyclopropane, even though all the carbons are sp3 hybridized, the C–C bond angle has to be compress from 109.5º to 60º. Thus introduces and angle strain.



(i) bond angle 109.5° **(ii) bond angle 60°**

Angle strain: i) maximum overlap in open chain or large ring compounds
ii) less overlap in the cyclopropane ring

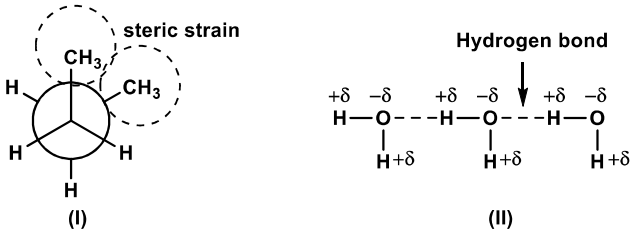
b) Torsional strain: There is a tendency on the part of two carbons linked to each other to have their bonds staggered. That is why staggered from of any molecule like ethane, n-butane is most stable. As the bonds of two connected carbons move towards eclipsed state, a torsional strain is set up in the molecule thus raising its energy. Thus the staggered conformations have the least and eclipsed have the highest torsional strain. The energy required to rotate the molecule around the C–C bond is called torsional energy.



Conformation of Ethane: Staggered (less torsional strain) and eclipsed (more stable strain)

Steric strain (van der Waals strain): Groups attached to two linked carbons can interact in different ways depending upon their size and polarity. These interactions can be attractive or repulsive. If the distance between the groups or atoms is just equal to the sum of their van der Waals radii, there will be attractive interactions between them. Moreover, if these atoms or groups are brought closer than this distance, there will be repulsions leading to van der Waals strain or steric strain in the molecule.

c) Dipole-dipole interactions: It is attraction of the +ve end of the polar molecule for the –ve end of another polar molecule (e.g. H_2O). Hydrogen bond is a particular case of powerful dipole-dipole attractions. Because of



(i) Steric strain and (II) Hydrogen bonding

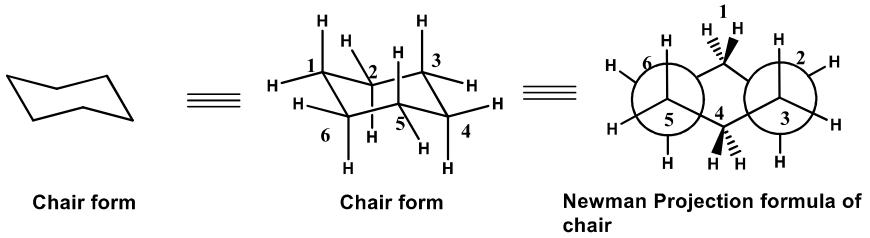
these interactions, polar molecules are generally held to each other more strongly than nonpolar molecules of comparable molecular weight.

The stability of a conformer is determined by the net effect of all above factors.

C. Conformations of cyclohexane:

a) The chair conformation of cyclohexane:

- Cyclohexane molecule exists predominantly in a nonplanar, folded conformation the chair conformation.
- All bonds are staggered; therefore, torsional strain is minimized.
- The bond angles not exactly 109.5º but very close to that of open chain alkanes.
- Dihedral angle is not exactly 60º but these are around 56º causing slight flattening of ring.
- In the chair form, four carbon atoms are in one plane (C2,C3,C5,C6). These represents the average plane of the molecule. One carbon atom (C1) above the plane and one carbon atom (C4) is below the plane or vice versa.



Chair form | Chair form | Newman Projection formula of chair

b) The boat conformation of cyclohexane:

In the boat form of cyclohexane there is complete eclipsing of the hydrogens attached to the carbon atoms.

The Newman projection shows two eclipsed butane units.

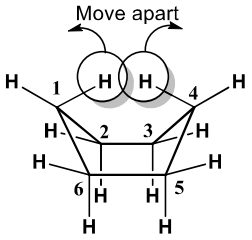
The inside hydrogens on C1 and C4 (flagpole hydrogens) sterically interfere with each other. Which lead to instability for boat form in comparison to chair.

The flagpole hydrogens lie only 1.83 Å apart than their sum of van der Waals radii 2.5 Å.

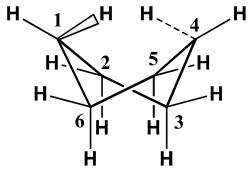
In the boat form, four carbon atoms (C2,C3,C5,C6) are again in one plane. C1 and C4 are either above or below the plane.

c) The twist boat conformation of cyclohexane:

The boat conformation is higher energy conformation due to



Boat form



twisted / skew boat form

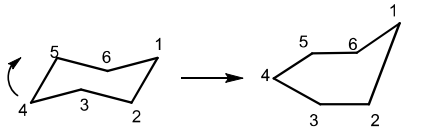
eclipsing on its side carbons and due to transannular interaction between flagpole hydrogens.

A modified boat conformation in which the flagpole hydrogens are moved away and therefore van der Waals strain or steric strain decreases. Similarly, the torsional strains due eclipsing hydrogens are also decreased to some extent. Such boat conformation is known as twist boat or skew boat conformation.

d) Half chair conformation of cyclohexane:

When below carbon of the chair form is lifted upward so that five carbons are in the same plane and only one carbon atom is above or below to the plane, such a conformation is called as half chair conformation.

It has angle strain as well as torsional strain lies above 11 kcal/mol, above the chair conformation. It is the most unstable conformation of cyclohexane.



Chair form Half chair conformation

e) Conformational analysis of cyclohexane:

One chair conformation of cyclohexane can be easily converted into an alternate chair conformation via boat, skew boat and half chair conformations. The overall relationships are summarized in below potential energy curve.

The thermal energy associated with the molecules at room temperature is of the order of 15-20 kcal/mol and the energy required for the interconversion of above conformations is only 11 kcal/mol. Therefore, these conformations constantly converted to each other and cannot be separated from each other.

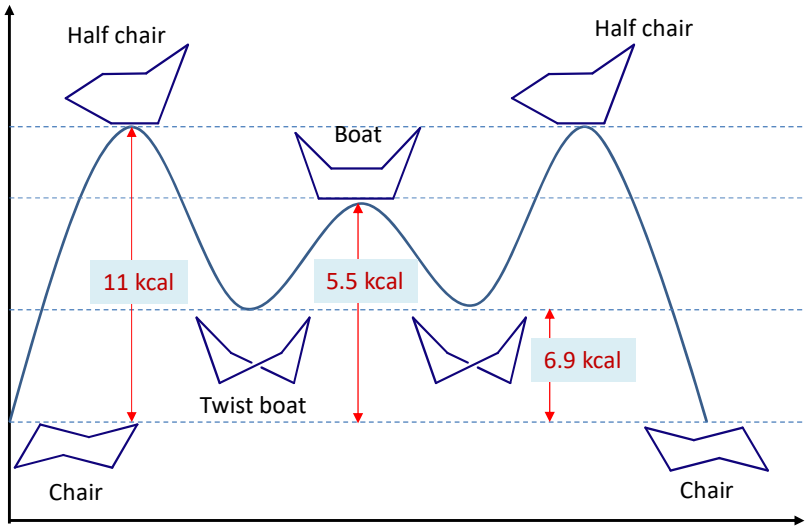


Fig: Potential Energy Relationship

f) Equatorial and Axial bonds in chair form of cyclohexane

In cyclohexane (C_6H_{12}) there are 12 hydrogen atoms. There are two distinct kind of hydrogens. Six of the hydrogens which are marked H_e are almost oriented within the plane of cyclohexane ring. These are called as equatorial hydrogens. The hydrogens which are projecting outwards and are in the average plane of the ring are called as equatorial hydrogens, the bonds which are holding these hydrogens are called as equatorial bonds. These bonds projects above and below the plane alternately.

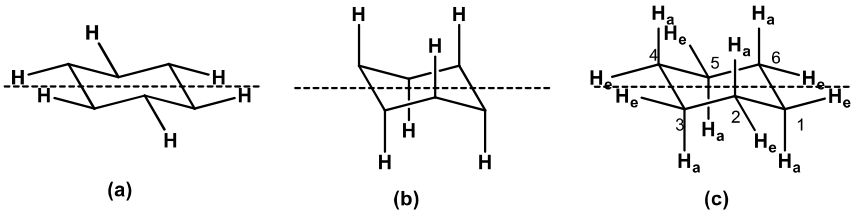


Fig: (a) Equatorial bonds (b) Axial bonds (c) Axial & equatorial bonds

In the chair conformation, there are six other hydrogen atoms which are marked as H_a in the figure; are oriented perpendicular to the cyclohexane ring. These are called as axial hydrogens. The hydrogens which are perpendicular to the average plane of the molecule and parallel to the axis passing through centre are known as axial hydrogens. The bonds by which these are held to the ring are called as axial bonds. The axial bonds projects above and below the plane of the ring alternately.

It may be noted that there is one axial and one equatorial hydrogen on each carbon in the chair conformation of cyclohexane.

g) Ring Flipping:

When one form of the chair is converted into another, it is known as ring flipping. Each of the six carbon atoms of cyclohexane has one equatorial and one axial hydrogen atom. Thus, there are six equatorial hydrogens and six axial hydrogens. In the flipping and reflipping between conformations, axial hydrogens become equatorial hydrogens while equatorial hydrogens become axial.

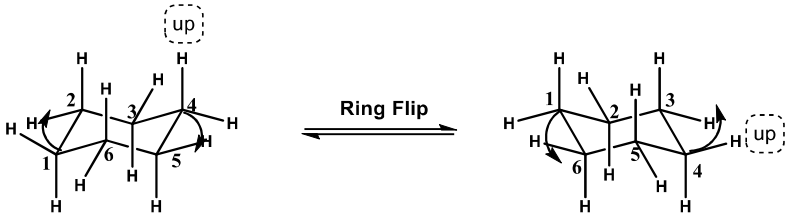


Fig: Interconversion of axial and equatorial bonds

The equatorial-axial interconversion is so rapid at room temperature that all hydrogen atoms on cyclohexane can be considered equivalent. The energy barrier between the alternate chair conformations is only 10 kcal/mol.

10. Conformations of substituted cyclohexanes:

In cyclohexane itself, the two chair forms have equal energy. When one of the hydrogens of cyclohexane by some substituent, then the two chair forms are no longer equivalent in energy. e.g methyl cyclohexane

a) Conformations of methyl cyclohexane:

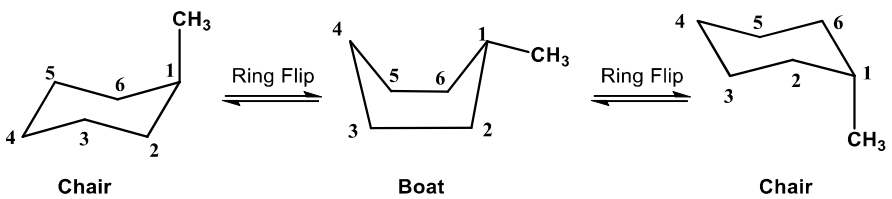


Fig: Conformations of Methyl cyclohexane

There are two possible chair conformations of methyl cyclohexane one with $-CH_3$ in equatorial position and the other with $-CH_3$ in axial position. In addition to these two chair conformations, boat conformation is also possible. However, as stability of boat is less, very small fraction of molecule would exists in boat form.

The chair conformation in which the methyl group occupies the equatorial position (A) is found to be more stable than the chair conformation in which methyl group is axial position (C). This can be explained by the Newman projection formula for both conformers.

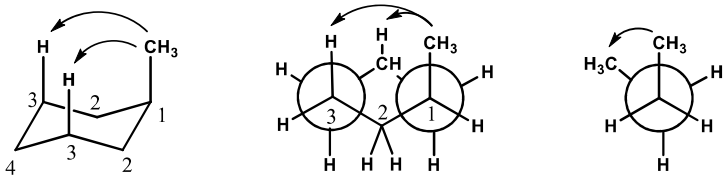


Fig: (a) 1,3-diaxial interaction (b) Newman Projection formula (c) Gauche conformation of butane

In the axial conformer, the methyl group is very close to other two axial hydrogens on the same side of the molecule.
This destabilizing influence arises due to steric repulsions between an axial methyl group and another two axial hydrogen atoms located two carbon away (1,3-position) is called as 1,3-diaxial interaction.

The two gauche butane interactions between the axial methyl group and the two ring C-C bonds destabilizes the axial conformer, while no such interaction exists when the methyl is at equatorial position.

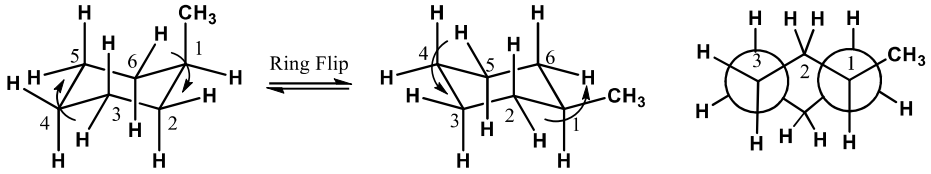


Fig: (a) NO interaction (b) Newman Projection Formula

A gauche interaction in butane destabilize that conformation by 0.9 kcal/mol, thus the destabilization caused by the axial methyl in axial methylcyclohexane with its two gauche interaction resembles gauche butane and is twice this value. The equatorial methylcyclohexane is about 1.8 kcal/mol more stable that the axial conformation.

Any group when occupies axial position creates two gauche interactions. Although the equatorial isomer is more stable than axial isomer, it is not possible to separate them from each other, since the thermal energy associated with these molecules is large enough to bring about inner conversions between axial and equatorial conformations.

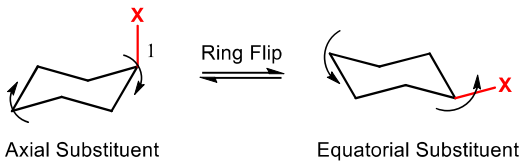
At 25ºC, methylcyclohexane exists as an equilibrium mixture of two conformations with 95% of the molecules having the equatorial methyl structure and 5% having the axial methyl structure.

In short, whenever any group occupies the axial position the stability of that conformation decreases and whenever it occupies the equatorial position, the stability of that conformation decreases.

b) Effect of size of the substituents:

As the size of the substituent present on the axial position increases, the 1,3-diaxial interactions also increases. The energy difference between the axial and equatorial conformations go on increasing, the equatorial conformer becomes more and predominant.

Actual energy differences for various substituents are given in below table. A direct relationship exists between these differences in energy, called free energy (ΔG^0).

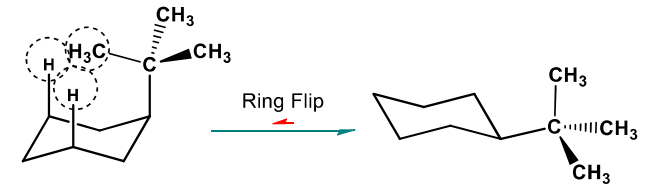


Substituent	Free energy difference kcal/mole	Substituent	Free energy difference kcal/mole
-H	0.00	-COOH	1.40
-CN	0.20	$-CH_3$	1.80
-F	0.25	$-CH_2-CH_3$	1.90
-I	0.46	$-CH(CH_3)_2$	2.10
$-OCH_3$	0.75	-Ph	2.90
-OH	0.90	$-C(CH_3)_3$	5.5 very large

The free energy difference and equilibria data in given table provides a quantitative picture for structure conformation relationship.

c) Locking of conformation:

Generally, substituents larger than hydrogen prefer to be equatorial



Axial t-butyl cyclohexane (severe interactions)

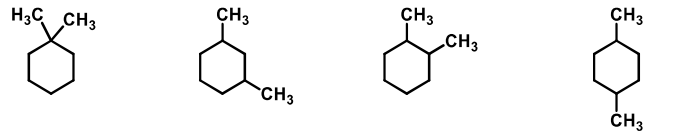
Equatorial t-butyl cyclohexane (no interaction)

on a cyclohexane ring to minimize 1,3-diaxial interactions. The conformational free energy for ethyl, isopropyl group are only slightly larger than that for methyl group, while that for t-butyl group is much larger. The t-butyl group is causes so much more severe 1,3-diaxial interactions, that this molecule exclusively exists in equatorial position i.e. locked in equatorial position, this phenomenon is called as locking of conformations.

11. Conformations of Dimethyl cyclohexanes:

We will now discuss the stereochemistry of dimethyl cyclohexanes. These exhibits all types of stereoisomerism i.e. geometrical, optical and conformational. We will not only consider these stereo isomers but will also learn how to decide their relative stabilities.

Depending upon the relative position of the two substituents four structural isomers are possible for dimethyl cyclohexane.



1,1-dimethyl cyclohexane | **1,3-dimethyl cyclohexane** | **1,2-dimethyl cyclohexane** | **1,4-dimethyl cyclohexane**

We will now discuss the stereoisomers formed by each of these dimethyl cyclohexanes.

A. 1,1-Dimethyl cyclohexane: When two methyl groups are present on the same carbon atom, such compound is called as 1,1-dimethyl cyclohexane.

Geometrical isomerism: Since both methyl groups are present on the same carbon atom, such compounds do not show geometrical isomerism.

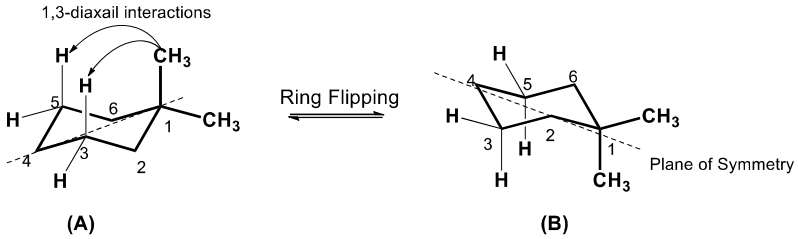


Fig: 1,1-Dimethyl cyclohexane

a) Optical isomerism: The molecule possesses plane of symmetry passing through carbon C1 and C4 (plane that included both methyl and divides the molecule into two equal parts) hence, optical isomerism is not possible in1,1-Dimethyl cyclohexane.

b) Conformational isomers: 1,1-Dimethyl cyclohexane is exists in two distinct chair conformations (A) and (B). Boat and skew boat are also possible but we will consider only chair conformations as they are most stable and most of the molecules prefer to exist in chair conformation.
In 'A', one methyl is occupying the axial position and another methyl at the equatorial position. If the ring flips, we get 'B' in which position of two methyl groups inverted.

c) Relative stabilities: Whether the conformation 'A' is more stable or 'B' is more stable that is depends upon the relative sizes of the groups. That conformation is more stable, in which the bulkier group occupies equatorial position. In compound 'A' and Compound 'B' both substituents are same i.e. methyl ($-CH_3$), then both conformations will be identical.

B. 1,2-Dimethyl cyclohexane: When two methyl groups are present on the different carbon atoms, such compounds shows geometrical isomerism. Those geometrical isomers are (a) Cis-1,2-dimethyl cyclohexane in which both methyl groups are pointing towards same side of the average plane of the molecule and (b) Trans-1,2-dimethyl cyclohexane in which both methyl groups are pointing towards opposite side of the average plane of the molecule. (cis and trans isomerism is not relative to either groups are axial or equatorial).

a) Cis-1,2-dimethyl cyclohexane (a,e form): The isomer in which one methyl group is in axial and the other in the equatorial position. Both methyl groups are pointing towards same side of the average plane of the molecule.

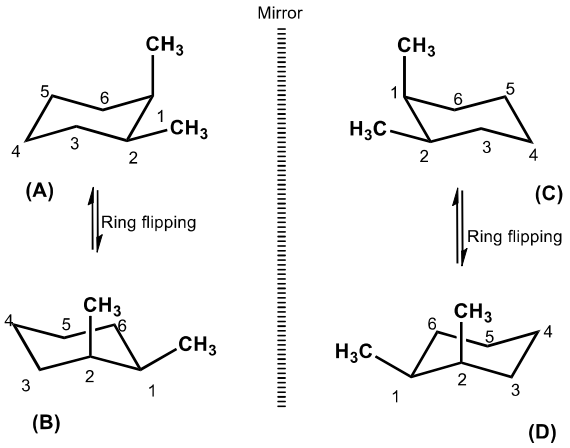


Fig: Cis-1,2-dimethyl cyclohexane

1. Optical isomerism: 1,2-dimethyl hexane don't have any element of symmetry and hence is expected to be optically active. However, it is found that the compound is optically inactive. Conformation (A) and its mirror image (C) are actually non-superimposable mirror images i.e. enantiomers. However when (A) flips it gives (B), which is same as (C)

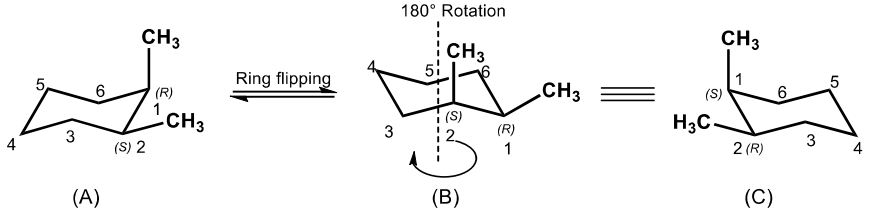


Fig: Ring flip racemizes cis-1,2-dimethyl cyclohexane

Similarly, (B) and (D) are non-superimposable mirror images, i.e. they are enantiomers. However, when (B) flips we get (A) which is same as (D). It means that when (A) flips in to (B) or (B) flips into (A) they are converted into their enantiomers. Since the stability of these two conformations is same, they exists in equal proportions. This makes the molecules is exists as a racemic mixture and hence optically inactive.

2. Relative stability: In cis 1,2-dimethyl cyclohexane there is one methyl group produce two 1,3-diaxial interactions with axial hydrogen atoms present at C3 and C5 of the ring (i.e. two butane gauche interaction of methyl with C3 and C5 carbon of the ring). On the basis 0.9 Kcal/mol for each 1,3-diaxial CH_3-H interaction or butane gauche interactions, we calculate 1.8 Kcal/mol van der Waal's strain for cis-1,2-dimethyl cyclohexane. But, both the methyl groups are gauche to each other (making an angle ≈60º with each other), this give rise to an energy 0.9 Kcal/mol for this isomer, hence there is a total 2.7 Kcal/mole of Van der Wall's strain.

b). Trans-1,2-dimethyl cyclohexane (a,a and e,e): The isomer in which both the methyl groups are in the equatorial position (e,e) or axial (a,a) i.e. the two methyl groups are on the opposite side of the average plane of the

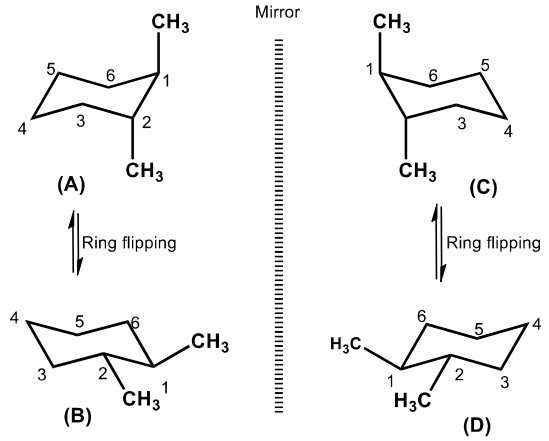


Fig: Trans-1,2-dimethyl cyclohexane

ring.

1. Optical isomerism: Both (A) and (B) have no any elements of symmetry and therefore are optically active. Thus trans-1,2-dimethyl cyclohexane exists as a pair of enantiomers (A) and (C); and (B) and (D). Ring flipping of (a,a) trans-1,2-dimethyl cyclohexane would produce more stable (e,e) trans-1,2-dimethyl cyclohexane. Compound (A) and (C) as well as compound (B) and (D) are the pairs of enantiomers, while compound (A) and (D) as well as compound (B) and (C) are the pairs of diastereomers.

2. Relative stability: In the trans 1,2-diaxial (a,a) forms (A) and (C), there are two axial methyl substituents giving rise to total four butane gauche interactions, increasing the energy of the molecule by 4x0.9 = 3.6 Kcal/mol. In the trans 1,2-diequatorial (e,e) forms (B) and (D) none of the substituent of at the axial position but both methyl groups are gauche to each other. This gives rise to an energy 0.9 Kcal/mol for this isomer.
The order of the stability of conformer is

Trans-1,2- (e,e)	>	cis-1,2-(a,e) or (e,a)	>	trans-1,2-(a,a)
(0.9 kcal/mol)		(2.7 Kcal/mole)		(3.6 Kcal/mol)

C. 1,3-Dimethyl cyclohexane: 1,3-disubstituted cyclohexane shows geometrical isomerism i.e. cis form and trans form we will discuss them one by one.

a) Cis-1,3-dimethyl cyclohexane (a,a and e,e): The isomer in which both methyl groups is in the axial position (a,a) or in the equatorial position (e,e) i.e. the two methyl groups are on the same side of the average plane of the ring.

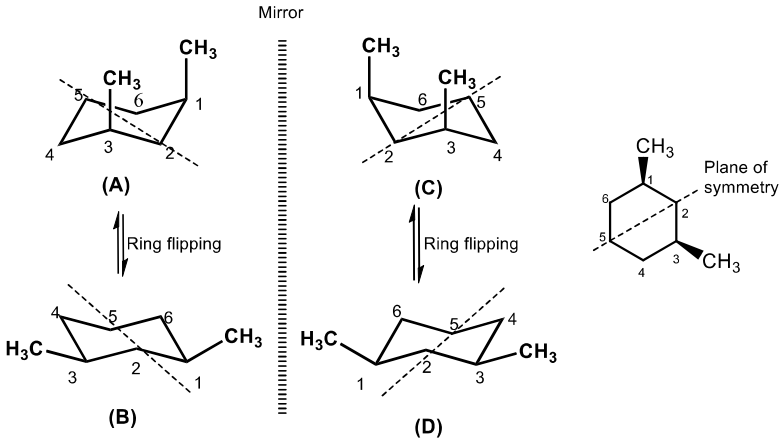


Fig: cis-1,3-dimethyl cyclohexane

1. Optical isomerism: The cis-1,3-dimethyl cyclohexane has a intramolecular plane of symmetry passing through C2 and C5, therefore is a meso compound and such compound is optically inactive and cannot be resolved. Compound (A) and (C) as well as compound (B) and (D) are superimposable mirror images of each other, i.e. there are two pairs of identical compounds.

2. Relative stability: When both the methyl groups are in axial position (A) and (C) each will have two butane gauche interactions. Methyl group at C1 is gauche to C3 and C5 carbons of the ring and methyl group at C3 is gauche to C1 and C5 carbons of the ring. This would corresponds to 4x0.9 = 3.6 Kcal/mol. In addition to this, the two bulky methyl groups themselves produce 1.8 Kcal/mol steric interaction, therefore the total energy content increases to 5.4 Kcal/mol.

When both the methyl groups occupy the equatorial positions (B) and (D), there are no butane gauche as well as any steric interactions. Therefore, conformations (B) and (D) are more stable than conformations (A) and (C).

b) Trans-1,3-dimethyl cyclohexane (a,e): The isomer in which one methyl group is at the axial position and the other at the equatorial position, i.e. the two methyl groups are on the opposite side of the average plane of the ring.

1. Optical isomerism: The trans-1,3-dimethyl cyclohexane there is no

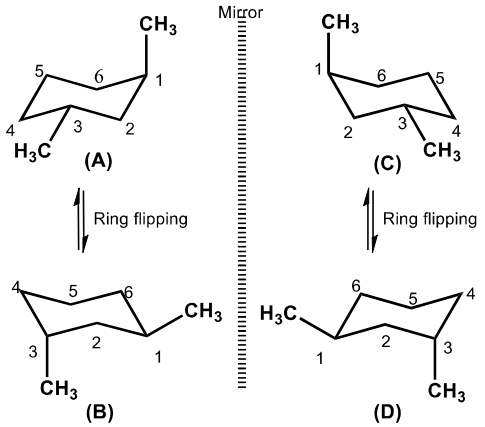


Fig: Trans-1,3-dimethyl cyclohexane

intramolecular plane of symmetry hence it is optically active. The conformations (A) and (C) or (B) and (D) are non-superimposable mirror images of each other hence, they are pairs of enantiomers. Flipping of compound (A) into (B) as well as compounds (C) into (D) produces identical compounds and hence they have equal stability.

2. Relative stability: In trans-1,3-dimethyl cyclohexane, there is one axial and one equatorial methyl group so that there are two gauche butane interactions rises van der Waal' strain with 1.8 Kcal/mol. Two methyl

groups are at 1,3 position and cannot have any interactions with each other.

The order of stability:

Cis-1,3- (e,e)	>	trans-1,3-(a,e)	>	cis-1,3 (cis)
0.0 Kcal/mol		1.8 Kcal/mol		5.4 Kcal/mole

D. 1,4-Dimethyl cyclohexane: 1,3-disubstituted cyclohexane shows geometrical isomerism i.e. cis form and trans form we will discuss them one by one.

a) Cis-1,4dimehylcyclohexane (a,e): The isomer in which one methyl group is in the axial position and the other in the equatorial position, i.e. the methyl groups are on the same side of the average plane of the molecule.

1. Optical isomerism: The cis-1,4-dimethyl cyclohexane has a intramolecular plane of symmetry passing though C1 and C4 hence it is optically inactive. It exists in the meso form and cannot be resolved. The two conformers (A) and (C) or (B) and (D) are superimposable mirror images and optically inactive. Flipping of compound (A) into (B) or (C) into (D) produce the identical compounds and hence have equal stability.

2. Relative stability: In cis-1,4-dimethyl cyclohexane there is one axial methyl group so that there are two butane gauche interactions. Thus there will be total 1.8 Kcal/mol of van der Waals strain for cis-1,4-dimethyl cyclohexane.

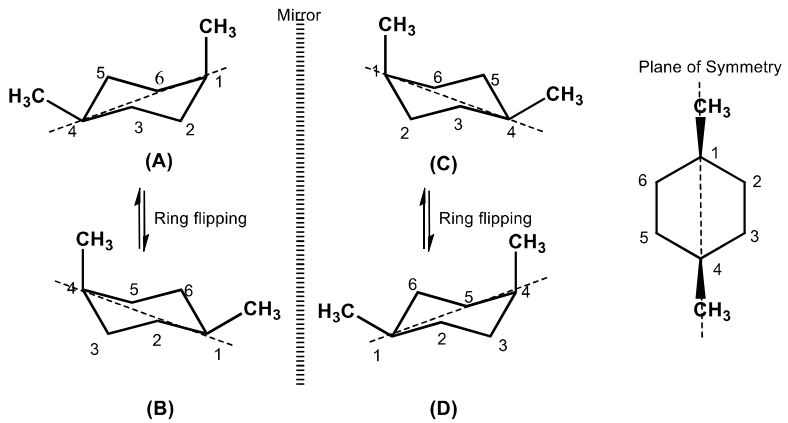


Fig: Cis-1,4-dimethylcyclhexane

b) Trans-1,4-dimehylcyclohexane (a,a and e,e): The isomer in which both

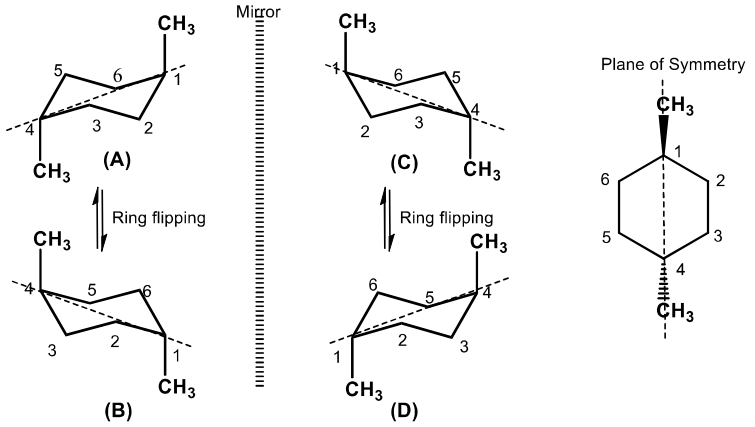


Fig: Trans-1,4-dimethyl cyclohexane

methyl groups are on the opposite side of the average plane of the ring. The isomer in which both methyl groups are in the equatorial (e,e) or axial positons (a,a).

1. Optical isomerism: The trans-1,4-dimethyl cyclohexane has not only the plane symmetry passing through C1 and C4 but also have a center of symmetry and hence it is optically inactive. Compound (A) and (C) on ring flipping produces more stable di-equatorial conformations, that are compounds (B) and (D).

2. Relative stability: When both methyl groups are in axial position (a,a) there will be totally four 1,3-diaxial interactions i.e. two above and two below the plane therefore highly unstable and will contain total 4x0.9 = 1.8 Kcal/mol of van der Waals strain. But when both methyl groups are in the equatorial position, there are no such interactions and hence it is more stable conformation.

The order of stability of conformers..

Trans-1,4 (e,e)	>	cis-1,4 (a,e)	>	trans-1,4 (e,e)
0.0 Kcal/mol		1.8 Kcal/mol		3.6 Kcal/mol

Following table gives various possible isomers of dimethyl cyclohexane and their relative energies.

Position	Isomer	Conformation	No. of butane gauche interactions	Relative energies Kcal/mol
1,1	-	(a,e)	2	1.8
1,2	Cis-1,2	(a,e) or (e,a)	3	2.7
	Trans-1,2	(a,a)	4	3.6
	Trans-1,2	(e,e)	1	0.9
1,3	Cis-1,3	(a,a)	4	5.4
	Cis-1,3	(e,e)	0	0.0
	Trans-1,3	(a,e) or (e,a)	2	1.8
1,4	Cis-1,2	(a,e) or (e,a)	2	1.8
	Trans-1,2	(a,a)	0	0.0
	Trans-1,2	(e,e)	4	3.6

* *

E-Commerce : Theory and Practice

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Preface

Electronic commerce, or simply e-commerce, is changing the way in which banks and consumers interact and transact. E-commerce provides consumers the ability to bank, invest, purchase, distribute, communicate, explore, and research from virtually anywhere an Internet connection can be obtained.

Given the explosive growth of the Internet, most e-commerce providers are migrating from proprietary networks and dial-up servers to the Internet in order to capture larger market shares. The World Wide Web, or simply the Web, has become the vehicle of choice for conducting commerce over the Internet because of the user-friendly and rich multi-media interface provided by Web browsers.

E-business (Electronic Business) is the convergence of communication and information processing technology within core business process and culture. It is an enabling business process made possible with technology that provides more information and faster information delivery.

It is neither a separate technology for business nor a separate business process. To most people, E-business incorrectly conjures an umbrella of radical initiatives for doing business on the Internet—rather than for efforts at enabling business as usual and extending marketing, sales, and support opportunities merely through a new channel.

A strong rationale for funding, managing, and providing IT solutions for e-commerce from within the organization. Selling part of the e-commerce venture or outsourcing operations to IT firms simply does not usually permit a company to reap the

maximum benefits of e-commerce. At times, however, it may be in a company's interest to go outside the firm and form strategic alliances with companies in the same or complementary industries.As is the case with outsourcing operations, such as the relationships with Amazon, alliances should not generally relate to the company's core competencies. They also should not typically relate to customer interaction activities such as customer service and fulfillment, unless there are clear advantages related to a company's capabilities.

After formulating an e-commerce strategy, senior managers must develop a plan for implementation. The company's organizational structure may at times conflict with the goals of e-commerce, and senior managers must anticipate these conflicts and act accordingly, whether by changing the structure of the traditional organization or by creating new structures specific to e-commerce. These considerations span the areas of financing, management teams, and operations. A final consideration is the use of strategic alliances .

The success of e-Commerce depends on the security of data like personal details and credit card numbers transmitted over the Internet. The domain name system Internet protocol that makes IP addresses readable by humans is insecure. Security measures need to be taken in e-Commerce systems to prevent compromising the systems. Some of these measures include building firewalls, incorporating cryptography and authentication, and using secure connections.

This book contains the fundamental and basic information of subject and the selection of contents makes it an appropriate book for the students.

—Editor

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1

Introduction

ELECTRONIC COMMERCE

Electronic commerce, or e-commerce, (also written as *eCommerce)* is a type of business model, or segment of a larger business model, that enables a firm or individual to conduct business over an electronic network, typically the internet. Electronic commerce operates in all four of the major market segments: business to business, business to consumer, consumer to consumer, and consumer to business. It can be thought of as a more advanced form of mail-order purchasing through a catalog. Almost any product or service can be offered via ecommerce, from books and music to financial services and plane tickets.

E-commerce has allowed firms to establish a market presence, or to enhance an existing market position, by providing a cheaper and more efficient distribution chain for their products or services. One example of a firm that has successfully used e-commerce is Target. This mass retailer not only has physical stores, but also has an online store where the customer can buy everything from clothes to coffee makers to action figures.

Amazon, by contrast, is a primarily an e-commerce-based business that built up its operations around online purchases and shipments to consumers. Individual sellers can also engage in e-commerce, establishing shops on their own websites or through marketplaces such as eBay or Etsy.

Such marketplaces, which gather multitudes of sellers, serve as platforms for these exchanges. The purchases are typically fulfilled by the private sellers, though some online marketplaces take on such responsibilities as well. E-commerce transactions are typically be done through a computer, a tablet, or a smartphone.

Aspects of Electronic Commerce

When you purchase a good or service online, you are participating in e-commerce.

Some advantages of e-commerce for consumers include:

- *Convenience.* E-commerce can take place 24 hours a day, seven days a week.
- *Selection.* Many stores offer a wider array of products online than they do in their brick-and-mortar counterparts. And stores that exist only online may offer consumers a selection of goods that they otherwise could not access.

But e-commerce also has its disadvantages for consumers:

- *Limited customer service.* If you want to buy a computer and you're shopping online, there may or may not be an employee you can talk to about which computer would best meet your needs. Some websites do include chat features to connect with their staff, but this is not a uniform practice across the industry.
- *No instant gratification.* When you buy something online, you have to wait for it to be shipped to your home or office; however, services such as Amazon increasingly offer same-day delivery as a premium option for select products.
- *No ability to touch and see a product.* Online images don't always tell the whole story about an item. E-commerce transactions can be dissatisfying when the product the consumer receives is different than expected.

DEFINITIONS AND MODELS

There are many definitions of e-Commerce, but they all imply some manner of electronic mediation for business transactions. The UK Department of Trade and Industry (DTI) defines e-Commerce as: The exchange of information across electronic networks, at any stage in the supply chain, whether within an organisation, between businesses, between businesses and consumers, or between the public and private sectors, whether paid or unpaid.

Though the word *commerce* carries with it a sense of activities being undertaken for payment, this definition gives the term *e-Commerce* a broad informational scope to also include activities for which no direct payment is made within a supply chain. A supply chain describes the distribution of goods, services and information flows between market participants within or between industries. For example, a vehicle manufacturer is at the heart of a variety of supply chains, including parts, raw materials, services, etc., supplied to it by other firms. The optimal management of a supply chain reduces transaction costs. As a result, the competitive advantage of the vehicle manufacturer is enhanced. This explains why many prefer the term *e-Business* rather than *e-Commerce* to describe such electronically mediated activities.

The DTI definition does not just place the scope of e-Commerce as being Internet- or Web-mediated, but includes electronically mediated activities undertaken outside the Internet and/or which pre-date the Internet.Earlier forms of e-Commerce, prior to the term being coined, include Electronic Data Interchange (EDI). This is the exchange of information by trading partners, for example orders, using technically defined templates whose origins go back to 1969. The succeeding decades have seen many large corporations taking up EDI based on value-added networks. Value added is the process whereby each successive stage of production adds more value than the previous stage. Examples include private sector organizations such as IBM and GEIS (part of the US giant

General Electric). Another major sphere is that of Electronic Funds Transfer (EFT) through which the banking system facilitates financial settlements. Prominent amongst EFT systems is SWIFT (Society for Worldwide Interbank Financial Telecommunication), which has handled international inter-bank settlements since the 1960s. The BACS system is one such that handles inter-bank settlement for the UK banking sector. Finally other industries have created their own forms of EDI such as the airline reservation system, SABRE.There is a distinct difference between the Internet and these other forms of electronic transactions:

- The Internet uses protocols that are *open* and *non-proprietary*. That is, these protocols are published so that theoretically any user can use them to hook up to the Internet
- EDI systems are *closed* or *proprietary* systems, which are open only to paying participants.

The fact that systems are closed means a greater guarantee of security for all transactors. Open systems are by definition open to potential fraudulent activity. So though the economic transactions may be alluring, the potential threat to the integrity of global payment systems is too great at present for the major international banks to shift towards Web-enabled systems. One of the major challenges to examining, analysing and explaining the business environment for e-Commerce is the confusion of terms. Perhaps more importantly, the lack of appropriate models by which to examine, analyse and explain it inhibits clarity of thought and interpretation.

Central to any market transaction, whether in a geographical or virtual location, is the exchange of information. In a market economy, prices signal information about transactions between consumers and producers and between producers themselves. The equivalent in e-Commerce is Business-to-Consumers (B2C) and Business-to-Business (B2B). The advantage of e-Commerce to consumers is greater access to fuller information on prices of goods and services. The

advantage to producers is they can directly access a greater market potential for their goods and services. However, e-Commerce does not overcome the problem of transaction costs (particularly transport costs) and immediacy in purchasing goods and services at designated locations, although it may reduce search costs in some general instances and shift them from producers to consumers in others. Essentially, e-Commerce does not alter the nature of exchange and transactions in a market economy.

Moreover, given the relatively low level of Internet commerce in most advanced economies, the heroic assumption that the Internet is now the universal market transactor is not vindicated by evidence. Given the United States had first-mover advantage, and the size of its economy (which is only slightly less than the whole of the European Union), it may come as no surprise that e-Commerce revenue in the United States in 2000 was twenty-three times that of the United Kingdom, thirty-three times that of France and seventeen times that of Germany. The ratio of B2B to B2C for the same year in the United Kingdom, France and Germany was 7.04, 7.06 and 7.09 respectively, compared with 7.07 for the United States. If one looks at the contribution of total e-Commerce to national income, measured by Gross Domestic Product (GDP), the results do not stand up to many of the hyped claims.

Notwithstanding the rise and then fall in e-Commerce revenues in 2000 and 2001, and allowing for the size of the US economy, e-Commerce represents a small proportion of all economic transactions. The essential issue is that the dominant virtual medium is television and is likely to remain so for a long time, so that adaptations of this technology to the demands of e-Commerce are more likely to generate longer-term benefits and greater market access. There is also a tendency to conflate goods and services that can be downloaded via a modem, for example software and music, with more physical goods that have to be delivered to the home or pick-up point. In other words, there is as much variability in e-Commerce transactions as there is in conventional ones.

Examples of B2C include Amazon.com, the on-line retailer of books, music and games. Amazon started achieving profitability ($5 million) only in the last quarter of 2001 after having invested $3 billion in its short life, much of which has been spent establishing itself as an on-line brand and creating a fulfilment system. The disadvantage for many B2C companies dealing in tangible goods is the lack of a distribution system that is reliable and economically efficient. These firms to date have difficulty obtaining the economies of scale and scope derived by large retail outlets in conventional shopping malls.

Much of B2B activity is associated with the operation and management of supply chains. Advances in information and communications technology (ICT) have facilitated the development of real-time supply chains, that is, orders for goods and services that are activated immediately. For example, the Ford Motor Company had proposed to link its suppliers of car parts to Ford's production sites through their Web sites so that adjustments in demand for parts could occur instantaneously.

However, rather like Just-in-Time (JIT) inventory systems, instantaneous delivery of large items of inventory from anywhere in the globe was not realizable owing to size and cost restraints. The technology does speed up the turnover time of production through instant receipt and processing of orders. What these changes produce is an electronic continuum along which supply chains find themselves in terms of the two types of flow:

- Those which use electronic mediation to organize their supply chains, but whose tangible goods require physical transportation, and whose payment is handled using traditional inter-company means.
- Products whose entire supply chain can be mediated by electronic means, in terms of product, payment and its mediation. So digital artefacts, for example computer programs can be developed, and then searched for, ordered, invoiced, paid for and delivered to customers using wholly electronic means.

Chaffey's taxonomy includes other less well cited e-Commerce models such as C2C and C2B. Consumer-to-Consumer (C2C) implies the sale of goods and services between individuals, often via auction sites such as eBay. Consumer-to-Business (C2B) implies individuals selling goods and services to companies. Examples include the sale of cars by individuals to companies. Conceptually in these cases, it is difficult to define who is the consumer and who is the producer. By definition, a consumer does not sell. Such models persist even though the semantic irregularities demand otherwise, partly because no better descriptions currently exist, and that these are part of marketing strategies and ploys by particular companies.

A more concrete model is Business-to-Public Institution, or, more commonly in the United Kingdom, Business-to-Government (B2G). This relates to the trade in goods and services between the private sector and the different forms of government, whether local, regional or national. This particular description is gaining greater resonance as governments in the advanced economies seek to promote the concept of e-Government. A final model is the User-to-User or Peer-to-Peer, which is styled P2P. This implies a relationship between two individuals that is electronically mediated but not via any central body. Freenet is an example of a network that promotes the digital exchange of music artefacts on a P2P basis.

ELECTRONIC COMMERCE MODELS

E-commerce, or electric commerce, is the process of buying and selling of various products and services by businesses through the internet. Nowadays e-commerce has become very popular among the people who want to buy and sell different things because of the convenience it offers and the cost benefits to retailers and the cost savings to the customers, and also the secrecy it offers.

E-commerce draws on such technologies as electronic funds transfer, supply chain management, internet marketing, online transaction processing, electronic data interchange (EDI),

inventory management systems, and automated data collection systems.

Modern electronic commerce typically uses the World Wide Web at least at one point in the transaction's life-cycle, although it may encompass a wider range of technologies such as e-mail, mobile devices and telephones as well.

E-commerce is the purpose of internet and the web to conduct business but when we concentrate on commercial deals among organizations and individuals demanding selective information systems under the guarantee of the firm it accepts the form of e-business. Nowadays, the word 'e' is hitting momentum. There are primarily five types of e-commerce models:

Business To Consumer (B2C)

Business to consumer is the first type of e-commerce that is also the most common one. It is also known as B2C model. In this type online business selling is offered to individual customers. This type started to expand after 1995 and now became one of the most common e-commerce. The B2C model works by retailers and marketers that use clear data in various marketing tools so can sell their products to the internet users.

The internet users can use the shopping cart for everything they need. Payment is mostly done through credit cards or by payment gateways like the PayPal.

Direct interaction with the customers is the main difference with other business model. B2C normally deal with business that are related to the customer. The basic concept of this model is to sell the product online to the consumers.

Business To Business (B2B)

Business to business, known as B2B model, is the largest e-commerce model that is based on revenue which involves trillions of dollars. In this both the buyers and sellers are business entities. B2B describes commerce transactions between businesses, such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer.

The volume of B2B transactions is much higher than the volume of B2C transactions and any other transaction.

The primary reason for this is that in a typical supply chain there will be many B2B transactions involving sub components or raw materials, and only one B2C transaction, specifically sale of the finished product to the end customer.

Benefits of B2B model:

1. Encourage businesses online.
2. Products import and export.
3. Determine buyers and suppliers.
4. Position trade guides.

Consumer To Consumer (C2C)

Consumer to consumer (C2C) or citizen-to-citizen electronic commerce involves the electronically facilitated transactions between consumers through some third party. A common example is the online auction, in which a consumer posts an item for sale and other consumers bid to purchase it; the third party generally charges a flat fee or commission.

The sites are only intermediaries, just there to match consumers. They do not have to check quality of the products being offered.

The C2C model facilitates online transactions of goods and services between the individual net users. But in this both the web users or both the parties cannot carry out any transaction without the platform that is provided by an online market maker such as the eBay.

There is also the Customer to Business (C2B) model which is relatively less common. It's a complete reversal of the traditional sense of transaction, but could be found in crowdsourcing based projects.

Peer To Peer (P2P)

Peer to peer, peer-to-peer or usually said as P2P, is a communications model in which each party has the same capabilities and either party can initiate a communication

session. This type that is a technology that helps their customers to share a computer resource and computer files to anyone they require without the need of a central web server.

In recent usage, peer-to-peer has come to describe applications in which users can use the internet to exchange files with each other directly or through a mediating server.

In some cases, peer-to-peer communications is implemented by giving each communication node both server and client capabilities. Those who are going to implement this model, both sides demand to install the expected software so that they could convey on the mutual platform.

This kind of e-commerce has very low revenue propagation as from the starting it has been tended to the release of use due to which it sometimes caught involved in cyber laws.

Mobile Commerce

Mobile commerce or m-commerce, uses mobile devices like the mobile phones as can carry out online transactions. Nowadays, web designers are trying to optimize website so they can easily view on mobile phones and to allow the use of this model. Mobile Commerce conduct commerce using a mobile device, such as a mobile phone, a Personal Digital Assistant (PDA), a smartphone, or other emerging mobile equipment such as dashtop mobile devices. Mobile commerce products and services that are available:

- Mobile ticketing - tickets can be sent to mobile phones using a variety of technologies. Users are then able to use their tickets immediately, by presenting their phones at the venue.
- Mobile vouchers, coupons and loyalty cards - mobile ticketing technology can also be used for the distribution of vouchers, coupons, and loyalty cards. These items are represented by a virtual token that is sent to the mobile phone.
- Content purchase and delivery - mobile content purchase and delivery mainly consists of the sale of ring-tones,

wallpapers, and games for mobile phones. The convergence of mobile phones, portable audio players, and video players into a single device is increasing the purchase and delivery of full-length music tracks and video.

- Location-based services - the location of the mobile phone user is an important piece of information used during mobile commerce transactions.
- Information services - a wide variety of information services can be delivered to mobile phone users in much the same way as it is delivered to PCs. These services include: news, stock quotes, sport scores, financial records and traffic reports.
- Mobile banking - banks and other financial institutions use mobile commerce to allow their customers to access account information and make transactions, such as purchasing stocks, remitting money.
- Mobile StoreFront - mobile phone as a touch sensitive handheld computer has for the first time made mobile commerce practically feasible
- Mobile brokerage - stock market services offered via mobile devices have also become more popular. They allow the subscriber to react to market developments in a timely fashion and irrespective of their physical location.
- Auctions - unlike traditional auctions, the reverse auction (or low-bid auction) bills the consumer's phone each time they place a bid.
- Mobile Browsing - with a mobile browser, customers can shop online without having to be at their personal computer.
- Mobile Purchase - catalog merchants can accept orders from customers electronically, via the customer's mobile device. In some cases, the merchant may even deliver the catalog electronically, rather than mailing a paper catalog to the customer.

- Mobile marketing and advertising - refers to marketing sent to mobile devices.

ECOMMERCE INFRASTRUCTURE DECISIONS

Every business requires an infrastructure to support its customers and operations. This includes facilities, equipment, and processes for all functional areas. Choosing the correct infrastructure to match your business strategies enables your operations to run efficiently. Conversely, if an element of your infrastructure is out of sync with your strategies, you will likely feel the pain in every aspect of your business.

Here's an example. If your value proposition is to provide the highest level of customer service for premium products, your infrastructure should include processes to deliver quick and responsive service, including live chat, self-service tools, and quick turnaround on questions and orders. I addressed strategies for value propositions earlier, in "What's the Value Proposition of Your Ecommerce Company?."

Choosing the correct infrastructure to match your business strategies enables your operations to run efficiently.

If your value proposition is to provide the lowest prices every day, your infrastructure should reflect that goal. You can accomplish this in various ways. But the cost of goods sold and overhead expenses — which include infrastructure items — should be as low as possible.

Typically, ecommerce businesses try to maintain a high degree of flexibility in their infrastructure to keep fixed costs low, to react quickly to market changes or competitive pressures. A key infrastructure decision is whether to outsource or manage operations in-house.

Most ecommerce businesses are small, with fewer than 25 employees. If you look at all the functional areas of the business that must be managed on a daily basis, it will be hard to find and afford an in-house staff with all the skills required to be successful. When deciding on your business infrastructure and operations, be sure to evaluate what your core strengths are.

Know what you do well and know what you do not do well. They are equally important. Look to outsource part-time activities or ones that require high levels of skill or specialization.

Marketing. Of all the infrastructure elements, marketing may be the most important. To succeed, your website must be found. Once visitors are on your site, you need to keep them there and compel them to buy from you. That's the job of your marketing team. Whether it's website design, social media, search marketing, merchandising, email, or other forms of advertising, it's all about marketing.

Managing marketing activities in-house is very challenging. Most small ecommerce businesses outsource at least part of it.

Facilities. A key competitive advantage that ecommerce businesses have over brick-and-mortar stores is not having to invest in physical facilities. In many cases, you can run your business out of a home office, basement, or garage. If you drop ship or outsource fulfillment, you may be able to do that for a long period of time. Even with many employees, you can set up your offices in class B or C space, as you have no need for a fancy store in a high-traffic location.

A word of advice is to keep your options flexible. Try to find an office park with a variety of spaces of different sizes. You may be able to start in a smaller space and move up to a larger one (without penalty), as your needs change.

A key competitive advantage that ecommerce businesses have over brick-and-mortar stores is not having to invest in physical facilities.

Customer service. There are many choices today for delivering high-quality customer service. You can manage those activities in-house or outsource to a third party. Basic customer service for sales and post-sales activities can be handled using email and, for more extensive needs, phone support. A customer-management system will make those activities easier, but for smaller companies, it is not a requirement.

Live chat will impact your operations — someone needs to be available during specified hours of operation. Be sure to

gauge the impact of that on your organization, if you decide to handle those activities in-house.

Information technology. Choosing an ecommerce platform is one of the most important decisions you will make in your business. Do you want to build and host your own system, outsource the development and then manage the system going forward, or use a hosted, software-as-a-service platform that is turn-key and externally managed?

If you build and host your own system, you may need more cash upfront and skilled administrators and developers on your staff. By using a SaaS platform, you will not need to host or manage the system in-house, but you may still need web developers on staff. Choosing to outsource the development and hosting will reduce your staffing costs, but you will incur higher costs for any future enhancements or changes to your websites.

There are pros and cons to any approach. Think through the impacts on your staffing, cash flow, and bottom line before you move forward.

Fulfillment. Another key decision is whether you will manage your own inventory or outsource those activities to a fulfillment house or through drop shipping arrangements with your suppliers.

Managing your own inventory will provide a high level of control, but you will tie up cash in warehouse space and fulfillment staff. In some industries — such as the jewelry supply industry that my previous business was in — managing your own inventory was the most logical choice. We had no alternative for drop shipping, and most items were purchased in bulk and were very small. We did not trust preparation and fulfillment to an outside service.

Select the best fulfillment option to meet your needs. Be sure to understand the costs involved and analyze the other options before moving forward.

Finance and administration. You can manage your finance and administration activities in-house, outsource them, or use a hybrid of the two.

If your ecommerce platform is tightly integrated into your accounting system, you may have very little need for an in-house bookkeeper. If you use separate systems for your website, order management, and accounting, you may need more help for data entry and making sure that the information is properly managed.

Many ecommerce companies use outside services for vendor payments, payroll, and other basic accounting activities. They decide to focus on the sales, marketing, and customer service. This allows them to maintain a focus on growing their businesses, instead of paying an internal accountant — or doing that work yourself as the business owner.

On the administration side, you need a leadership team. Good communication is important, whether you have three or 100 employees. Be authoritative or democratic in your management style — it is up to you. But choose a style and stay consistent. Be sure that everyone understands their roles, as well as the overall business strategies. You may need to adjust your approach as your business evolves.

Good communication is important, whether you have three or 100 employees.

Human Resources. Many small-business owners avoid the human resources function. Recruiting, setting up compensation, maintaining compliance, and other HR activities are specialized and time-consuming. You may choose to bring the resources in-house. But, should you outsource, there are many individuals and agencies well equipped to do the job.

TYPES OF E-COMMERCE

There are different types of e-commerce. Following are the lists of five major types of e-commerce.

Business-to-Consumer e-commerce (B2C)

In this type, online business attempt to reach individual consumers to sell out the goods. The most frequent online consumer purchases have been books, music, software, air

tickets, PC peripherals, clothing, videos, hotel reservations, toys, flowers and consumer electronics.

Business-to-Business e-commerce (B2B)

In this type businesses focus on selling to other business. There are number of B2B business models developed, including e-distributors, B2b service providers, matchmakers, and infomediaries that are widening the use of B2B e-commerce.

Forrester and Gartner, major research firms on online commerce estimated that B2B commerce is 10 to 15 times greater than B2C commerce. Firms are using B2B auction sites, spot exchanges, online product catalogues, and other online resources to obtain better prices.

Consumer-to-Consumer (C2C)

In this type of e-commerce consumers sells to other consumers with the help of an online market maker, such as the auction site eBay. In C2C e-commerce, the consumer prepares the product for market, places the product for auction or sale, and relies on the market maker to provide catalog, search engine, and transaction-clearing capabilities so that products can be easily displayed, discovered, and paid for. The size of the market is estimate over $5 billion and is growing rapidly.

AOL boasts some 14000 chat rooms covering such topics as healthy eating, caring for your Bonsai tree, and exchanging views about latest soap opera happenings.

Peer-to-Peer e-commerce (P2P)

Peer-to-peer technology enables internet users to share files and computer resources directly without having to go through a central Web server. In this e-commerce no intermediary is required.

Examples:

1. Gnutella is a peer-to-peer freeware software application that permits users to directly exchange musical tracks, typically without any charge.

2. Napster.com established to aid internet users in finding and sharing online music files known as MP3 files.

M-commerce

Mobile commerce or m-commerce refers to the use of wireless digital devices to enable transactions on the Web. It utilizes wireless networks to connect call phones and handheld devices such as the PalmVIIx to the Web.

Once it is connected the mobile consumers can conduct many types of transactions, including stock trades, in-store price comparisons, banking, travel reservations, and more. It is most widely used in Japan and Europe where cell phones are more prevalent than in the United States but it is expected to grow more rapidly.

Marketing in New Globalised Economy

Today's Companies need fresh thinking about how to operate and compete in the new economy. Today's economy is made up of old and new elements and is essentially a hybrid. We want to emphasize new elements such as the following:

* Companies are increasingly subcontracting activities to outsourcing firms. Their principle is to outsource those activities that others can do cheaper and better but retain core activities.
* Companies are increasingly benchmarking their performance against best-of-class companies anywhere in the world.
* Companies are deepening their partnering arrangements with key suppliers and distributors.
* Companies are emphasizing interdepartmental teamwork to manage Key processes rather than relying on traditional departmental systems.
* Companies are recognizing that, much of their market value comes from intangible assets, particularly their brands, customer base, employees, distributor and supplier relations, and intellectual capital.

* Companies are making substantial investments in information systems as the key to lower their costs and gain a competitive edge.

Many standard marketing practices like mass media advertising, sales promotion, sales force calls were part of the old economy. They will continue to be important, but today's businesses will have to answer such questions as:

1. "Is too much money being spent on mass advertising and not enough on one-to-one customer relationship management?
2. "Will companies need as many salespeople as before in an information-rich economy?"
3. "Should companies reduce their huge sales promotion expenditures and move to everyday low prices?"

The Major Driver's of the New Economy

Many forces play a major role in reshaping the world economy, among them technology, globalization and market deregulation play a major role. Here we will describe four specific drivers that strengthen the new economy:

1. Digitalization and connectivity
2. Disintermediation and re-intermediation
3. Customization and customerization
4. Industry convergence.

Digitalization and Connectivity

Today most appliances and systems operate with digital information, which convert text data, sound, and images into a stream of zeroes and ones that can be combined into bits and transmitted from appliance to appliance. Software is essentially digital instructions for operating systems, games, storage, and other applications.

But bits will not reside in separate appliance unless connectivity is established. For bits to flow from one appliance and location to another, a wired or wireless communication

network is necessary. The Internet, the "information highway," can dispatch bits at incredible speeds from one location to another. Much of today's business is carried over networks connecting people and companies. When they connect people within a company to one another and to the company mainframe these networks are called Intranets. Extranets when they connect a company with its suppliers and distributors; and the Internet when they connect users to a large worldwide "information repository." Connectivity is further enhanced by wireless communication. Consumers and business people no longer need to be near a computer to send and receive information. All they need is a cellular phone or personal digital assistant (PDA, such as a Palm). While they are on the move, they can connect with the internet to check stock prices, the weather, sports scores, or send and receive email messages. They can place online orders by simply using a phone or a PDA.

Disintermediation and Reinterpretation

The new technological capabilities have led thousands of entrepreneurs to launch a dotcom in the hope of striking gold. The amazing success of early online dot-coms such as AOL, Amazon, and yahoo struck terror in the hearts of many established manufacturers and retailers. For example, Compaq had its hands tied because it sold its computers through retailers, whereas Dell Computer grew faster by choosing to sell online. Established store-based retailers-notably bookstores, music stores, travel agents, stockbrokers and car dealers – began to doubt their future as more businesses went into direct online marketing. They feared, and rightly so, being disintermediated by the new e-tailers.

But disintermediation was only half the story. Re-intermediation took place on a grand scale. New online middlemen appeared such as mysimon.com, Priceline.com, lifeshopper.com, buy.com, compare.com.

As for the traditional "brick-only" firms – such as Compaq and Merrill Lynch started their own online sales channels becoming "brick-and-click" competitors.

Customization and Customerization

The old economy revolved around manufacturing companies whose main drive was to standardize production, products, and business processes. Through standardization and branding, manufacturers hoped to grow and take advantage of economies of scale. In contrast, the new economy is supported by information businesses. As companies grew proficient at gathering information about individual customers and business partners (suppliers, distributors, retailers), and as their factories were designed more flexibly, they increased their ability to individualize their market offerings, messages and media.

For example, Dell Computer invites customers to specify exactly what they want in a computer and delivers a custom-built one in a few days. The combination of operational customization and marketing customization has been called customerization. A company is customerized when it is able to dialogue with individual customers and respond by customizing its products, services and messages on a one-to-one basis.

Customization is not for every company: There are several downsides.

(a) Customization can raise the cost of goods by more than the customer is willing to pay.

(b) Some customers do not know what they want until they see actual products.

(c) Customers cannot cancel the order after the company has started the work on the product.

(d) The product may be hard to repair and have little sales value.

In spite of this, customization has worked well for some products like laptop computers, apparel, skincare products, and vitamins and is an opportunity worth investigating.

Industry Convergence

Industry boundaries are blurring at an incredible rate. Film companies such as Kodak are also chemical companies,

but they are moving into electronics to digitize their image-making capabilities. Disney is not only into cartoons and theme parks, but it makes major films, licenses characters, and manage retail stores, hotels, cruise ships, and educational facilities. In all these cases, companies are recognizing that new opportunities lie at the intersection of two or more industries.

How business practices are changing

(a) From organizing by product units to organizing by customer segments.

(b) From focusing on profitable transactions to focusing on customers lifetime value.

(c) From focusing on just the financial scorecard to focusing also on the marketing scorecard.

(d) From focusing on shareholders to focusing on stakeholders.

(e) From Marketing being the exclusive responsibility of the marketing department to marketing being every employee's responsibility.

(f) From building brands through advertising to building brand through performance.

(g) From focusing on customer acquisition to focusing on customer retention.

(h) From no customer satisfaction measurement to in-depth customer satisfaction measurement.

(i) From over-promise, under-deliver to under-promise, over-deliver.

(j) Today's marketplace is made up of traditional consumers (who do not buy online), cyber consumers (who mostly buy online), and hybrid consumers (who do both). Most consumers are hybrid. They shop in grocery stores but occasionally order from Peapod; they buy books in Barnes & Noble bookstores and sometimes order books from bn.com.

But people still like to squeeze the tomatoes, touch the fabric, smell the perfume, and interact with salespeople.

Consumers are motivated by other needs than only shopping efficiency. Most companies will need a presence of both offline and online to cater to these hybrid consumers. Companies are adjusting their marketing practices to meet new conditions. Two newer practices that companies and their marketers are getting involved are:

1. E-business and
2. Customer relationship management.

How marketing practices are changing:

E-business

E-business describes the use of electronic means and platforms to conduct a company's business. The advent of the internet has greatly increased the ability of companies to conduct their business faster, more accurately, over a wide range of time and space, at reduced cost, and with the ability to customize and personalize customer offerings. Countless companies have set up websites to inform and promote their products and services.

They have created Intranets to facilitate employees communicating with one another and to facilitate downloading and uploading information to and from the company's computers. Companies have also set up Extranets with major suppliers and distributors to facilitate information exchange, orders, transactions, and payments.

E-commerce is more specific than e-business; it means that in addition to providing information to visitors about the company, its history, policies products, and job opportunities, it also offers to transact or facilitate the selling of products and services online. Amazon.com, e-plasticsnet, e-steel are examples of e-commerce sites.

E-commerce has given rise in turn to e-purchasing and e-marketing.

E-purchasing means companies decide to purchase goods, services, and information from various online suppliers. Smart e-purchasing has already saved companies millions of dollars.

E-marketing describes company efforts to inform, communicate, promote and sell its products and services over the Internet.

Customer Relationship Marketing

Customer relationship marketing (CRM) enables companies to provide excellent real-time customer service by developing a relationship with each valued customer through the effective use of individual account information. Based on what they know about each individual customer, companies can customize market offerings, services, programs, messages and media.

STRATEGY OF E-COMMERCE

In designing an e-commerce strategy, it is critical to recognize what the Internet changes. Not every value proposition in traditional commerce can attract customers in e-commerce, and not every traditional strategy is a viable source of increased profitability. The best strategies do not ignore the fundamental properties of the Internet and the behaviour of its users.

The organization must develop strategies for e-commerce operations that are consistent with overall corporate strategy. (Since this is a dynamic model, the order of appearance of these elements may be different. Strategy may precede leadership and resource commitments and structure and systems already in place may constrain the strategy decision.) The goals should include an increase in customer acquisition, enhanced channel optimization, improved customer loyalty and retention, and capturing value for the organization.

- Well-positioned online brand
- Online-friendly offerings
- Reliable customer service
- Cross-channel coordination

Four strategic moves are :

Well-Positioned Online Brand: Acquiring Customers and Building Trust. The simplest way for companies to initiate e-commerce operations is to transfer the brand name to the

Internet, using the company's name as the domain name so that existing customers and potential new customers can easily find the company's Web site. The company can then advertise the Web site in various physical locations and in all print publicity materials. All letterheads, business cards, other types of business publications, and traditional advertising media should include the Web site address. In-store signage, kiosks, advertising on bags, and other materials have also been successful in drawing customers to the online channel. Large online marketing campaigns are likely to produce click-throughs and hits, but not customers, and have typically proved to have poor payoffs.

A brand name will draw customers to the company's site and can help assure customers about the quality of the offerings, the accuracy of the information, and the security of the Web transactions on that site. The brand name can also promote customer loyalty. The company must continue to provide the level of service and security that the brand name implies, or it will fail to attract repeat online customers and may even damage the traditional brand.

If the company's traditional brand is centered on price competition, it must reevaluate this strategy for e-commerce. Price competition is rarely a viable source of profitability in e-commerce. Search costs for comparing prices are negligible online, and price wars have typically led to prices decreasing to just at or above cost. The Internet also offers easy access to stores that offer price differentials, because customers do not need to travel any physical distance to get to any given store. Only in limited contexts should companies expect to achieve long-term competitive advantage based on price.

Online-Friendly Offerings: Product Selection and Differentiation. The company must decide what products to offer on the Web site. Companies such as Office Depot have found that they are able to provide more total products to customers through Web sites. Physical store space limits the number of inventory items available in stores, while the Web enables the company to provide a larger product offering. Even

when integrating their offline and online brand management, a company should not feel compelled to offer precisely the same products online as in its physical stores. The ability to offer a large quantity of products, especially in retail industries, is a major inducement to acquiring an online channel.

Further, it is fully appropriate for a company to eliminate online offerings that are simply unprofitable or otherwise inappropriate. General retailers such as Wal-Mart and grocers have used price minimums, margin requirements, and category restrictions to limit their online offerings. Some companies also require a minimum total purchase on their Web site.

Companies should also consider peripheral offerings in addition to those provided by the company's physical facilities. Such additions are especially appropriate for companies in service industries and companies with large business-to-business (B2B) components. For example, Office Depot's business services offerings are a strong complement to its office supplies business.

Another differentiator is offering customers the ability to obtain unique or uniquely tailored products or information. Customization can be a powerful differentiator because it allows customers to control the product or service choices, and loyalty can be built partly due to high switching costs. Personalization gives customers their very own version of the site that can include information and recommendations based on the customers' prior purchases and demographics.

Reliable Customer Service: Inspiring Loyalty among Customers. Building trust online requires more than a strong brand; it requires strong customer service practices that emphasize the convenience of the online channel. The customer must trust the company and its Web site. Trust can be built through assurances of privacy and transaction security and by providing accurate information. Trust in the transaction's completion is built through prompt and accurate fulfillment of orders. Many people purchase at Amazon rather than other Web sites because of its consistently highly rated fulfillment and customer service operations.

Web site design also contributes to satisfying customers. Basic characteristics of the site, such as simplicity, legibility, clarity, and a professional look, are necessities for all Web sites. Strong search engines are especially important for companies with a large number of product offerings. Information about physical stores, customer service, and delivery and return policies should be easily accessible from the home page.

Technology should be a facilitator and not an end in itself, however, and the company should not invest too heavily in design features without being confident of their appeal. Neiman Marcus found that its customers were not interested in viewing luxury products on a high-technology platform. Barnes and Noble discovered that they could not create interest in online parallels to their in-store coffee bars and author visits.

The site should also provide a number of services for customers who need information about the site, the offerings, or products they have purchased. These include comprehensive FAQ (frequently asked questions) sections, easily accessible information on delivery and returns, and rapid email response and technical support, where appropriate.

Numerous delivery options should be available to the customer to allow for both speed and low-cost preferences. Companies such as Nordstrom's, which offers products that need to be examined in person before the sale is complete, have provided particularly generous return policies to overcome the hesitation to purchase online inherent in their product line.

Physical stores can also be used for pick-up of items that are needed immediately in industries such as pharmacies. Customers should also be offered convenient opportunities to return defective or unsatisfactory products, including returning such products to the physical stores.

Cross-Channel Coordination: Convenience and Revenue Stimulation. The Web site and physical stores should not be seen as two separate entities that happen to share a brand name. Cross-marketing is an important component, but

ultimately, the online and traditional stores must have complementary roles in the overall corporate strategy. Exploiting the advantages of integration means more than drawing customers to the Web site through promotion in the physical store.

Allowing online customers to pick up and return orders to physical stores provides customers with choices and convenience, bringing more traffic to the physical stores. Initially many traditional companies did not allow online customers to return purchased products to their stores.

Today, virtually everyone allows customers to return undesired items to physical store locations. Numerous studies have shown the propensity of customers to make additional purchases when drawn to the store by online-generated functions. Therefore, the Web site should include an easily accessible store locator function that includes a map to the location, a phone number, and store hours. The physical store and online operations can each be used to stimulate sales in the other channel. Some products that require high levels of interaction with the product can be introduced to the online customer but sold in the physical locations.

Kiosks that provide a computerized access to the online site, on the other hand, have been a successful mechanism in physical stores to stimulate online traffic. Many retailers have encouraged the use of kiosks to order online products not available in the physical store or when delivery of the products is more convenient. Kiosks are also effective in overcoming concerns about online shopping for less computer literate customers.

The Web site can also provide more convenience for customers who wish to purchase specific items immediately rather than wait for delivery. For example, Office Depot can now direct customers to local stores that currently have the product in inventory. Customers need not call all the local stores and tolerate taped messages and long waits to find a product. Even Internet pure-play companies like Amazon,

through its alliance with Borders, for which it provides Web site operations, can direct customers to the nearest Borders store that has a desired product. Customers need only provide a zip code.

Integration of physical stores and online operations can also lead to greater efficiencies. Supply chain advantages that lead to more effective purchasing, inventory control, and logistics management may enhance the company's overall cost structure and result in greater profitability.

2

E-Commerce: A Global Overview

AN OVERVIEW OF E-COMMERCE

E-commerce is the most important application of the new communication technology. Manufacturers, traders and consumers can now reach the market more quickly and get more information than they could ever before. The electronic commerce has penetrated the businesses in many ways. E-commerce has tremendously reduced the transaction costs allied with purchase, sales, operating, holding inventory and financial cost. The application of e-commerce through development of web site enhances the potential global market and sales revenue, product, potential new customers, services and geographical areas. In term of non-financial benefits, e-commerce has significantly helped improving human resources and timeliness, quality of services, customers' satisfaction and some other indirect effects.

The imperative of electronic commerce depends on the evaluation and assessment. To evaluate related data on e-commerce is necessary, since it is not readily available. The available data are collected by different agencies using numerous definitions and methodologies used by the collecting group. In the absence of reliable data, policy makers, governing bodies and business communities are unable to take decisions that reflect the changes brought about by the e-commerce. By

employing relevant and accurate data on e-commerce, the policy makers and researchers would be able critically analyse the impact of e-commerce on labor market, market structures and functioning, changes in distribution of goods and services, customers preferences changes in global competition. It permits them to take well-framed decisions about the policies and investments in e-commerce related sector.

Research forecasts that e-commerce will account for 86% of worldwide sales of goods and services by the year 2004. The potential for e-commerce is bright, specifically in those markets where buyers and sellers are motivated to reduce costs, increase efficiency and cut delivery time. By 2003, estimated revenues from e-commerce across the globe will be approximately 1.5 trillion dollars. The rate of growth varies due to the development of infrastructure especially in developing countries. Projected Internet users by the end of 2000 are approximately 48% (North America), 22% (Western Europe), 17% (Asia Pacific) and 7% (Middle East/Africa), which of course stimulate further growth of e-commerce (Sussan and Kassira, 2003).

E-commerce Across the Globe

In Malaysia, the rate of development of e-commerce is quite low compared with other developed countries like Australia, United Kingdom and United States. Table 1 shows the value of e-commerce transactions for Malaysia, Australia and United States.

Table : Value of E-Commerce Transactions (USD)

Countries	*1998*	*1999*	*2000*
Malaysia	18.01m	58.89m	164.15m
Australia	123.2m	180.6m	1.2b
United States	25b	75b	250b

Sources:

1. International Data Corporation, 1999

2. Australia Bureau of Statistics, Household Use of Information Technology Report, 1998

3. Forrester Research Report.

Value of e-commerce transaction across the globe especially in these three countries increase significantly in 1998 to 2000. It reflected the enhancement of awareness towards the importance of e-commerce in today's business. However the value of e-commerce transaction differs in comparison between the countries.

While, developed countries like United States and Australia enjoy greater income from doing business electronically, developing countries such Malaysia is gearing up to close the income gap. E-commerce success requires high level of education and technological skills.

The transportation, energy and telecommunication infrastructure also plays important role in ensuring e-commerce success. Without them, e-commerce impact cannot reach wider customers. In addition, the supporting services are also needed in achieving success of e-commerce. These services include banks, hardware manufacturers, programmers, access providers, information providers, web designer, market research organization and also higher learning institution.

Table :E-commerce Revenues Projection In Malaysia (1997-2004)

Year	***Revenue (USD million)***
1997	6.31
1998	18.01
1999	58.89
2000*	164.15
2001*	426.72
2002*	993.68
2003*	2,066.40
2004*	3,469.85

* Projections

Source: Malaysian Business, April 2000

In the case of Malaysia, several measures have been taken for past several years to support the progress of e-commerce like Multimedia Super Corridor (MSC) projects, establishing

Multimedia University and encouraging banking institutions to venture electronic banking transactions.

Due to those necessary actions undertaken, it is projected that e-commerce will continue to prosper in Malaysian market. R-commerce earnings in Malaysia for the year 1997-2004.

Meanwhile, developed countries such United States continues to enjoy the success of electronic commerce. It seems that e-commerce development in United States does not been affected by a number of crisis beginning September 11, 2001, downturn of economics and Iraq War.

According to the most recent studies carried out by Forrester Research and Institute for Supply Management (ISM) indicated significant growing of purchasing activities by enterprises using Internet.

For instance, average amount of indirect goods and services purchasing via Internet has progressed from 8.3% (Quarter 1, 2002) to 10.5% at then of the year. This momentum resumes till second quarter of 2003. The similar pattern was also found for purchasing of direct goods and services for the same time period.

Table : Average Amount of Purchasing Done Via The Internet

(as a % of total company purchasing)

Period	*Indirect Goods/Services*	*Direct Goods/Services*
Quarter 1, 2002	8.3%	5.7%
Quarter 2, 2002	8.7%	6.6%
Quarter 3, 2002	9.0%	6.5%
Quarter 4, 2002	10.5%	9.4%
Quarter 1, 2003	11.0%	10.0%
Quarter 2, 2003	11.0%	11.7%

Source: Forrester Research, Institute of Supply Management (ISM), January and July, 2003

A report by the Department of Commerce, USA acknowledged the increased use of Internet for commercial activity. In September 2001, 21% of the USA population was

using the Internet to make purchase and 8% was using it for online banking as against 135 of both activities in 2000. The Department of Commerce found that 36% of the population used the Internet to search for product or service information in September 2001, an increase of 10% compared to the preceding year.

In addition, United States government has introduced friendly policy and cost guidelines that promotes e-commerce growth. For instance, The USA Department of Trade in 1998 announced the standard transaction costs for some selected e-commerce activities. From the exhibit, it is clearly crystal that US government help to boost e-commerce by charging higher cost for transaction done via conventional and traditional method like booking flight tickets through travel agent. This additional cost is expected to change consumer behaviour and choice of means for doing business from the common ways to the latest and more attractive style, that is by electronic devices.

E-procurement

E-procurement or e-purchasing is a user-friendly, Internet-based purchasing system that offers electronic buying order processing and enhanced administrative functions to buyers that results in operational efficiencies and potential cost savings. Business enterprise can place orders with suppliers on the website. E-marketplace is an online exchange where multiple vendors and buyers meet at one site for dealing in goods, materials and services. A number of websites have been set up in various industries, but they are going under a process of selection with some business withdrawing from e-marketplace operation or merging with other businesses. E-procurement performs all procurement activities such as requisitioning, purchase order transmission, notification of electronic query, request, response to pre-bidding and receipt of goods and processing thereon. Virtually, all types of products, including books, music CDs, toys, household appliances, clothing, foods and other groceries, jewelries are available for sale on the Internet. The founder and Chief Executive Officers (CEO) of

amazon.com estimated that the books sold on the Internet accounted for around 15% of the total books market.

Many people believe that e-purchase benefits only certain quarters like large enterprises and multinational companies with very huge investments can afford to meet such expenses. That assumption is untrue. It can be applied to any enterprises of varied size. Quoting from the technology research firm, AMR Research, among businesses with more than 10,000 employees, 40% participate is some form of public B2B exchange while among companies with 1,000 to 2,500 employees more than 80% are expected to be doing so within a year or more.

E-purchase benefits enterprises by cutting a labor costs and improves efficiency by reducing human errors. To reduce errors further, enterprises must not allow purchasing by a single person every time. The benefits obtained by the e-procurement system should not be lost due to maverick purchasing. Since in e-purchase, the transactions conducted are more transparent both within the enterprise and with the suppliers. However, some of the suppliers are not very well equipped with it. E-procurement involves displaying the catalog and other information such as inventory and supplier mark up, are shared with others, which few suppliers are reluctant to do so.

The benefits should not only be to the buyers. It should be balanced with the buyer and the supplier. The purchasing should not be shifted from old to new suppliers. Reliability and the level of service must be enhanced. The relationship and trust that has been developed over a period of time cannot be ignored. The Canadian National Railway Company once had more than 75 000 items in its online catalogs that saved it $10 million in procurement costs.

For smaller purchases, the staff used to search paper catalog which did not have the required information and moreover other processes were done through phone, fax and mail services before. The initial teething problems such as issuing multiple requisition orders were resolved and soon the system went live

for all suppliers. E-procurement helped in getting better prices from suppliers.

After a trial of six months, the railroad company was able to reduce the cost of processing from an average $50 per order to $4 electronically. The company got larger discounts for bulk-buying and other purchases. The usage of online catalog can help the employees to check the items, which are purchased often. E-procurement focuses on the increasing integration of suppliers' procurement network. It supports all business partners in shortening process chains, speeding up the flow of information and exploiting potential for innovation. Procurement markets are already networked worldwide. A successful procurement system will depend on how well the network functions across the boundaries.

GLOBAL E-COMMERCE: MARKET OR IN THE MARKETPLACE

Today, 44% of North American companies are selling on-line. Thirty-six per cent more expect to do so by next summer, according to Lucent Technologies. By 2003, International Data estimates that the 159 million people online world-wide will have mushroomed to 510 million. This community is made up of your usual mixed bag of surfers and legitimate customers. Exactly the sort of people that pass through your average retail outlet. Just how do you get passers-by to do more than kick the tires?

To start with one needs to be more than a little "Internet savvy": you need to be fully aware of the virtual community, how it is reached and how its dollars are captured.

You need to understand the consequences of business operations and service delivery in a near light speed environment. But the chances are you may be one of the 75% of CEOs that Price Waterhouse Coopers say don't regularly log on to the Net. Nevertheless, you could be approving large sums to establish an on-line presence. Robert D. Hof wrote a whimsical piece on ecommerce in the March 10, 1999 *Business Week*. It

was in the form of a memo to senior management on the implications of doing business electronically. In part he said, "We have to get off our butts and get wired. Not just E-mail. Not just Web browsers or a Web site. I mean the big kahuna: electronic commerce. Our future depends on nothing less than transforming our company into a full-fledged e-business. Now. Or else we're roadkill." His shock language was directed at that 75%.

But Hof's "roadkill" can also be experienced by those who *do* plunge in. Audits of system development exercises almost invariably discover that, even when project scope *was* defined, it seemed to become longer and wider as the project advanced. But often scope is not defined. Scope uncertainty is a principal reason why IT projects far too often end up costing more than anticipated, generating products that don't exactly reflect what senior management originally had in mind. The risks can be considerable.

The problem is requirements definition. Senior management may have a sound, and profound conceptual understanding of what it wants. The IT team may be highly proficient. Failure occurs in bridging business concepts, technical planning and development. Sometimes no one is all that clear on just what is trying to be achieved. In such cases, all parties struggle to convert a mix of needs, wants, ideas and options into a workable tool or utility, often under the guns of business expediency and other pressures. These pressures may be so great that the team leaps into development before sufficient time has been spent on the necessary preliminaries. The problem may be compounded when technical novices push their IS department to deliver before the business homework is done.

We need to know globally, conceptually and tactically just what it is we are dealing with here. Few would disagree that Amazon.com practices e-commerce. Airline on-line ticket reservations and purchasing are evidently candidates, as are eBay, Mbank and a host of others. But what of promotional Websites? What of ATMs? What about call centres that use

telephony? And has all the Internet and Web hype really displaced the key functions of EDI?

Telephones, FAX machines and dedicated data lines are very much a part of today's business delivery infrastructure, and will continue to be so for the foreseeable future. Clearly "ecommerce" is a whole lot more than one technology and one user community. It is about the use of many technologies by many different individuals and organizations. The challenge is matching technology to need.

Let's start with some basic definitional issues. To begin with we are not all that clear about what "electronic" means. "Electronic" is not a synonym for "Internet". And we should not equate "ecommerce" with the World Wide Web. What is "commerce" in the electronic domain? Is it mere "presence"? Is it a transaction, or is it an event that by definition includes funds transfer? In my view "ecommerce" is an electronically facilitated business event. These events may use technology in whole or in part. Importantly, activity on electronic channels must serve the corporate bottom line. But serving the bottom line does not necessarily translate into immediate profit. For what could be a very long time, ecommerce involvement could be a loss leader. In effect, it may cost you to be there with no, or little, revenue assurance. In such cases, your corporate ecommerce strategy ought to be written around positioning yourself for future on-line business effectiveness. Either you, or your market, may not be sufficiently developed to make digital money.

There are many questions here but there is no denying that *whatever* ecommerce is exactly, it is big, and getting bigger. *CIO Canada* in August 1999 predicted that 1999 on-line retail revenue would be 145% over 1998. The Boston Consulting Group, in its *State of Online Retailing 2.0* said that "online retailers in Canada and the US will collect US$36.6 billion during 1999". Amazon.com is said to be the third largest book retailer in Canada, having achieved this status without any apparent promotion. Their 1998 sales were a reported $600

million plus. Auto By Tel is the second largest auto dealer in the US. (There are related initiatives under development in Canada by Microforum Inc., Tim Dealer Services and National Bank called "e-FINCOM".)

Business Week notes that "e-commerce (activity) between businesses is five times as much as consumer ecommerce, or about $43 billion last year. And by 2003, Forrester Research Inc. figures it will balloon to US$1.3 trillion. That's 10 times consumer ecommerce, constituting 9% of all U.S. business trade—and more than the gross domestic product of either Britain or Italy. Around 2006 or so, it might reach up to 40% of all U.S. business." Further, *Business Week* notes that "the on-line superstore Buy.com undersells rivals, sometimes at or below cost, hoping to make profits off advertising. It hit $125 million in sales its first full year in 1998—more than any company in history." (Read the *Business Week* quote again. In the ecommerce world, business rules vary more than a little from the traditional).

The numbers are impressive, but they are no more dramatic than are the pitfalls. The ecommerce playing field is really more a minefield than a sportsfield. Many enter it without taking time to put on the proper gear or learn the rules well. Some appear to forget that in business the bottom line pervades all: there has to be a business case behind every initiative, even if that initiative is putting free cereal samples in 10,000 mail boxes. Consequently the Internet is full of commercial and institutional Web sites that do not support the enterprise; in fact, some sites are so poorly put together and infrequently updated that they telegraph negative impressions.

Ecommerce is rarely all or nothing. It is rare that one is either fully into it or not in it at all. Likely the "not at all" scenario is no longer an option. Even independently owned bed and breakfasts now understand that they at least need an e-mail address, if not a full on-line reservation system. But it is infrequently "all" as well, unless you are a dedicated "virtual company" selling insurance, banking services or books to connected customers.

What this means is that the enterprise of the present is, indeed must be, ecommerce active. The challenge for business managers is in defining what ecommerce is for them. Importantly, they need to define what elements of their operation will be on-line, in whole or in part. They need to determine where the value-add is in providing speed over person-to-person contact and vice versa. They need good development and management tools, and they need techniques for measuring results.

Companies frequently assign their ecommerce development activity to their IS shop, to communications or marketing with little or no direction. There is the assumption that this is a new vehicle, yes, but the rules are the same. Nothing could be further from the truth. Example: your very attractive corporate logo may look real good on a print publication, but the colours could come out frightful on a Web page. Also, staff who is not given quality direction will err on the side of quantity. Many managers believe that high volumes of on-line information are a success measure. Rather, it may send messages about your lack of focus.

More than a few organizations who have established a Web presence brag about the "hits" they are realizing. But these huge numbers don't seem to translate into business activity and revenue. Why would that be? The answer is that an Internet "hit" is no more than a customer glancing in your shop window as he walks by. Something may or may not register with this person but you have no easy way of finding that out. Effective on-line firms track very carefully what their electronic visitors do – where they go, how long they ponder a page, whether they go back and re-visit a site. Software is now available to allow you to measure just exactly what impression your site is making. This is equivalent, to a degree, to a shop owner being able to reach out of his store and sift through the short-term memory of a passer-by.

Far too little time is given to the client issue. The Internet, the Web and on-line services put the enterprise in a global community. A lot of that community is looking for something

for nothing. Many of your enquiries and contacts will be, really, a waste of your time. But one never knows: your vision may have been firmly fixed on product vending in a 50 square kilometre area. You may be surprised to discover enquiries and orders coming in from other continents, many time zones away. Ecommerce will present you with a number of pretty serious risks and decisions. Do you re-engineer your operation to operate globally – as you must; or do you ignore those opportunities coming across your desktop and risk being panned by the on-line community?

Are you even emotionally ready to consider working in several languages and over 24 time zones? Do you have a reliable and current currency converter at hand? Are you licensed to vend in other countries? What happens if your customer is not satisfied with your product, or if you deliver and you do not get paid? If you offer "Excellent Customer Service", can you provide it at 4 AM on Sunday morning?

Imagine becoming *selective* about your customers. "Yes, I will deal with that person, organization, country, but not this one". I reckon few companies have established customer selection criteria that will serve to guide their front office workforce.

Here is the opportunity, and the challenge. Can you afford to ignore a global phenomenon that offers exposure to millions of potential customers and that enables transactions that could cost you less than a penny to process? If nothing else, on-line exposure can help you convey an image of progressive, informed, responsive enterprise. The challenge is in not losing sight of why you are there.

E-COMMERCE AND ITS APPLICATION IN INDIAN INDUSTRIES

Many international business researchers are of the opinion that increased globalization of markets and increasing international competition imply that firms in all nations will face similar, if not identical, competitive environments. In India due to liberalization of economy, the companies are facing acute competition in the international markets.

In the new millennium, the internet-based way of doing business has certainly changed many industries and has influenced many customers and businesses.

It has changed the shapes of whole set of industries and markets and has already had a great impact on consumers and is all set to have a very exciting future. It has improved services, reduce costs, open new channels and transform the competitive landscape.

This paper is divided into two parts. First part deals with how E-Business is changing business environment. Second part of the paper is designed to examine the application of E-Commerce in selected Indian industries. For the purpose of the study, the e-business applications are divided into three categories:

* E – Commerce
* E – Procurement
* E – Collaboration.

E-commerce

E-Commerce, which primarily refers to buying, selling, marketing and servicing of products or services over internet. Business on the net is classified into B2B (Business to Business), B2C (Business to Consumer) and C2C (Consumer to Consumer).B2B transactions are largely between industrial manufacturers, partners, and retailers or between companies.B2C transactions take place directly between business establishments and consumers.

B2B sites are essentially the net meeting points for buyers and sellers of the industrial world. They serve a limited number of customers. The Turnover would be many times that of the most B2C sites and most importantly they make profits.

B2C sites are offering low value items CDs, Cassettes, Food, Toys, Flowers, and Cards etc. because no complicated logistics are involved.

C2C sites don't form a very high portion of web-based commerce. Most visible examples are the auction sites. Basically,

if some one has something to sell, then he gets it listed at an auction sites and others can bid for it.

E-procurement

The Internet offers a natural platform to facilitate efficient procurement as numerous buyers and sellers find each other and transact according to some pre-specified protocols. The following are the procurement strategies available for a manufacturer.

* Strategic Partnership
* Online Search Strategy
* Combined Strategy.

1. *Strategic Partnership:* Strategic partnership strategy is to develop a long-term supply relationship with a specific supplier.
2. *Online Search Strategy:* Online Search Strategy is to shop online for a better price.
3. *Combined Strategy:* The combined strategy is to combine both – sign a long-term purchase contract with a supplier up to a certain level, but if necessary additional quantity may be purchased online.

E-collaboration

We define e-collaboration as business-to-business interactions facilitated by the Internet. These include information sharing and integration, decision sharing, process sharing and resource sharing. There are many new cases that examine different elements of collaboration from information sharing and integration to process and resource sharing.

IMPORTANCE OF GOING GLOBAL

Globalization involves the transfer of an existing business system to other countries or the management of another business system in other countries. The terms 'international', 'multinational', 'global' and 'transnational' have been used to describe different stages in the globalization ladder of business

development. The decision of nationally based e-Commerce to go global will depend on factors such as demography, entry modes, socio-cultural diversity, as well as the approach and management style to be used when entering new markets. The United States today represents the largest national market in the world, with roughly 25 per cent of the total world market for all products and services. The fact that 75 per cent of the world market potential is outside their national territory has been the force driving many US companies to 'go international' and even to extend further and 'go global'. With three-quarters of its revenue generated by its soft drink business outside the United States, Coca-Cola, acknowledged as the most successful global company, has driven the message of globalization further than anybody else. For non-US companies the incentive is even stronger. The two wealthiest countries after the United States, Japan and Germany, have 85 per cent and 94 per cent respectively of the world market potential.

Today there are only seven countries where English is the primary language spoken, by about half a billion people or 8 per cent of the total population, their combined economies representing only 30 per cent of the total world economy. e-Commerce companies that will continue to target this small percentage of the world market will miss out on capturing a much larger potential market. The total global e-Commerce market is forecast to reach $1.6 trillion by 2003, a very powerful incentive for companies entering this arena.

If present e-businesses have been able to achieve year-upon-year growth in visitors, sales or members using only domestic focused Web sites, then in order to sustain or increase this growth it will be almost impossible to do so without entering and servicing new markets. Almost 10 per cent of the world's population has access to the Internet. The global Internet audience had grown to 580.78 million people by the end of May 2002. The survey indicated that, for the first time ever, Europe has the highest number of Internet users in the world, with 185.83 million Europeans online, compared with 182.83 million in the United States and Canada, and 167.86 million in Asia-

Pacific. The survey's findings also indicate that the digital divide between developed and developing nations is as wide as ever. While Europeans account for 32 per cent of global Internet users, only 6 per cent of the world's Net users are based in Latin America. The Middle East and Africa combined account for just 2 per cent of global Internet users; the lack of tele communications infrastructures in those regions means that most citizens remain unconnected.

Methods of Entry

Until recently a traditional business has had the options of entering new geographical markets through direct or indirect exporting, new start-ups, franchising, joint ventures, acquisitions, concessions or licensing, depending on the degrees of risk and the level of involvement they were prepared to accept.

To these alternatives can be added now the virtual business via the Internet. The nationally based business will start with cautious testing of new markets, often selected with a similar culture, having a focus that is culturally and managerially 'ethnocentric' or centred around the home market. A multinational business will have a 'polycentric' orientation, i.e. a focus based on the understanding and appreciation of different operating contexts.

The global or transnational business will have a fully global strategy, focusing on maximizing the benefits obtained from economies of scale in sourcing, product standardization and marketing. Typical of global operators is their adaptable, geocentric approach, which allows them to 'think globally but act locally'.

Opportunities and Threat

The Internet has already made a big difference in the way business operates globally, offering substantial advantages to both buyers and sellers, because it can cope with a rapidly changing environment. Many industries have further motives for embracing the Web, as it offers huge savings on their

marketing and distribution costs, which in certain cases, for example the airlines, can make up about a quarter of their total operating expenses. The Internet has made a big difference to aviation, with portable computers becoming essential in the process of booking and buying air travel. Simplifying booking and cutting out the cumbersome process of issuing card tickets can be very attractive to customers. Since 2000, an increasing number of airlines, such as Northwest and Swissair, have been offering online facilities for seat selection and check-in, as well as for booking and paying for flights.

e-Commerce will also allow businesses to learn more about their Web customers, so they can package offers tailored to their individual needs. This is what in marketing terms is called 'customer of one' and it applies to airlines, just as it does to cars or computers. Continuing with the same example, there are distinguishing characteristics between the different levels of airline Web sites. The most basic are 'brochure sites' which offer simple static information, not much different from the printed brochures found in the bricks-and-mortar travel agents. At the next level are the constantly updated versions of the 'brochure sites'.

The third level contains sites that obtain information from the customer as he logs on and builds a profile of his travel needs and preferences. It can answer requests for information, take bookings and issue e-mail confirmation of bookings. This sort of e-Commerce transaction is now quite common, especially for the no-frills, low-cost airlines. The next generation Web site will recognize and greet the customer by his or her name when s/he logs on and will know that s/he is a valuable customer. It will be able to analyse his travel history and suggest alternative itineraries that might suit him better.

Niche Marketing

No-frills, low-fare carriers such as EasyJet and Ryanair have been using this low-cost, high service strategy to carve out successful niches. The emergence of these new companies has increased the level of competition in the industry, putting

established carriers under increasing threat of loss of business on their traditional routes and ultimately bankruptcy. One notable example is Swissair, and even British Airways has felt the pinch with the threat of its shares losing their blue-chip status. Other examples of industries that have made good use of the trend towards personalization through the Internet are the perfume and fashion industries. Custom fragrance marketers have been established, usually family-run businesses where the Internet has radically changed the direction of this niche market. In 2001 a number of new entrants have included Procter & Gamble with Reflect.com, Ashford.com, RomanceHer.com, Eleuria.com and Creativescent.com. The Internet is about to turn this niche market into a major profit-making category of prestige fragrance and force the major perfume companies to create custom divisions. Nevertheless these new ways of doing business are at risk for being untested and vulnerable to sudden market downturns or fashion changes.

Small and medium-size enterprises are the main beneficiaries of the low-cost marketing possibilities offered by the Internet, which can turn them from small niche players into global ones. A fundamental change is happening in the world of Asian marketing that could prove a bonanza for struggling companies. The Internet is providing low-cost ways for small to medium-size businesses to get their advertising message across, focusing on specific audiences. Asia has been experiencing a phenomenal growth in Internet advertising, whose potential demand has been recognized by US Internet advertising agencies.

DoubleClick Asia, a joint venture between New York-based Double Click and Hong Kong Web portal builder Asiacontent.com, has been able to track Internet users' movements by collecting 'cookies' or files embedded in users' Web browsers that log the pages they visit and for how long. This information allows marketing solution providers such as DotMedia China or Next Media to help their customers, which are local companies, to target their own local audience in a far more efficient way by posting relevant ads on their Web sites.

Another interesting SME example is Charles Tyrwhitt, a UK manufacturer of mainly shirts, but also ties and other accessories, to the exclusive ABC1 men market.

The company has adopted a 'clicks and mortar' strategy, which hopefully will turn this British niche player into a global one. It will also reduce its brochure and marketing costs. The company's strong customer service culture is being translated on to the Net, where this is so important. The firm's success lies in its ability to carry more than 3,000 lines of stock at any one time, with each shirt being offered in up to forty-eight combinations of size, cuff and sleeve. The company is able to maximize sales by targeting groups of people more effectively than could ever be done through mail order.

The key to the success of niche e-businesses is first and foremost brand awareness. Second, expanding the customer base geographically is leading to the need for a greater product range to meet strong local preferences in style and fashion. The Internet has proved to be the perfect messenger for niche interests, serving individual tastes and diverse geographical demands. In certain industries, such as national media, which were previously dedicated to mass markets, the Internet is offering for the first time the possibility of meeting specialist demands. As successful online newspapers in the United States reach less than 25 per cent of their local Net users, some have tried to add an interest-based niche to their regional focus.

For example, the *San Jose Mercury* is concentrating its online energies to SiliconValley.com, a specialist site for technology news. The objective is to have a network of loyal users by meeting specialist demand with detailed information. In the United Kingdom the commercial site Fish4, which is backed by local newspaper publishers, owned by the Guardian Media Group, is claiming to have reached the necessary critical mass of information to make a niche product. BBC News online is another example where the battle between general and niche is being fought. The way it uses its huge breadth of content, both broad-brush and localized, demonstrates the diversity of

its users and their demands. In just one day 98,450 different stories were read, amounting to a staggering 20 per cent of all the stories the site has ever produced.

Understanding the Global Environment

For the e-Commerce organization shaping the direction of its global expansion it is vitally important to understand the external environment as a means of identification of opportunities and threats. An analysis of the variety of factors and environmental influences is necessary in order to allow a balance of internal capabilities and resources with the opportunities offered externally that ultimately would affect business planning and implementation within the organization. The elements of the external environment connected with the organization can be divided into four distinct groupings, known by the acronym STEP.

3

Structure of E-Commerce

AN INTRODUCTION TO STRUCTURE OF E-COMMERCE

After formulating an e-commerce strategy, senior managers must develop a plan for implementation. The company's organizational structure may at times conflict with the goals of e-commerce, and senior managers must anticipate these conflicts and act accordingly, whether by changing the structure of the traditional organization or by creating new structures specific to e-commerce. These considerations span the areas of financing, management teams, and operations. A final consideration is the use of strategic alliances .

Internal Investment: Maintain Full-Equity Interest in E-Commerce. The company faces a decision about equity for the e-commerce venture, whether to retain complete ownership in the e-commerce venture or to spin it off as an independent company. The lessons are clear. Many high-profile failures occurred in traditional companies that tried to imitate the pure-play model by spinning off. Investment in the venture should be made from within the firm, and reliance on outside capital typically seems like an indicator of trepidation about e-commerce on the part of senior management.

Spinning off e-commerce was popular in the early period of e-commerce, and the results have generally been disastrous. Building up large market capitalizations through IPOs was a

popular trend, but it has become less desirable in a weaker and more skeptical stock market. The vast majority of these companies, including Wal-Mart, Kmart, Barnes and Noble, and Staples, have bought back the stock from equity partners and folded the e-commerce spin-offs back into the company.

- Internal investment
- Integrated management teams
- IT know-how from within
- Strategic partnerships

The other main justification for spinning off was that the company lacked the experience needed to pursue e-commerce or that additional investment capital was necessary. While it may be true that stand-alone firms sometimes find it easier to quickly develop e-commerce expertise, integrated e-commerce ventures in large organizations can also do this. Since e-commerce capabilities are becoming an increasingly important core competency, companies should develop the expertise and control the e-commerce operation inside the company through a full integration into business units and functions.

Integrated Management Teams: Innovate without Spinning Off. From the distribution side, e-commerce should often be seen as simply another sales channel and thus changes in the management structure are kept to a minimum. In industries that already have multiple channels such as banks (i.e., physical branches, ATM) and catalog businesses (e.g., Nordstrom), an integrated structure is particularly relevant. With full integration, business functions such as marketing are easy to coordinate and organizational territorial conflicts are reduced. A less ideal but still viable alternative is to create a separate business unit for e-commerce. Many companies that began with spin-offs and then brought e-commerce back within the company chose to adopt separate strategic business units (SBUs).

Many companies have started their e-commerce operations with entirely separate management teams, often proposed to increase the focus on innovation and e-commerce, under the premise that e-commerce will not be given enough attention or

independence by senior management at the parent organization. These management teams have often been established far from company headquarters, have had loose organizational cultures, and have been led by independent leadership often drawn from pure-play or other entrepreneurial companies.

Certainly innovation, flexibility, and creativity are needed to drive a successful e-commerce operation. But we have seen that this can occur successfully within traditional organizational boundaries. A formal set of management control structures and systems is necessary to balance the desired empowerment. When separate business units are established, they should function primarily to coordinate the full integration of e-commerce throughout the business units.

As with other organizational functions, it is sometimes desirable initially to establish a central organization both to drive and to coordinate these new activities. But, as the function matures, it should generally be more fully integrated into the business units. The separate functional units and the integrated functions within the business units may need unique structures and systems including unique performance measures and compensation and reward systems, but this customization of the organizational structure can be accomplished within existing organizational boundaries. There is no need to spin off core capabilities and detach valuable corporate assets.

IT Know-How from Within: Building Future Capabilities. Not every company, especially those late to e-commerce, will have invested well enough in IT to develop e-commerce independently. Many e-commerce companies, even those with strong IT departments, have chosen to outsource e-commerce because of the necessity of speed. Speed is indeed a powerful motivation for outsourcing, but outsourcing should be used to catch up, not to give up. Although outsourcing may be used initially to create e-commerce solutions, the company can reassume control over e-commerce and IT and eventually can use the e-commerce systems for traditional commerce as well. Staples followed this approach in attempting to catch its IT-leader rival, Office Depot. Staples invested heavily in IT to

build technology close to its core capabilities, but also created a sole-sourcing partnership to avoid delays in more peripheral areas of the business.

Another alternative is to acquire IT capabilities by purchasing a small IT firm and integrating the firm while the e-commerce solution is being implemented. UPS has followed this approach several times in its attempt to hold its IT leadership position over rival Federal Express, and UPS has been able to continually roll out new services while integrating its acquisitions.

Other companies, however, have made the mistake of selling equity to venture capitalists and then relied on these partners for all of their IT needs. Barnes and Noble made this mistake and then was hamstrung further when Amazon sued them for a patent violation related to their Web platform. Borders and Toys 'R' Us have taken the dramatic approach of having a competitor, Amazon, run their Web site for them. Companies must learn from these mistakes and not place themselves in such a precarious position with respect to IT.

Strategic Alliances: Moving beyond Core Competencies. Although companies are advised to maintain equity interest, management control, and IT integration, traditional businesses can benefit from alliances with online companies in other ways. These relationships are most beneficial when the arrangement gives the traditional company access to supply-chain management, peripheral offerings, and customer bases.

Supply-chain management is a particularly useful area for partnership when the company cannot simply supply online customers from the same distribution channels as physical stores. Wal-Mart, Kmart, and Target have all made such arrangements to deal with their general merchandising businesses. CVS also simplified its procurement process for its Web site by entering into a partnership with Merck.com.

To provide peripheral offerings that will be available only online, alliances have also proven to be a successful approach. Neiman Marcus partnered with several luxury retailers to

create a limited-scope "luxury portal" of high-end goods within its Web site. CVS partnered with WebMD to provide medical advice to complement pharmacy services.

Finally, traditional companies can gain access to large online customer bases by making strategic alliances with portal and ISP companies. Wal-Mart and Kmart entered agreements with AOL and Yahoo respectively to co-brand Internet service packages that would bring their customers online and to their site in particular. Traditional companies may also profit from providing a physical presence to online companies that are realizing the inevitable trend toward integrated channels. Target has agreed to house E*Trade kiosks and customer representatives in its stores, in what has been a beneficial relationship for both parties. For E*Trade, the Target deal was just one aspect of a bricks-and-clicks strategy that culminated with the building of a New York super-centre.

THE ELECTRONIC COMMERCE CHALLENGE

One of the biggest challenges in the development of electronic commerce has been for banks and merchants to overcome the issues of customer identification and account verification for online purchases. While the credit card systems have a process in place to verify and authorize transactions, the Internet poses challenges for merchants to not only validate that funds are available in an account, but to positively identify that the customer is in fact authorized to use that account for purchases.

Early in the life of eCommerce, this situation led to the development of the SET protocol (Secure Electronic Transactions). While the initial version of SET was written in 1995, it has yet to be implemented for a number of reasons.

More recently, there has been a standard proposed called x9.59 (Account Authority Digital Signatures, or AADS), which recognizes the necessity of binding a certificate to an account number. Lynn Wheeler, the author, appropriately summarizes the current situation in his document: "To make electronic

commerce real, it will be necessary to demonstrate integration of public-key bindings into the core account-based business processes. This requires changes to the installed data processing implementations. Without this integration, there is little hope of deploying electronic commerce on a large scale."

In the physical world, merchants can validate the identity of the accountholder by comparing the signature on the credit card with the signature on the sales slip. But in a virtual world, where the customer is not present, the merchant does not know if that person is authorized to use the account number provided for the transaction. The danger in the eCommerce environment is that without some additional controls, the exposure to losses from fraudulent usage is exponentially greater.

The Development of SET

Early in the life of eCommerce, this situation led to the development of the SET protocol (Secure Electronic Transactions). While the initial version of SET was written in 1995, it has yet to be implemented for a number of reasons. But the catalyst for SET was the realization that there must be a way to positively identify individuals in an online environment, and that the identification process must include the binding of the individual to a specific transaction. This is absolutely critical to the effective management of credit card and debit card account usage. The implementation of the SET protocol has been challenging for a number of reasons, and as time has passed there have been other standards and solutions proposed as alternatives. No doubt there will be many more, as eCommerce is still in its relative infancy. But with each iteration of SET or other proposed solutions, it's clear that the industry has recognized the major obstacles, both technically and operationally, and is working to overcome them.

When the first version of SET was released in 1995, it became clear to me that there were monumental operational issues related to its implementation which were not addressed in the specification. Most notably, I saw two major obstacles:

- While the role of a Certificate Authority is to guarantee the identity of an individual, in the case of financial transactions, it must extend far beyond that — it must also link the identity of that individual to a certain account number. This greatly increases the issue of liability for the CA.
- The linking of digital certificates to specific account numbers would require an overhaul of the mainframe systems and operational functions that manage credit cards or other transactional accounts, and the cost of implementation could be significant.

An Alternative Solution

More recently, there has been a standard proposed called x9.59 (Account Authority Digital Signatures, or AADS), which recognizes the necessity of binding a certificate to an account number. It was developed by Lynn and Anne Wheeler, a husband-and-wife team of computer scientists who work at First Data Corp. Their understanding of credit card processing and account management is reflected in this proposed standard, as it addresses three major issues:

- The fundamental concept of AADS is that it limits the scope of a digital signature to a specific account, so that the CA's liability is limited as well. In this case, it would be far more attractive to the banks to issue digital certificates; and they would be in the best position to do this since they would have both the customer and the account information.
- Since a digital certificate is tied to a specific account, it makes the operational process for the bank or card company manageable. If a card is reported lost or stolen, or if there is a credit problem with the account, both the account number and the certificate can be blocked at the same time to limit liability.
- The customer's public key would reside with the account record, eliminating the need for a parallel system and the associated operational issues and costs.

AADS advocates the use of public key cryptography, yet it incorporates business operational considerations that are necessary to the cost-effective implementation of electronic commerce. This viewpoint is critical for widespread acceptance and every-day use.

Lynn Wheeler appropriately summarizes the current situation in his document: "To make electronic commerce real, it will be necessary to demonstrate integration of public-key bindings into the core account-based business processes. This requires changes to the installed data processing implementations. Without this integration, there is little hope of deploying electronic commerce on a large scale."

AADS advocates the use of public key cryptography, yet it incorporates business operational considerations that are necessary to the cost-effective implementation of electronic commerce.

DIGITAL SIGNATURES AND ITS APPLICATION IN E-COMMERCE

When first invented in the 1970s, digital signatures made an amazing promise: better than a handwritten signature unforgeable and uncopyable on a document. Today, they are a fundamental component of business in cyberspace. And numerous laws, state and now federal, have codified digital signatures into law.

There's no simple definition for "digital signature," but if there were, it might go something like this: a cryptographic method of communication that authenticates transactions taking place over the Internet. No problem, right?

Basically, the idea behind digital signatures is the same as your handwritten signature. You use it to authenticate the fact that you promised something that you can't take back later. A digital signature doesn't involve signing something with a pen and paper then sending it over the Internet. But like a paper signature, it attaches the identity of the signer to a transaction. Having a digital certificate is like using your driver's

license to verify your identity. You may have obtained your license from Maryland, for example, but your Maryland license lets you drive in Nevada and Florida. Similarly, your digital certificate proves your online identity to anybody who accepts it.

Digital signatures are created through the use of public-key cryptography. If you are going to sign something digitally, you need to obtain both a public key and a private key. The private key is something you keep entirely to yourself. You sign the document using your private key which is really just a kind of code then you give the person (the merchant of the website where you bought something or the bank lending you money to buy a house), who needs to verify your signature your corresponding public key. He uses your public key to make sure you are who you say you are. The public key and private key are related, but only mathematically, so knowing the public key makes it possible to verify your signature without knowing your private key. In fact, it's nearly impossible to figure out your private key from your public key.

For acquiring a private and a public key one needs to obtain something called a digital certificate. For that, you go to a certificate issuer, which will give you a digital certificate which issues a identity of the person and issues him the public key. Anything he signs with his corresponding private key is valid." When you buy something online and digitally sign the transaction, you provide the merchant with your digital certificate. If the merchant trusts the issuer of the certificate, he uses the certificate to verify your signature.

Often the authority that provides you with a digital certificate will also provide you with a private key. Certain computer systems will let you generate your own private key, but be careful. That is where the potential for fraud comes in. It's considered impossible to forge a digital signature the way one can forge a paper signature, but if you are careless with your private key-leaving it unprotected on your desktop, for instance-it's possible for you to compromise its integrity.

Who issues the certificates?

Certain organizations want to become authorities in issuing digital certificates. The U.S. Postal Service, for example, is in the process of unveiling a programme to issue digital certificates. It's likely that banks and credit card companies will also be interested in doing the same.

The implications for digital signatures and e-commerce are enormous. Here's a simple example. Let's say Mickey Mouse buys a pound of cheddar on www.cheese.com, then denies he bought it. The cheese merchant is stuck with the bill because there's no way to prove absolutely that Mickey made the purchase somebody else could have used Mickey's password or his credit card number.

Such repudiations end up costing merchants money, which makes them raise prices to cover the costs of fraud, which, in turn, hurts honest consumers. But if Mickey had used a digital signature when he made his purchase, the merchant could prove that Mickey bought the cheese.

Using digital signatures opens up opportunities in other areas as well trading stocks, authorizing the transfer of medical records, applying for mortgages. All of the things that require a paper signature can potentially move online, making transactions smoother, faster, more secure and less expensive.

In most cases your company spends a lot on your user ID-password infrastructure, and simply can't afford yet another security infrastructure. One option is to look for products (the Practical PKI Appliance from Single SignOn.Net, for example) that provide support for both user ID-password authentication and digital signatures, all in one reusable package.

These laws are a mistake. Digital signatures are not signatures, and they can't fulfill their promise. Understanding why requires understanding how they work. The math is complex, but the mechanics are simple. Alice knows a secret, called a private key. When she wants to "sign" a document (or a message, or any bucket of bits), she performs a mathematical

calculation using the document and her private key; then she appends the results of that calculation called the "signature" to the document. Anyone can "verify" the signature by performing a different calculation with the message and Alice's public key, which is publicly available. If the verifica-tion calculation checks out then Alice must have signed the document, because only she knows her own private key.

Mathematically, it works beautifully. Semantically, it fails miserably. There's nothing in the description above that constitutes signing. In fact, calling whatever Alice creates a "digital signature" was probably the most unfortunate nomencla-ture mistake in the history of cryptography.

In law, a signature serves to indicate agreement to, or at least acknowledgment of, the document signed. When a judge sees a paper document signed by Alice, he knows that Alice held the document in her hands, and has reason to believe that Alice read and agreed to the words on the document. The signature provides evidence of Alice's intentions. (This is a simplification. With a few exceptions, you can't take a signed document into court and argue that Alice signed it. You have to get Alice to testify that she signed it, or bring handwriting experts in and then it's your word against hers. That's why notarized signatures are used in many circumstances.)

When the same judge sees a digital signature, he doesn't know anything about Alice's intentions. He doesn't know if Alice agreed to the document, or even if she ever saw it.

The problem is that while a digital signature authenticates the document up to the point of the signing computer, it doesn't authenticate the link between that computer and Alice. This is a subtle point. For years, I would explain the mathematics of digital signatures with sentences like: "The signer computes a digital signature of message by computing m^e mod n." This is complete nonsense. I have digitally signed thousands of electronic documents, and I have never computed m^e mod n in my entire life. My computer makes that calculation. I am not signing anything; my computer is.

PGP is a good example. This e-mail security programme lets me digitally sign my messages. The user interface is simple: when I want to sign a message I select the appropriate menu item, enter my passphrase into a dialog box, and click "OK." The programme decrypts the private key with the passphrase, and then calculates the digital signature and appends it to my e-mail. Whether I like it or not, it is a complete article of faith on my part that PGP calculates a valid digital signature. It is an article of faith that PGP signs the message I intend it to. It is an article of faith that PGP doesn't ship a copy of my private key to someone else, who can then sign whatever he wants in my name.

I don't mean to malign PGP. It's a good programme, and if it is working properly it will indeed sign what I intended to sign. But someone could easily write a rogue version of the programme that displays one message on the screen and signs another. Someone could write a Back Orifice plug-in that captures my private key and signs documents without my consent or knowledge. We've already seen one computer virus that attempts to steal PGP private keys; nastier variants are certainly possible.

The mathematics of cryptography, no matter how strong, cannot bridge the gap between me and my computer. Because the computer is not trusted, I cannot rely on it to show me what it is doing or do what I tell it to. Checking the calculation afterwards doesn't help; the untrusted computer can't be relied upon to check the calculations properly. It would n't help to verify the code, because the untrusted computer is running the code (and probably doing the verification). It would n't even help to store the digital signature key in a secure module: the module still has to rely on the untrusted computer for input and output.

None of this bodes well for digital signatures. Imagine Alice in court, answering questions about a document she signed. "I never saw it," she says. "Yes, the mathematics does prove that my private key signed the document, but I never saw it." And then an expert witness like myself is called to the stand, who

explains to the judge that it is possible that Alice never saw the document, that programmes can be written to sign documents without Alice's knowledge, and that Alice's digital signature doesn't really mean anything about Alice's intentions. Solving this problem requires a trusted signing computer. If Alice had a small hand-held computer, with its own screen and keyboard, she could view documents on that screen and sign them with that keyboard. As long as the signing computer is trusted, her signatures are trusted. (But problems remain. Viewing a Microsoft Word document, for example, generally involves the very software most responsible for welcoming a virus into the computer.) In this case we're no longer relying on the mathematics for security, but instead the hardware and software security of that trusted computer.

This is not to say that digital signatures are useless. There are many instances where the insecurities discussed here are not relevant, or where the dollar value of the signatures is small enough not to warrant worrying about them. There are also instances where authenticating to the signing computer is good enough, and where no further authentication is required. And there are instances where real world relationships can obviate the legal requirements that digital signatures have been asked to satisfy.

Digital signatures prove, mathematically, that a secret value known as the private key was present in a computer at the time Alice's signature was calculated. It is a small step from that to assume that Alice entered that key into the computer at the time of signing. But it is a much larger step to assume that Alice intended a particular document to be signed. And without a tamper-proof computer trusted by Alice, you can expect "digital signature experts" to show up in court contesting a lot of digital signatures.

ARCHITECTURE OF E-COMMERCE SYSTEMS

The buying and selling of products and services over the Internet is termed ‘online trading’. Online trading or e-Commerce is important to businesses because it provides a

flexible source of trading with customers, and with business partners. To enable online trading, companies need to combine existing computerized transaction processing systems and information systems with Internet and Web technology. Existing computerized systems, databases, and Internet and Web technology are the basic components of online trading and form the architecture of e-Commerce systems. Computer system architecture consists of hardware and software components that are configured in terms of the needs of organizations.

Companies connect computers to a LAN, WAN and the Internet, using TCP/ IP, based on client-server architecture, to share computer software, printers or scanners. Basic Internet tools such as e-mail, browsers, search engines and protocols such as file transfer protocol (FTP) and Telnet are combined to form the system architecture for e-Commerce.

The systems architecture for a company will depend on its trading activities. A retail company will have a different architecture from a manufacturing company or a service company. As a company changes and evolves its mission or objectives, its e-Commerce system architecture will need to change too. Alternatively, the stimulus to change may come from competitors who use the most modern e-Commerce technology.

Internet, e-Commerce systems and information systems

Some of the terms used to describe a company's involvement with the Internet are that it has 'an online presence' or it has 'a Web site'. Such terms hide the complex IT and IS that form the infrastructure that underpin e-Commerce systems.

An information system is the application of a computer to capture and process data to provide information for managers and executives for the purposes of decision making and management. A company will normally have various information systems, such as an airline reservation system or an inventory control system. These systems will be linked to a corporate database that stores relevant data, like product or customer

details. A company's Web site is connected to such information systems and databases to provide the essential product or service information for customer and employee use.

Companies' existing client-server technology and its IS/IT infrastructure is connected to the Internet to form part of an e-Commerce architecture. The e-Commerce architecture is based on a company's business model, consisting of the basic logic of what it wants to produce or sell, how it will market it, how it defines its customers and other fundamental business issues. IT is combined with Internet technology to enable a company to personalize its service to a customer.

Databases

A computer database consists of records on specific items of interest, for example customers' contact details or the products they have bought. It is a collection of data that can be queried for specific purposes such as targeting a particular customer for certain products. Databases are used to market products and services. This is termed *database marketing*. Databases are used to store data on the purchasing habits of customers and enable a company to develop a tailored relationship with its customers. The data are then processed to provide tailored information on individual customers' preferences that are then sent information about products or services relevant to their current buying habits. Data-mining techniques are used to reprocess existing data in databases to extract previously unrealized information of potential commercial use.

e-Commerce systems and the customer

e-Commerce systems that interface with the customer need to be pragmatic. The selection and evaluation of Internet technology need to be appropriate to both the company's needs and the customer's ability to use the system. A good business model will assume that the customer has little interest in technology and avoid the technology trap.

Avoiding the technology trap. It is not user-friendly to use over-complex Internet and Web technology in e-Commerce

systems. The technology needs to be appropriate to prevent prolonging the time it takes for customers' commands to be executed by the system.

Web site evaluation software

It is possible to measure the popularity of a company's Web site using evaluation software that generates log files. Such log files record the number of visitors to the site or page impressions. They record which parts of the Web site are most popular, the times of the day people visit, record which search engines are being used by visitors and how long they spend on the site, known as the 'stickiness' of the site. These log files can subsequently be used to evaluate the performance of the site from a business perspective and the information can be used to make it easier for customers to make transactions.

Internet service providers

A company wanting to trade over the Internet has to agree a contract with an Internet service provider (ISP). ISPs provide communication and hosting services for individuals and companies wanting to access the Internet. ISPs provide access to the Internet and enable Internet commerce by connecting individuals and companies to the Internet. There are thousands of ISPs that a company can choose from, all of them providing domain name services and electronic mail. The two most popular ISPs are UUNET Technologies and AT&T World Net. Other organizations, like a bank with mainframe computers, may also act as an ISP.

ISPs also provide hosting services for Web sites by installing and operating the server computers and software for a company. The computers and software are located at the ISP's site. Transaction services such as payment systems or order capture and fulfilment are also provided by ISPs.

Example of e-Commerce architecture

The important considerations for designing e-Commerce architecture are the customer, the company, the company's

existing information systems and how payment will be made. For example, a company with a Web site that includes an order form would need a Web server that can provide a catalogue, whose details would be retrieved from a catalogue database, and order form.

It would need to interface with an existing database to collect and record the order details entered by the customer. The payment might be transacted with a credit card whose details would be captured on the order form utilizing standard security features available on the Web.This example shows that an e-Commerce system is composed of existing information systems, databases and Internet technology. Other sophisticated e-Commerce architectures are possible for companies that need distributed transaction processing. For example, the Open Buying Consortium (OBI) has proposed a system architecture consisting of six fundamental system components split into buy-side, the customer and sell-side activities. These components are: Browse, Request, Approve, Fill, Receive and Pay.

APPROACHES TO E-SERVICE

We have identified three types of e-service literature. The first is what we call the *macro* or *very broad view* of e-service, namely that e-service is effectively synonymous with e-commerce. An *intermediate view* of e-service is that we can study the provision of *specialist services* made available by *specialist service providers* that help service Internet users (both individuals and companies). The third perspective on e-service is what we term a *micro perspective*, namely the provision of particular and varied detailed customer services within a site as *part* of the website - user interface.

At the broadest level is the view that e-commerce per se is an electronic service to customers - one that provides greater convenience. This view places e-commerce as an option available to customers, providing another channel of distribution or information. For example, instead of spending, say, an hour to physically access and purchase from a bookstore, the customer has the option to purchase the same electronically. As a further

example, a company may use the Web to provide information about the company's offering to assist consumers in their product search, without necessarily enabling the consumer to purchase through the Web.

A related macro view of e-service is the *services marketing* perspective on e-retailing. They argue that e-retail offerings are service offerings and exhibit many of the same characteristics as other non-Internet-based services. They further argue that Internet services can be evaluated by similar criteria, such as responsiveness, empathy and the establishment of trust through courtesy and competency. The principal service provided by e-retailers is a search and evaluation facility that potentially saves time and effort for the consumer. The task of the e-retailer is to provide a website design that caters to different shopping styles, provides evidence to reduce risk and also educates the user in a shopping mode that may differ to what they are used to in conventional retail shopping.

There is now a considerable number of papers that have applied the macro perspective of e-service to a specific industry. For example, Muir and Douglas (2001) have studied how service delivery has changed in legal services with the rise of e-commerce. They argue that the quality of service is potentially improved with the Web. A Web presence allows legal practices to be more transparent and to offer greater access to information for customers by way of improving their services. It is suggested that this improved communication may lead to a reduction in complaints against solicitors.An *intermediate perspective* of e-service is the provision of *electronic services* from *specialist providers* to users of the Internet and intranets. Thus we have a market (external or internal) in which key electronic services are similar to products and sold or exchanged in a market to general users of the Web. here is a huge variety of specialist firms that offer their services (products) to Web users.

Web designers form a stereotypical group in this category, but also included are all types of suppliers of a wide range of Internet services, such as portal providers or providers of any specific link in the Internet network. For example, consider the

commercial services offered by Compuserve, Prodigy, America Online and e-world. The pages of the national financial newspapers are filled with the advertisements of companies offering such Web-enabling services, some claiming to offer an integrated service.Electronic trust services are specialist e-services that provide reassurance and trust to the financial and privacy security of Internet information flow. There is a number of third-party commercial service providers who guarantee protection of either the financial security or the personal confidentiality of information flows.

A special case of this situation is the role of the electronic signature, an issue discussed by Travers (2001), who is particularly concerned with the status, planning and implementation of electronic signatures, in the context of the UK Electronic Communications Act 2000. He argues that electronic signatures can be considered within a knowledge management framework and proposes a six-part system that incorporates people, clients, knowledge matters, business development and training. Travers notes that the Electronic Communications Act provides:

- An approvals scheme for businesses providing cryptography services such as electronic signature services and confidentiality services;
- For the legal recognition of electronic signatures and the process under which they are verified; and
- For the removal of obstacles in other legislation to the use of electronic communications and storage in place of paper.

A somewhat unusual example of a specialist e-service is the provision of electronic money (Buck, 1997), which could be redefined as a trust-service, but Buck did not do so in his paper. He notes that there is a range of online payment systems, including credit systems (e.g. Payflow Pro), debit systems (e.g. BankNet), token-based mechanisms (e.g. Digicash) and electronic cash schemes (e.g. Mondex). Such mechanisms vary considerably in terms of safety, privacy protection and trustworthiness.

An example of a specialist e-service within an internal market is that of an e-mail-mediated help service (Hahn 1998). Hahn analysed 265 help-service responses from service logs and found, among other things, that users and help-service staff held different internal models for ideal e-mail communication. Users desired a fairly simple exchange of communication, that is, a clear question followed by a quick, simple response. Staff, on the other hand, envisaged the need for a more complex interrelationship, over several messages.

This takes us to the third perspective of e-service, namely the *micro* approach. Perhaps the dominant element in this field is the role of information. Some authors see information-based marketing as a potential competitive advantage. Other scholars see the Web as important for tracking and gathering customer feedback (Sampson, 1998; Sen *et al*., 1998). Still other writers focus on the role of e-information as an aid to facilitating consumer search.

It is particularly in Merrilees (2002) that a broader perspective is given to interactivity. He embraces a more multi-dimensional approach to the concept of interactivity. Included factors are two-way communication between the e-retailer and the user; the ability of each party to communicate with the other including through e-mail; the ability to personalize the situation for the individual user; and the ability of the individual to control the communication and learn from it.

Finally, there are numerous other Internet studies that emphasize particular aspects of e-service besides information or interactivity. For example Mols (2000), in his study of Danish retail banking, examined the role of more individualized services for consumers and their need for a close relationship with the bank. As a final example of a difficult-to-classify study of providing services on the Internet see Mathur (1998) who takes a financial accounting approach to the topic.

In summary, we have used our three-part classification of macro, intermediate and micro as an initial way of structuring the literature, as it exists.

This is not to say that we endorse all perspectives of the literature. In particular we have reservations about the macro perspective. In a sense, the use of the World Wide Web by a retailer to market its organization as an online e-retailer is no more a services marketing exercise than the use of catalogues makes Lands End a services marketer.

The *service component for an e-retailer* is the sum total of the ancillary support mechanisms provided by the retailer and the channel intermediaries to aid the Web prospective buyer to select, pay for and receive the merchandise.

The e-retailer may provide services for the consumption of the prospective buyer through the Web channel, but this still does not make the channel a service unto itself. Thus we prefer the intermediate and micro perspectives of initial classification and our empirical research design is more in keeping with the micro perspective. A more refined taxonomy of e-services is developed below.

BRITISH LIBRARY (www.bl.uk)

This is a free service provided by the British Library in London that includes a 'turn the page' function. This technology is new to websites and is only available for three articles at the time of going to press. The home page offers a range of services provided by the library and is easy to use with simple menu selection and navigation.

Of interest is the 'turn the pages' of Leonardo da Vinci's notebook. This technology displays a scanned image of the original notebook and allows the user to turn pages using the cursor in a way similar to a real book. To enter this site, select 'turn the pages' on the home page and follow the instruction. To use this facility a Shockwave driver is required and can be downloaded free in two minutes from the same site. This is an interesting site for those who are interested in history.

E-SERVICE METRICS: A MANAGEMENT TOOL

Our research in the previous section revealed that interactivity was overwhelmingly important for achieving a

perception of high e-service. This finding is even stronger when we add frequently asked questions (FAQs) to its role because this is a form of interactivity. In a sense the emphasis on interactivity is akin to the importance of personal service in the conventional literature.

Interestingly, personal service was found to be the most important type of customer service in conventional retailing. Interactivity in the e-context includes two-way communication, the ability of the e-retailer to communicate to the user and the ability of the user to communicate with the e-retailer, responsiveness in answering questions (including the special case of FAQ) and personalization of the process.

Even without measurement, interactivity is clearly a good candidate as a capstone element in a powerful e-service programme. Similarly, we recommend that an e-retailer should audit its interactivity every year or so, along the lines suggested in the previous section (using, say, a critical incident analysis). If interactivity is found to be too low or not as high as desired, then steps can be undertaken to increase it, through, for example, increased customization or other means.

A second key finding of our research study is that interactivity needs to be supported by special offers, information, variety of items for sale and ease of use, as part of an integrated approach to e-service. An e-service audit of an e-retail site should incorporate all components of e-service.

A third key finding of our research is also very important for the practice of good e-service. We have shown that it is not sufficient to create and manage *positive e-service experiences*. Equally, the firm's e-commerce strategy needs to be able to handle *negative critical incidents*.

The first point is that *even high-service sites* experience periodic problems in e-service. Show that high-service sites, while generally having a very high (72 per cent) positive incidence of interactivity, nonetheless had a 6 per cent (that is, non-zero) incidence of negative interactivity. The same pattern occurs in the areas of product variety and delivery.

Firms need to take steps to continuously improve (that is, lower) the rate of negative incidents. Ideally, more interactivity may need to be built in if all other aspects of interactivity fail - this is the ultimate approach to service-failure recovery. Perhaps it is a toll-free phone service that is needed as a service in the last resort?

A fourth key finding of our research that needs to be carefully considered by websites is that the solution for sites attempting to increase their e-service capability is not simply to *add* more information, an FAQ service or similar facility. Such actions are a necessary, though insufficient condition to becoming a high-service site.

Take information, for example. Information incidents, both positive and negative, were important in determining membership of the e-retailer in a high-service or low-service category and the overall level of e-service of the site. Yet there was only a slight difference (and one that was *not* statistically significant) in the quantity of information across high-service and low-service sites.

4

E-Commerce and Economic Development

E-COMMERCE AND ECONOMIC GROWTH

While e-commerce clearly has a positive impact on the business sector, doubts have been raised about its impact on the macroeconomic growth, and productive growth (2) in particular. Various studies show that e-commerce had an impressive performance particular in terms of productivity growth. The US, which leads the world in IT and e-commerce, has had a notable economic performance, particularly in terms of productive growth, since 1995.

But, the same was not happened with the developing countries as they failed to catch up technologically with the industrialized world. To assess the broader economic impact of e-commerce and the ramifications of developing countries' catching up or not, UNCTAD has conducted a quantitative analysis based on two scenario: one in which the developing countries fall behind technologically and one in which they catch up with the developed countries. The analysis is centred on cost saving and assume that e-commerce can reduce costs of services, particularly in retail and wholesale trade, transport and financial and business services. Cost savings in services are stimulated through a productive growth scenario, which allow for the analysis of such macro-economic variables as GDP, welfare, wages and terms of trade. The analysis is a

unique application of a computable general equilibrium model to e-commerce at the global level.

According to the report, under the first scenario developed countries would have welfare gains of $117 billion, while the developing world (excluding Asia) would lose welfare of $ 726 million. The Asian region, on the other hand, would gain $ 802 million, largely attributable to the transport services sector. Besides welfare and GDP losses, developing countries would also experience a reduction in wages and deteriorating terms of trade.

E-Commerce could therefore end up actually widening, and not narrowing, the gap between the developed and developing countries.

Under the second scenario, however, if developing countries were to catch up with developed countries in productivity, they would increase output, wages and welfare.

A 1% productive growth m the service sector in Asia for example, would result in welfare gains of $12 billion, GDP growth of 0.4% and a 2 to 3% growth in the service exports. By reducing costs, increasing efficiency, reducing time and distance, e-commerce could thus become an important tool for development.

IMPACT OF E-COMMERCE ON ECONOMY

Business and the economy are inextricably linked with the development and implementation of new technology (Tassabehji, 2003). Growth and development of any modern economy has been recognized by many economic theorists, such as Kondratieff, Schumpeter, Mensch and Porter, to be based on innovation of new technology. In the early twentieth century, the economist Kondratieff introduced his 'Long Wave Theory (3)' of economic growth. He detailed the numbers of years that the economy expanded and contracted during each part of the half-century long cycle, which industries suffer the most during the 'downwave' and how technology plays a role in leading the way out of the contraction into the next 'upwave'.

Building on this theory the economist Schumpeter (1961) assigned technological innovation an almost exclusive role, as engine of economic development: the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new market, the new forces of industrial organization that capitalist enterprise creates. Mensch (1979) updates the Schumpeter theory, giving it an empirical base in history, where clusters of innovation take place and generate completely new sectors. He stressed that only technological innovations can overcome depression and that government must implement an aggressive innovation policy to stimulate the search for new and basic innovation.

Further, Porter (1990), emphasizes that the prosperity and competitive advantage of a nation is no longer as a result of a nation's natural resources and its labour force, but rather the ability of its industry to innovate and upgrade. This can be seen as a disruptive technology on a macro environmental level. And today, whether economic community subscribes to these economic theories or not, the impact of new technology on the economy of a nation is indisputable. Continuous growth of e-commerce is expected to have deep impact on structure and functioning of economies at various levels and overall impact on macro-economy. Some key areas are discussed below:

Impact on Intermediation

Traditional production, transportation and distribution process is characterized by the liner-point-to-point path (4). In this process intermediaries play an important role.

In physical world, because of large distance between production units and consumer units, it is not possible for consumers to approach producers directly and vice versa. The existence of intermediaries namely, distributors, wholesalers and retailers, this increase the transaction costs for both the producers and consumers.

But in the emerging economic scenario, liner-point-to-point information and knowledge flow no longer represent the reality.

In the process of e-commerce transactions, it is possible for the consumer to conduct and place an order with the manufacturer instantly and directly (Singla, 2000).

And same is possible within the various agents of this process (i.e., between producer and Retailers, Retailers and Distributors, Distributors and Retailers etc.). E-Commerce technology brings about the benefits of more accurate and timely information flow, administrative saving, lowering total distribution cost, closer trading relationship, improved cash flows, and moving closer to the end consumers.

No doubt that online ordering and delivery of product is reducing the role of intermediaries. Therefore, it is also feared that intermediaries would be completely eliminated in the e-commerce economy.

However, this fear may be unfounded. In 'e-commerce economy, though it is possible to deliver a number of goods and services online, it may not be possible to eliminate the physical delivery of many goods because of their vary nature. Goods such vegetables and grocery, garments and shoes, toys etc. cannot be delivered online (they have physical existence). Though intermediaries like wholesalers and retailers can be eliminated in such transactions, it may not be possible to eliminate distributors and transporters.

The demand for distributors and transporters is in fact expected to increase tremendously (Westland and Clark). Even with the advent of e-commerce technology, the functions of intermediaries will not change, because collecting information is a labour and time intensive task. However, this group can exploit new opportunities and challenges.

Impact on Agriculture

The open access architecture of the Internet, declining information technology costs, and high volume have resulted in progressive steps forward for the entire marketing system. Parallel changes in the structure of agriculture have also contributed to the popularity of the current generation of information technology.

Chief among the changes is in the need for closer coordination of the supply chain-both upstream and downstream from the producer-and stretching' from seed, fertilizers, and machinery suppliers, to the food processors and retailers. Thus, technologies like electronic commerce have forced new relationships between and among the buyers of agribusiness to form a complex web interaction (Ehmake et al., 2001)

Various studies show that there is much about the potential success of e-commerce's in agriculture. Common agribusiness business-to-business transactions such as buying, selling, trading, delivering and contracting seem to be natural targets for conversion to e-commerce.

Many theoretical benefits of e-commerce in agriculture have been identified such as: (1) promotion of information flow, market transparency and price discovery (Poole, 2001); (2) facilitation of industry coordination (Nicolaisen, 2001); and reduction or elimination of transaction costs (Porter, 2001; Thompson, 1996).

Internet based e-commerce also offer tremendous opportunities to create collaborative marketplaces in low-cost and effective way (Nicolaisen, 2001). E-commerce in agriculture could also potentially tighten the supply chain and cut marketing margins and transactions costs in way that benefit smaller, local producers as well as local agribusinesses. It also enables a vast array of products to be transacted, usually at a price that is competitive with local retailers.

E-commerce can also change the situation of hard bargain caused by scattered farmers and lack of information. At the same time, the fast and convenient electronic bargain manner can accelerate the circulation of commodities, and lessen the risk, and increase the competitions of agricultural products in the international market (Cao and Chen, 2001).

These theoretical benefits appear to be undisputed. However, these have yet to materialize into profitability. Study of Golman Sachs (2000) discussed the general barriers citied by business to Internet based e-commerce adoption and explained that these barriers also apply to agribusiness as well.

These barriers include:

(1) unclear return on investment

(2) lack of budget

(3) lack of stakeholders support and

(4) complicated technology.

Added to these, there may be some other factors (10) slowing down e-commerce adoption in agriculture. In fact, many of the issues faced by e-agribusinesses are the same as those faced by the firms in other sectors similar to changes brought by other new agricultural technologies (Hooker et al., 2001).

However, characteristics of the agricultural sector and its participants present some inherent impediments to the implementation of e-commerce practices. Nonetheless, despite these challenges, there is room for creative solutions potentially leading to successful adoption.

Those potential strategies touch on: structure of industry; market and product expertise; and organizational development. At this point of time it is not very clear-the impact of e-commerce on farms, agribusiness firms, markets, and rural communities. Are there only winners or are losers too? If so, who are they? What will government to do, with or against e-commerce in agriculture? Since e-commerce is still evolving, it is too early to definitive answer (Mueller, 2000).

An inspection of current practices; however, suggest that success of e-commerce in agribusiness is undeniable. Factors specific to agriculture will create additional challenges, which must be overcome before success may be attained. The ability of each player to work though these challenges will determine the speed of implication of e-commerce in agriculture.

Impact on Labour Market

E-Commerce, consisting of marketing and other business processes conducted over the computer-mediated networks is changing the way organizations in many industries operate. It leads to the automation of some job functions and replaces

others with self service operations, raising output per worker and dampening employment requirements in some occupations, as well as in the industries in which these occupations are concerned (Hecker, 2001).

The introduction and implementation of new technologies has posed important challenges for the commercial workers and their trade unions worldwide. Among the issues that unions have to deal with are, both B2B and B2C, self-scanning, logistics system, multimedia and other in store sales support applications. In many ways, they are already deeply affecting labour market (Gottardi et al., 2004).

In contrast, e-commerce has spurred employment in industries producing software, and systems used by e-commerce and other occupations associated with websites and networks.

Various studies showed that e-commerce has a positive impact on the labour productivity. At the theoretical level, since e-commerce reduces coordination costs between different work processes, they facilitate firms to fragment tasks to enable them to improve the labour productivity. At the same time when the routine tasks can be automated, e-commerce reduces unskilled work. In a recent study, Atrostic and Nguyen (2004) considered the impact of computer networks on the labour productivity in the US manufacturing sector, using micro data predominantly for 1999.

They found a positive and significant impact of computer networks on plant level labour productivity, suggested that networks increase labour productivity by around 7.5 per cent. Motohashi (2001) provides evidence for the positive impact of different information networks on labour productivity in Japan.

In the UK a recent study by Criscuolo and Waldron (2003), based on Annual Business Inquiry, shows that buying online positively affects the labour and total factors of productivity, while selling online has a negative impact on productivity.

But, perhaps the larger impact of e-commerce on labour market can be seen in the form of online job search. However, very little is known about the importance of online job

applications or direct employer initiated contracts with potential candidates.

Even then, online job posting has grown spectacularly (Autor, 2001). Estimates place the number of online job boards at over 3000, the number of active resumes online at over 7 million, and the number of job posting at 29 million. Kuhn and Skuterud (2000) reported that 7 per cent of employed workers regularly use the web to search for a new job in 1998.

The leading job board, Monster.Com, offered 3.9 million resumes and 4, 30,000 jobs in August 2000. Further, the Internet is likely to change how some workers deliver labour services. For example, falling telecommunications traffic regardless of where it originates. Improvements in communication and control technology likely mean that people who monitor equipment or other workers can perform their task at the greater physical remove. Remote access to e-mail and company documents will enable many workers to perform some or all of their work from home to elsewhere.

On the flip side, it has also been feared that the reduction in number of intermediaries and sales persons due to reduction in number of supermarkets and showroom would reduce employment world over. The worst affected are expected to be the unskilled manpower.

It is true that unskilled labour is getting displaced in a big way in the e-commerce economy. Internet and e-commerce by facilitating firms to employ home-workers on a contractual basis are seen to promote insecure employment opportunities. In India, as well as in the other low-income economies, the potential of e-commerce is seen to employment from the formal sector to small firms in the unorganized sector where employment is not protected by any legislation.

Further, if this feature of e-commerce encourages the formation of small firms that are narrowly specialized, it also implies that there is less room for employee mobility within the firms, transforming the careers paths of employees (Francis, 1986). Added to this, as with other tools, the internet is not

without its limitations as a means of attracting qualified candidates.

For example, companies listing opportunities on major job boards may receive applications from a much wider geographic region-and sometimes less qualified applicants-requiring additional sorting and review.

Firms are also noting that some candidates who post their resumes online may be more passive job seekers; they want to "test the waters" and wait the results, versus proactively applying for open position.

Impact on Transportation

In a very short time span common sense has emerged within the world of transport, about the assumed huge impact of e-commerce and especially the Internet on relationships between companies (and consumers). Dholakia et al, (2000) concluded that in those regions of the world where there is old, established and often congested road infrastructure, any e-commerce-based methods that could lead to trip reduction and/or trip rationalization can contribute to an improvement in the quality of life.

At least from a theoretical point of view, it seems quite clear that the online shopping could lead to reduction of transport demand. In some cases, online shopping eliminates any kind of physical transport (when goods can be dematerialized as software, books, music etc.). In other cases, a goods transport is still necessary, but the journeys to shops are eliminated or reduced. Even if the purchase is finally made at the shop, the consumer can have used the Internet, looking for information, instead of visiting different shops.

Thus, electronic commerce transactions have strong implications on transportation. In this context, numbers of studies have been conducted to measure the impact of e-commerce on the number of trips.

Browne (2001) first quoted the study made by Farahmand and Young (1998). It modelled the effects of the number of trips

by switch to home shopping of 10 per cent of the customers of a grocery store and a DIY store (of a typical size) in the UK. They assumed that delivery vans would carry the loads of nine customers on each round trip.

In both the cases, the reduction in total trips is around 9 per cent. The vehicle kilometer made by the delivery vans for the 10 per cent of home shoppers suppose a reduction of 87 per cent in comparison with the vehicle kilometers previously made by car. Further, the study (Coirm, 1999) also modelled a case of grocery home delivery in UK and their result shows that if 10-20 per cent of shoppers use home shopping, the reduction in the trips could arrive to 7-16 per cent.

For the purchase made from home, the reduction in vehicle kilometers is 70-80 per cent even if each van only carries eight loads. Against this, study of Colin (2001) revealed that commerce has not had as great an impact on transport lows as some had expected, at least in terms of the volumes carried. However, some substitution effects are to be expected.

Not only on the retail transportation, e-commerce does have impact on the companies where heavy transportation is needed. E-transportation tool can enable seamless connectivity, provide dock-to-dock visibility of the supply chain, and deliver real time information that leads to better and faster decisions. E-transportation also enables shippers a choice of carriers to be used for shipments of merchandise varying in weights and service, and identifies all shipping packing, marking, labelling and communications requirements as well. (Vevaldi and Prasad, 2002).

But many shippers still are not quite ready to put their faith in this relatively new e-commerce tool. Indeed, as with the introduction of new technology, e-commerce as it relates to the transportation industry, is going to take time to catch on.

For transportation companies it is expected that, with e-commerce, a whole new market will open up for transportation and logistics companies, or whatever they may be called in the

future. At present e-commerce is pursued to a fairly high degree between companies, but is still not very developed between companies and private persons.

The business-to-consumer (B2C) relation is expected to grow rapidly though, and when this happens it will result in several changes for actors in the logistics area. When delivering to private persons instead of companies, the demand for fast and accurate deliveries will increase.

This is because one or more of the physical nodes will disappear when the goods can be transported directly from the producing company to the end customer. Direct home deliveries will request shorter lead times, and more complex distribution systems will be necessary to make this possible.

Expected trends in traffic and distribution from a widely spread use of e-commerce are fewer passenger cars, an increased number of pickup trucks, and smaller consignments, especially on international transports. Further the study of Hultkrantz and Lumsden (2000) concluded that the logistics industry has to face the challenges and opportunities created by e-commerce, both from within the industry and from external players.

The industry has always been pressed to cut costs and squeeze margins, and the future will be even more formidable as competition forces most companies to continue the streamlining of their business.

Impact on Taxation

When new technologies evolve, can taxation issues be far behind? If e-commerce is being billed as one of the greatest economic developments of the 21st century the taxation issues arising there from poses the single biggest challenge of the century to both-the businesses and the taxman's. (Girish, 20001) This is particularly true in the context of digitized products because transactions of such products are not backed up by any physical of goods. As e-commerce transcends the barriers of geographical boundaries the concept like the place of transactions and place of consumption become immaterial.

Therefore, it is often difficult to determine national jurisdiction and revenue rights

International tax issues in the area of e-commerce are manifold and include nexus 0fthe vendor and tax enforcement agencies. Taxing authorities may have great difficulty collecting revenue form vendors conducting commerce through foreign Internet addresses. The foremost problem associated with Internet based commerce is fixing the place of transaction.

The place where a web-server is located, the place where the user initializes the transaction and the server where payment is collected may be different. Electronic transfer of funds heightens the risk of money being sent to tax havens.

Further, many jurisdictions rely on the taxpayer to voluntarily identify himself, herself or itself as falling within its tax system.

Tax authorities may not be able to effectively enforce their rights to collect tax in such an environment, especially if a business does not consider itself to be within a tax jurisdiction and simply choose not to disclose its activities to the relevant authority. It is trite, but true, that taxation of e-commerce is a major concern for the international agencies and the tax authorities worldwide.

In Europe, North America, and Australia and in many Asian Countries (particularly India and Singapore) substantial research have been conducted on the impact of the e-commerce on taxation.

Among the plethora of books, reports, articles and papers produced on this topic however, the work of Organization for the Economic Co-Operation and Development (OECD) stands out as the most significant, given its commitment to consulting broadly with the governments worldwide as well as with the business community to develop an integrated and comprehensive approach to the taxation of e-commerce.

The identification and analysis of the inter jurisdictional measures imposed by e-commerce is one thing. The formulation

of domestic and treaty policies for dealing with e-commerce is another, even more controversial challenge. Perhaps, the most fundamental threat to the international tax system is the erosion of the worldwide tax base.

It is increasingly possible for a company to try to divert income to a tax haven by locating its server there. This raises issues of allocation of business profits between the residence and source countries and leakage to tax haven (Cidambi, 2000).

The debate over how international tax principles ought to be revealed and may be reformed is still in its formulative stage. It would be necessary to equip the tax administration after reviewing the entire procedure in the light of the advent of e-commerce. First, the procedures have to be simplified. Second, it would be necessary top create an environment within the tax department to ensure that the tax laws are implemented appropriately, and that integrity of the tax base is maintained. (Mantravadi and Chowdary, 2002).

For India, it is high time to learn from the experience of the work of OECD, Japan and the US to suggest a strategy to encourage e-commerce and integrate the tax system in such a way that it takes care of the twin problems of determining the sites of sales and also identifies the jurisdiction with regard to its authority to tax transactions. In doing so, we have to keep in mind the associated risk for the tax compliance.

Impact on Cost, Price and Competition

Logically, e-commerce reduces search and transaction cost (Mukhopadhya, 2002). Reducation in transaction costs are motivating businesses to incorporate e-commerce into their business strategy (Garcia, 1995 and Kambil, 1995) The net impact of e-commerce on UK Economy has been estimated to be between 2% to 3% of GDP. It has also been estimated that improved demand forecasting and stock management as a result of e-commerce will enable reduction in overall inventories by as much as 25% in the US.

At the micro level, there is evidence that this will provides an one-off sustainable improvement in the profitability by an

average of 5% or more for the enterprises currently working with low margin (Goldman Sachs, 1999). The e-commerce lowers costs because, the Internet lowers selling search costs as well as, by allowing seller to communicate product information cost effectively to potential buyers, and by offering sellers new ways to reach buyers through the targeted advertisement and one-on-one advertising.

Thus it is helpful in reducing the search costs on both the sides. By reducing search costs on both sides of the market, it appears likely that buyers will be able to consider more product offering and will identify and purchase products that better match their needs, with a resulting increase in economic efficiency.

But the reduction in the cost combined with new capabilities of technology can set off more complex market dynamics (Bakos, 2001). The lower search and information cost should push markets towards a greater degree of price and competition, and this outcome is certainly possible, especially for the homogeneous goods. On the other hand the use of Internet technology to provide differentiate and customized products, and thus avoid competition purely on the price.

Lower search costs in the digitized markets will make it easier for the buyers to find low cost sellers and thus will promote price competition among the sellers. Thus e-commerce economy comes quite close to the features of the prefect competition, as larger numbers of buyers and sellers can instantly interact with each other. Many characteristics of e-commerce should increase competition because buyers will have access to a global marketplace and the ability to easily compare price and product features (Fletcher et al., 2000).

E-Commerce technologies have the potential to significantly increase competition by increasing consumers' choice of products and traders (ACCC, 2001). However, some of the distinguishing characteristics of the e-commerce set up also have the potential for creating the monopoly power in the certain lines of products. The e-commerce set up has negligible distribution cost for the

intangibles and therefore marginal cost of the production and distribution is almost nil for these goods.

Sales of these goods to a particular customer does not reduce its availability to the other potential customers. Economies of scale arising out of negligible marginal cost, along with network externalities and consumer preference for the already acquired skills, provide natural monopoly power to some of the products in the e-commerce set up. Early birds are thus expected to reap the benefits in these lines of production. Therefore, in the e-commerce environment, monopoly is expected to exist along with the prefect competition. Competition would be especially seen in those areas where goods and services cannot be digitized and economies of scale are not very prominent. Breaking the monopoly power to remain in the competition would require high speed of innovation and making the product visible all the time, whether there is a demand for the products or not. Competition would be basically in the forms of converting ideas, knowledge and brain power into innovation.

ECONOMIC DEVELOPMENT AND PRODUCTIVITY

Production is a process of combining various material inputs and immaterial inputs (plans, know-how) in order to make something for consumption (the output). The methods of combining the inputs of production in the process of making output are called technology. Technology can be depicted mathematically by the production function which describes the relation between input and output. The production function can be used as a measure of relative performance when comparing technologies.

The production function is a simple description of the mechanism of economic growth. Economic growth is defined as any production increase of a business or nation (whatever you are measuring). It is usually expressed as an annual growth percentage depicting growth of the company output (per entity) or the national product (per nation). Real economic growth (as

opposed to inflation) consists of two components. These components are an increase in production input and an increase in productivity.

The figure illustrates an economic growth process (exaggerated for clarity). The Value T2 (value at time 2) represents the growth in output from Value T1 (value at time 1). Each time of measurement has its own graph of the production function for that time (the straight lines). The output measured at time 2 is greater than the output measured at time one for both of the components of growth: an increase of inputs and an increase of productivity. The portion of growth caused by the increase in inputs is shown on line 1 and does not change the relation between inputs and outputs. The portion of growth caused by an increase in productivity is shown on line 2 with a steeper slope. So increased productivity represents greater output per unit of input.

Accordingly, an increase in productivity is characterised by a shift of the production function (steepening slope) and a consequent change to the output/input relation. The formula of total productivity is normally written as follows:

- *Total productivity = Output quantity/Input quantity*

According to this formula, changes in input and output have to be measured inclusive of both quantitative and qualitative changes. In practice, quantitative and qualitative changes take place when relative quantities and relative prices of different input and output factors alter. In order to accentuate qualitative changes in output and input, the formula of total productivity shall be written as follows:

- *Total productivity = Output quality and quantity/Input quality and quantity*

Main Processes of a Company

A company can be divided into sub-processes in different ways; yet, the following five are identified as main processes, each with a logic, objectives, theory and key figures of its own. It is important to examine each of them individually, yet, as

a part of the whole, in order to be able to measure and understand them. The main processes of a company are as follows

- real process
- income distribution process
- production process
- monetary process
- market value process.

Productivity is created in the real process, productivity gains are distributed in the income distribution process and these two processes constitute the production process. The production process and its sub-processes, the real process and income distribution process occur simultaneously, and only the production process is identifiable and measurable by the traditional accounting practices. The real process and income distribution process can be identified and measured by extra calculation, and this is why they need to be analysed separately in order to understand the logic of production performance.

Real process generates the production output from input, and it can be described by means of the production function. It refers to a series of events in production in which production inputs of different quality and quantity are combined into products of different quality and quantity. Products can be physical goods, immaterial services and most often combinations of both. The characteristics created into the product by the manufacturer imply surplus value to the consumer, and on the basis of the price this value is shared by the consumer and the producer in the marketplace. This is the mechanism through which surplus value originates to the consumer and the producer likewise. Surplus value to the producer is a result of the real process, and measured proportionally it means productivity.

Income distribution process of the production refers to a series of events in which the unit prices of constant-quality products and inputs alter causing a change in income distribution among those participating in the exchange. The magnitude of the change in income distribution is directly

proportionate to the change in prices of the output and inputs and to their quantities. Productivity gains are distributed, for example, to customers as lower product sales prices or to staff as higher income pay. Davis has deliberated the phenomenon of productivity, measurement of productivity, distribution of productivity gains, and how to measure such gains. He refers to an article suggesting that the measurement of productivity shall be developed so that it "will indicate increases or decreases in the productivity of the company and also the distribution of the 'fruits of production' among all parties at interest". According to David, the price system is a mechanism through which productivity gains are distributed, and besides the business enterprise, receiving parties may consist of its customers, staff and the suppliers of production inputs. In this article, the concept of "distribution of the fruits of production" by Davis is simply referred to as production income distribution or shorter still as distribution.

The production process consists of the real process and the income distribution process. A result and a criterion of success of the production process is profitability. The profitability of production is the share of the real process result the producer has been able to keep to himself in the income distribution process. Factors describing the production process are the components of profitability, i.e., returns and costs. They differ from the factors of the real process in that the components of profitability are given at nominal prices whereas in the real process the factors are at periodically fixed prices.

Monetary process refers to events related to financing the business. Market value process refers to a series of events in which investors determine the market value of the company in the investment markets.

Surplus Value as a Measure of Production Profitability

The scale of success run by a going concern is manifold, and there are no criteria that might be universally applicable to success. Nevertheless, there is one criterion by which we can

generalise the rate of success in production. This criterion is the ability to produce surplus value. As a criterion of profitability, surplus value refers to the difference between returns and costs, taking into consideration the costs of equity in addition to the costs included in the profit and loss statement as usual. Surplus value indicates that the output has more value than the sacrifice made for it, in other words, the output value is higher than the value (production costs) of the used inputs. If the surplus value is positive, the owner's profit expectation has been surpassed. This basic example is a simplified profitability calculation used for illustration and modelling. Even as reduced, it comprises all phenomena of a real measuring situation and most importantly the change in the output-input mix between two periods. Hence, the basic example works as an illustrative "scale model" of production without any features of a real measuring situation being lost. In practice, there may be hundreds of products and inputs but the logic of measuring does not differ from that presented in the basic example.

Both the absolute and relative surplus value have been calculated in the example. Absolute value is the difference of the output and input values and the relative value is their relation, respectively. The surplus value calculation in the example is at a nominal price, calculated at the market price of each period.

Productivity Model

The next step is to describe a productivity model by help of which it is possible to calculate the results of the real process, income distribution process and production process. The starting point is a profitability calculation using surplus value as a criterion of profitability. The surplus value calculation is the only valid measure for understanding the connection between profitability and productivity or understanding the connection between real process and production process. A valid measurement of total productivity necessitates considering all production inputs, and the surplus value calculation is the only calculation to conform to the requirement.

The process of calculating is best understood by applying the term *ceteris paribus*, i.e. "all other things being the same," stating that at a time only the impact of one changing factor be introduced to the phenomenon being examined. Therefore, the calculation can be presented as a process advancing step by step. First, the impacts of the income distribution process are calculated, and then, the impacts of the real process on the profitability of the production.

The first step of the calculation is to separate the impacts of the real process and the income distribution process, respectively, from the change in profitability (285.12 – 266.00 = 19.12). This takes place by simply creating one auxiliary column (4) in which a surplus value calculation is compiled using the quantities of Period 1 and the prices of Period 2. In the resulting profitability calculation, Columns 3 and 4 depict the impact of a change in income distribution process on the profitability and in Columns 4 and 7 the impact of a change in real process on the profitability.

Illustration of the Real and Income Distribution Processes

Measurement results can be illustrated by models and graphic presentations. A presentation by means of an index is illustrative because the magnitudes of the changes are commensurate.

Vertical lines depict the key figures of the real process, production process and income distribution process. Key figures in the production process are a result of the real process and the income distribution process. Horizontal lines show the changes in input and output processes and their impact on profitability.

The logic behind the figure is simple. Squares in the corners refer to initial calculation data. Profitability figures are obtained by dividing the output figures by the input figures in each process. After this, the production process figures are obtained by multiplying the figures of the real and income distribution process.

Depicting the Development by Time Series

Development in the real process, income distribution process and production process can be illustrated by means of time series. (Kendrick 1984, Saari 2006) The principle of a time series is to describe, for example, the profitability of production annually by means of a relative surplus value and also to explain how profitability was produced as a consequence of productivity development and income distribution. A time series can be composed using the chain indexes as seen in the following.

Now the intention is to draw up the time series for the ten periods in order to express the annual profitability of production by help of productivity and income distribution development. With the time series it is possible to prove that productivity of the real process is the distributable result of production, and profitability is the share remaining in the company after income distribution between the company and interested parties participating in the exchange.

The graph shows how profitability depends on the development of productivity and income distribution. Productivity figures are fictional but in practice they are perfectly feasible indicating an annual growth of 1.5 per cent on average. Growth potentials in productivity vary greatly by industry, and as a whole, they are directly proportionate to the technical development in the branch. Fast-developing industries attain stronger growth in productivity. This is a traditional way of thinking. Today we understand that human and social capitals together with competition have a significant impact on productivity growth. In any case, productivity grows in small steps. By the accurate measurement of productivity, it is possible to appreciate these small changes and create an organisation culture where continuous improvement is a common value.

Measuring and Interpreting Partial Productivity

Measurement of partial productivity refers to the measurement solutions which do not meet the requirements of

total productivity measurement, yet, being practicable as indicators of total productivity.

In practice, measurement in production means measures of partial productivity. In that case, the objects of measurement are components of total productivity, and interpreted correctly, these components are indicative of productivity development.

The term of partial productivity illustrates well the fact that total productivity is only measured partially – or approximately. In a way, measurements are defective but, by understanding the logic of total productivity, it is possible to interpret correctly the results of partial productivity and to benefit from them in practical situations.

Typical solutions of partial productivity are:

1. Single-factor productivity
2. Value-added productivity
3. Unit cost accounting
4. Efficiency ratios
5. Managerial control ratio system.

Single-factor productivity refers to the measurement of productivity that is a ratio of output and one input factor. A most well-known measure of single-factor productivity is the measure of output per work input, describing work productivity. Sometimes it is practical to employ the value added as output. Productivity measured in this way is called Value-added productivity.

Also, productivity can be examined in cost accounting using Unit costs. Then it is mostly a question of exploiting data from standard cost accounting for productivity measurements. Efficiency ratios, which tell something about the ratio between the value produced and the sacrifices made for it, are available in large numbers. Managerial control ratio systems are composed of single measures which are interpreted in parallel with other measures related to the subject. Ratios may be related to any success factor of the area of responsibility, such as profitability,

quality, position on the market, etc. Ratios may be combined to form one whole using simple rules, hence, creating a key figure system.

The measures of partial productivity are physical measures, nominal price value measures and fixed price value measures. These measures differ from one another by the variables they measure and by the variables excluded from measurements. By excluding variables from measurement makes it possible to better focus the measurement on a given variable, yet, this means a more narrow approach.

The first column presents the measure types, the second the variables being measured, and the third column gives the variables excluded from measurement.

5

Measurement Practices in E-Commerce

E-COMMERCE: MEASUREMENT PRACTICES

Strong measurement practices form one of the cornerstones of good systems, particularly in e-commerce. Performance measures for e-commerce must overcome the uncertainty and unique dynamics associated with the Internet and must be more frequently adjusted in response to real-time information. With these considerations, no company should simply extend its existing performance measures to an e-commerce venture. Still, long-term cost differentials must be balanced with other financial and nonfinancial measures and leading and lagging indicators that are particularly useful for successful e-commerce implementations.

The information systems of the 1990s gave CEOs a new method of accessing, analyzing, and reporting on the accountability of their organization. The systems developed during this time of advancement in information technology helped to create a more streamlined capability for centralized accountability. The variety of data made available to a company at that time ranged from corporate-level results to the small-scale measurements of performance that enabled management to recognize advantages and potential problems in real-time. E-Commerce transforms these capabilities.

Like the root system of a massive tree, IT accountability systems helped management reach and observe every aspect of their business. With the addition of e-commerce to a pre-existing IT accountability system, companies can simplify access to previously collected information for those within the company and for external stakeholders, including partners, customers, and investors. New information could be created and both financial and nonfinancial measures could be integrated into the decision-making process.

The information could also be easily and quickly aggregated and disaggregated to facilitate various decisions. Managers could now measure inputs, processes, outputs, and outcomes in ways never before possible.

Cisco's new systems permit outsiders to view on its Web site not only its general business plan but also the company's performance statistics at any given moment. Seamlessness between internal IT systems and e-commerce gives Cisco the ability to provide such information with relatively little effort. This transparency between internal and external systems also helped Cisco endure many of the pitfalls associated with the technology bust by expanding the role of e-commerce to replace human positions throughout the company.

But e-commerce can be used for more than simply replacing employees. Instead, the information made available through a well-developed e-commerce initiative can empower employees at every level of business. Improved measurement is a key component. Management receives information in a timely manner, which lets it act on up-to-date measures of performance, while lower-level employees can access information at any time and take the initiative based on that information, with or without direct managerial direction.

Among the most important aspects of e-commerce as it applies to system management and measurement is maintaining consistency across all company lines. A company implementing a new e-commerce solution should ensure consistency among accounting systems, information technology

systems, and e-commerce systems and related measures. However, the implementation of an e-commerce solution also necessitates working to ensure compatibility between the systems of business partners using unified e-commerce solutions.

The uniquely advantageous relationship between Dell and its suppliers would not be possible without seamless internal and external systems that enable a free flow of information and measures between companies. E-com-merce can facilitate consistency of information and measurements by cascading information throughout the organization and then externally to other stakeholders.

In addition to measuring the performance of the business, e-commerce brings added importance to measuring the value and functionality of operations. Most e-commerce strategies will have a strong operational component, including cost savings from value chain management and cuts in labour costs for the online channel. Operational measures should be tracked by some dedicated resource and balanced between financial and nonfinancial assessments of operational performance. This analysis can lead to a better understanding of the payoffs of investment in e-commerce initiatives.

E-COMMERCE: CHALLENGES AND OPPORTUNITIES

E-commerce as anything that involves an online transaction. This can range from ordering online, through online delivery of paid content, to financial transactions such as movement of money between bank accounts.

This paper has analysed some of the challenges and opportunities of e-commerce.

Elizabeth Goldsmith and others (2000) reported that the general category of e-commerce can be broken down into two parts:

1. E-merchandise: selling goods and services electronically and moving items through distribution channels, for

example through Internet shopping for groceries, tickets, music, clothes, hardware, travel, books, flowers or gifts.

2. E-finance: banking, debit cards, smart cards, banking machines, telephone and Internet banking, insurance, financial services and mortgages on-line (Elizabeth Goldsmith and others, 2000).

Farooq Ahmed (2001) reported that the enormous flexibility of the internet has made possible what is popularly called e-commerce which has made inroads in the traditional methods of business management. All the facets the business tradition with which we are accustomed in physical environment can be now executed over the internet including online advertising, online ordering, publishing, banking, investment, auction and professional services. E commerce involves conducting business using modern communication instruments: telephone, fax, e-payment, money transfer systems, e-data interchange and the internet. The WTO has recognized that commercial transactions can be broken into 3 stages. 'The advertising and searching stage, the ordering, and payment stage, and the delivery stage.'

Growth of E-commerce

Electronic commerce or e-commerce encompasses all business conducted by means of computer networks. Advances in telecommunications and computer technologies in recent years have made computer networks an integral part of the economic infrastructure. More and more companies are facilitating transactions over web. E-commerce provides multiple benefits to the consumers in form of availability of goods at lower cost, wider choice and saves time.

People can buy goods with a click of mouse button without moving out of their house or office. Similarly online services such as banking, ticketing including airlines, bus, railways, bill payments, hotel booking etc. have been of tremendous benefit for the customers. Most experts believe that overall e-commerce will increase exponentially in coming years. Business to business transactions will represent the largest revenue but online

retailing will also enjoy a drastic growth. Online businesses like financial services, travel, entertainment, and groceries are all likely to grow.

Factors Influencing the Distribution and Forms of Global E-commerce

Nir B. Kshetri (2001) reported that the twin forces of globalization and the Internet have the potential to offer several benefits to individuals and organizations in developing as well as developed countries.

Apart from economic benefits such as more choices and the convenience of shopping at home, the twin forces can make progress on educational and scientific development, mutual aid, and world peace; foster democracy; and offer exposure to other cultures.

To fully exploit the potential of the Internet and e-commerce, policy makers in developing as well as industrialized countries are taking initiatives to develop the global information infrastructure (GII) and connect their national information infrastructures to the GII (Gore 1996).

All countries are not likely to benefit equally from the virtuous circle of Internet diffusion created by globalization and multiple revolutions in Communication technologies (ICTs). Forces influencing the distribution of global e-commerce and its forms include economic factors, political factors, cultural factors and supranational institutions.

Economic factors mainly influence perceived relative advantage of Internet use whereas political and cultural factors influence the compatibility of the Internet with a society. Supranational institutions' initiatives are influencing the price, quality and availability of ICT products and services, mainly in developing countries, thereby increasing relative advantage of Internet use.

Moreover international institutions are influencing laws, regulations and policies in developing countries making them more compatible with Internet use.

Brief Review of Literature on E-commerce: Challenges and Opportunities

An attempt has been made to put forward a brief review of literature based on few of the related studies undertaken worldwide in the area of e-commerce as follows.

Elizabeth Goldsmith and Sue L.T. McGregor (2000) analysed the impact of e-commerce on consumers, public policy, business and education. A discussion of public policy initiatives, research questions and ideas for future research are given.

Andrew D. Mitchell (2001) examined the key issues that electronic commerce poses for Global trade, using as a starting point the General Agreement on Trade in Services (GATS), the World Trade organization (WTO) agreement most relevant to e-commerce.

Nir B.Kshetri (2001) This paper attempts to identified and synthesized the available evidence on predictors of magnitude, global distribution and forms of e-commerce. The analysis indicated that the twin forces of globalization and major revolutions in ICT are fuelling the rapid growth of global e-commerce.

Jackie Gilbert Bette Ann Stead (2001) reviewed the incredible growth of electronic commerce (e-commerce) and presented ethical issues that have emerged. Security concerns, spamming, Web sites that do not carry an "advertising" label, cybersquatters, online marketing to children, conflicts of interest, manufacturers competing with intermediaries online, and "dinosaurs" were discussed.

Mauricio S. Featherman, Joseph S. Valacich & John D. Wells (2006) examined whether consumer perceptions of artificiality increase perceptions of e-service risk, which has been shown to hamper consumer acceptance in a variety of online settings.

Young Jun Choil, Chung Suk Suh (2005) examined the impact of the death of geographical distance brought about by e-marketplaces on market equilibrium and social welfare.

Prithviraj Dasgupta and Kasturi Sengupta (2002) examined the future and prospects of e-commerce in Indian Insurance Industry. (Arvind Panagariya, 2000) examined Economic issues raised by e-commerce for the WTO and developing countries. E-commerce offers unprecedented opportunities to both developing and developed countries.

Opportunities for E-commerce

Young Jun Choil, Chung Suk Suh (2005) reported that the development of the internet in the 20th century led to the birth of an electronic marketplace or it is called e-marketplace, which is now a kernel of electronic commerce (e-commerce). An e-marketplace provides a virtual space where sellers and buyers trade with each other as in the traditional marketplace. Various kinds of economic transactions and buying and selling of goods and services, as well as exchanges of information, take place in e-marketplaces. E-marketplaces have become an alternative place for trading. Finally, an e-marketplace can serve as an information agent that provides buyers and sellers with information on products and other participants in the market. These features have been reshaping the economy by affecting the behaviour of buyers and sellers.

E-business

E-business affects the whole business and the value chains in which it operates. It enables a much more integrated level of collaboration between the different components of a value chain than ever before. Adopting e-Business also allows companies to reduce costs and improve customer response time. Organizations that transform their business practices stand to benefit immensely from innumerable new possibilities brought about by technology.

E-commerce as anything that involves an online transaction. This can range from ordering online, through online delivery of paid content, to financial transactions such as movement of money between bank accounts. One area where there are some positive indications of e-commerce is financial services. Online

stock trading saw sustained growth throughout the period of broadband diffusion. E-shopping is available to all these who use a computer. Over the past year Amazon.Com, ebay India, Indiatimes have seen a rapid growth in categories such as mobile handsets, jewellery, fashion apparel, books, gift items and other items.

Naukri.com – India's premier recruitment site has captured around 50% of the recruitment market.

Icicidirect.com-Stock trading simplified, Icicidirect.com is today the country's premier trading portal.

Baaze.com the country's premier shopping site started as an auction site and graduated to be the most popular platform-shopping site.

Irctc.com-One of the best things about this site is that a credit card is not an essential requirement for buying tickets here. Instead the site offers a direct debit facility having tied with most of the popular banks.

It is being estimated that the online travel market in India was estimated at $300 million in 2005 and has crossed $750 million in 2006. By 2008, it is expected to exceed $2 billion.

Young Jun Choil, Chung Suk Suh (2005) reported that the economic consequences of the death of geographical distance due to the emergence of e-marketplaces. It has shown that overcoming spatial barriers by means of e-marketplaces lowers the price level. Since e-marketplaces achieve economies of scale by aggregating dispersed demands, they allow the economy to have more varieties that did not exist before their emergence.

E-commerce Integration

Zabihollah Rezaee, Kenneth R. Lambert and W. Ken Harmon (2006) reported that the rationale for infusion of e-commerce education into all business courses is that technological developments are significantly affecting all aspects of today's business. An e-commerce dimension can be added to the business curriculum by integrating e-commerce topics into existing upper-level business courses. Students would be

introduced to e-commerce education and topics covered in a variety of business courses in different disciplines e.g. accounting, economics, finance, marketing, management, management information systems. To help assure that all related business courses in all disciplines such as e.g., accounting, finance, economics, marketing, management, information systems pay proper attention to the critical aspects of e-commerce, certain e-commerce topics should be integrated into existing business courses.

Open and Distance Learning

Diana Oblinger (2001) reported that one is that education and continuous learning have become so vital in all societies that the demand for distance and open learning will increase. As the availability of the Internet expands, as computing devices become more affordable, and as energy requirements and form factors shrink, e-learning will become more popular. In addition to the importance of lifelong learning, distance education and e-learning will grow in popularity because convenience and flexibility are more important decision criteria than ever before. E learning will become widely accepted because exposure to the Internet and e-learning often begins in the primary grades, thus making more students familiar and comfortable with online learning. In fact, for many countries, distance education has been the most viable solution for providing education to hundreds of thousands of students.

E-commerce and E-insurance

Prithviraj Dasgupta and Kasturi Sengupta (2002) reported that the recent growth of Internet infrastructure and introduction of economic reforms in the insurance sector have opened up the monopolistic Indian insurance market to competition from foreign alliances. Although the focus of e-commerce has been mainly on business to consumer (B2C) applications, the emphasis is now shifting towards business to business (B2B) applications. The insurance industry provides an appropriate model that combines both B2C and B2B applications.

Traditional insurance requires a certificate for every policy issued by the insurance company. However, paper certificates encumber problems including loss, duplication and forging of the certificate. The conventional certificate is now replaced with an electronic certificate that can be digitally signed by both the insurer and the insurance company and verified by a certifying authority.

Online policy purchase is faster, more user-friendly and definitely more secure than the traditional processes. Therefore it is more attractive to the insurer. At the same time it incurs less cost and requires fewer resources than traditional insurance and is therefore more profitable for the insurance company.

E-insurance also makes the insurance procedure more secure since the policy details are stored digitally and all transactions are made over secure channels. These channels provide additional market penetration that is absent in traditional channels and help in earning more revenue than traditional insurance processes.

Future media of E-commerce

Patric Barwise (2001) reported that Probability 99% of e-commerce today is done using PCs either desktops or laptops. For B2B e-commerce this is unlikely to change.For B2C e-commerce however, things will be more complex.

There will be wider range of relevant media, including interactive digital TV, and a range of mobile and wireless services.

There will be huge difference between different consumers' ownership of equipment and access technology. Some will have broad band access and others have no digital communication at all.

Current and Future B2C Digital Media

Digital media able to support consumer e-commerce can be grouped under five main headings, with in the home PCS, IDTV and with in next five years a range of other online device such as games, computers, utility meters etc. In summary, the

online PC is well established while the other B2C digital media are still emerging. Economic issues raised by e-commerce for the WTO and developing countries.

Arvind Panagariya, 2000) reported that access to e-commerce, which in the WTO parlance often means access to e-exports, has two components that must be distinguished sharply: access to internet services and access to services that can be traded electronically. The former deals with to access to Internet infrastructure while the latter relates to specific commitments in electronically tradable services.

E-commerce offers unprecedented opportunities to both developing and developed countries. In the short run, the gains are likely to be concentrated in developed countries have more to benefit. This is because, in the short run, developing countries lack the infrastructure necessary to take full advantage of Internet. For many countries, especially developing ones, in these countries, most consumers do not have computers or Internet access. A likely scenario, therefore, is one in which a handful of independent entrepreneurs will receive the product by Internet, convert it into physical form such as CDs and sell the latter to consumers. But this activity may itself be costly, using up real resources. But in the long run, they can leapfrog, skipping some of the stages in the development of information technology through which developed countries have had to pass. Some efficiencies issues must be addressed. The issue of tariffs, which are applicable to products imported in physical form but not when transmitted electronically. As long as the cost of electronic transmission is lower than that of physical delivery, the presence of tariffs on the latter poses no problem. Effectively, the electronic transmission offers the product to the country at a price lower than that available through physical delivery.

Challenges for E Commerce

Internet based e-commerce has besides, great advantages, posed many threats because of its being what is popularly called faceless and borderless.

Some examples of ethical issues that have emerged as a result of electronic commerce. All of the following examples are both ethical issues and issues that are uniquely related to electronic commerce.

Ethical issues: Jackie Gilbert Bette Ann Stead (2001), reported the following ethical issues related to e-commerce.

1) *Privacy:* Privacy has been and continues to be a significant issue of concern for both current and prospective electronic commerce customers. With regard to web interactions and e-commerce the following dimensions are most salient:

(1) Privacy consists of not being interfered with, having the power to exclude; individual privacy is a moral right.

(2) Privacy is "a desirable condition with respect to possession of information by other persons about him/herself on the observation/perceiving of him/herself by other persons"

Security concerns: In addition to privacy concerns, other ethical issues are involved with electronic commerce. The Internet offers unprecedented ease of access to a vast array of goods and services. The rapidly expanding arena of "click and mortar" and the largely unregulated cyberspace medium have however prompted concerns about both privacy and data security.

Other ethical issues: Manufacturers Competing with Intermediaries Online. "Disintermediation," a means eliminating the intermediary such as retailers, wholesalers, outside sales reps by setting up a Website to sell directly to customers. Disintermediation include (1) music being downloaded directly from producers (2) authors distributing their work from their own Web sites or through writer co-operatives.

Dinosaurs – "Dinosaurs" is a term that refers to executives and college professors who refuse to recognize that technology has changed our lives. When an executive speaks in terms of the Internet being the "wave of the future," it is a sure sign of "dinosaur.

Perceptions of Risk in e-service Encounters

Mauricio S. Featherman, Joseph S. Valacich & John D. Wells (2006) reported that as companies race to digitize physical-based service processes repackaging them as online e-services, it becomes increasingly important to understand how consumers perceive the digitized e-service alternative. E-service replacements may seem unfamiliar, artificial and non-authentic in comparison to traditional service processing methods. Consumers may believe that new internet-based processing methods expose them to new potential risks the dangers of online fraud, identity theft and phishing swindles means schemes to steal confidential information using spoofed web sites, have become commonplace, and are likely to cause alarm and fear within consumers.

E-commerce Integration

Beside many an advantages offered by the education a no of challenges have been posed to the recent education system.

Zabihollah Rezaee, Kenneth R. Lambert and W. Ken Harmon (2006) reported that E-commerce Integration assures coverage of all critical aspects of e-commerce, but it also has several obstacles. First, adding e-commerce materials to existing business courses can overburden faculty and students alike trying to cope with additional subject matter in courses already saturated with required information. Second, many business faculty members may not wish to add e-commerce topics to their courses primarily because of their own lack of comfort with technology-related subjects. Third and finally, this approach requires a great deal of coordination among faculty and disciplines in business schools to ensure proper coverage of e-commerce education.

E-COMMERCE APPLICATION IN TRAVEL INDUSTRY

In India e-commerce is being driven by the growing online travel industry and online travel bookings have increased

substantially after the entry of low cost carriers. Currently, online travel industry is contributing 50% to the revenue generated by e-commerce in India. To boot, online travel industry is growing at 125% (compounded annual growth rate) annually. Generating revenues of around $300-500 million (Rs.1,350-2,250 crore) currently, the size of the online travel industry is around 2% of the entire travel industry. Online travel industry is expected to become a $2 billion industry by 2008. In India, it is basically low cost carriers like Air Deccan and the Railways, which have significantly led to increased use of e-commerce.

However airline industry is still exploring the advantages of e-commerce. Currently e-commerce is being used mostly for e-ticketing among the domestic airlines though e-ticketing penetration in India is as low as 17% against the world average of 49% and 42% in Asia Pacific. But according to the UN's International Telecommunication Union, about 400 million travellers worldwide are expected to book tickets on-line this fiscal.

Air Deccan launched its operations with a 100% web enabled ticketing service and in no time became India's largest e-commerce site, with Rs.30 million worth transactions per day. Electronic ticketing now accounts for 35%-40% of tickets sold by Air Deccan. E-ticketing not only make tickets more accessible for travellers 24/7 but also eliminates the need to invest in ticketing offices and other related infrastructure reducing operational costs. Also travellers could avoid the long queues and save the service charges payable to travel agents.

Being a 100% e-ticket enabled airline, Kingfisher not only offers e-ticketing but also electronic check-in, wherein after printing the boarding card on-line the customer can use web-enabled check-in on the airline's website and board the plane directly passing through only mandatory security check at the airport.

One of the biggest advantage of e-ticketing is that one can neither lose an e-ticket nor destroy it by leaving it accidentally in the pocket. Also e-ticketing environment offers much better degree of connectivity and reachability.

E-commerce Application in Government

India is now getting used to e-tendering. The Andhra Pradesh government's initiative is now a model for other states. It began in the year 2002 in Andhra Pradesh State government projects had been stalled by delays in awarding tenders. Cartels regularly cornered the bulk of government contracts and bids were tampered with after closure. For N.Chandrababu Naidu, the tech-savy chief minister in a hurry, this was unacceptable. He needed a way around the mess and predictably by use of technology. Now, 90% of all the tenders in Andhra Pradesh are completed online. Last year, orders worth Rs.15,000 crore were placed. While it earlier took anywhere between 90 and 135 days to finalise a tender, today it takes only 35 days. Northern Railway is planning to implement E-Procurement (E-Works contracts) System from December 2006.

Conclusion

Globally, e-commerce growth has been led by the popularity of online shopping portals like amazon.com and ebay.com but in India that has not been the case. It is mainly driven by the online travel industry and banking sector. For instance, 29% of Indian Internet users book airline tickets online and the figure is expected to touch 46% next year. Online rail ticket booking stands at 39% of the total bookings. As far as banking is concerned, there are 4.6 million online banking users in India. This figure is expected to go up to over 16 million by 2007-08 that will include both internet and mobile banking users. According to the Internet and Mobile Association of India (IAMAI), the e-commerce industry in India is expected to grow to a size of Rs.2,300 crore by 2007 against the Rs.1,200 crore. The total number of internet users which right now is 38.5 million is expected to reach 100 million by 2008.

PAYOFFS OF E-COMMERCE

We have examined how various organizational inputs and processes can impact the outputs of e-commerce. We have examined leadership, strategy, structure, and systems both in

the corporation generally and related specifically to e-commerce. We have also seen how these key factors of success can be successfully managed in a formal process to improve customer acquisitions, customer loyalty, cost savings, channel optimization, and value creation.

Although these outputs are important, the resource allocation decision should rely on understanding the impact of e-commerce decisions and actions on the outcome of improved corporate profitability.

Many researchers and managers have recognized the need to identify and measure the impacts of corporate actions and to provide a better analysis of the return on investment (ROI) of e-commerce expenditures. However, the appropriate metrics have not been well developed. The framework presented here provides the necessary specificity to identify both the causal relationships that lead to e-commerce success, and related measures. In this way, both general managers and IT and e-commerce professionals can more effectively evaluate the success of e-commerce and the potential and actual payoffs of e-commerce investments.

Managers now can also examine the interrelationships among the characteristics of e-commerce success discussed here. The causal linkage analysis illustrates the importance of leadership, strategy, structure, and systems and highlights the specific managerial actions that lead to success.

Some writers have suggested the need for more measurements of the effectiveness of IT. They note that corporations have overlooked economic rationality in justifying IT expenditures and instead have leaned toward a strategy that resembled an arms race, where firms acquire the best and most recent technologies to outpace others, regardless of the results. To assess the payoffs of e-commerce investments, companies must implement systems that evaluate the impact of e-commerce initiatives on financial performance and the trade-offs that must be made among competing organizational constraints and barriers to implementation.

These systems assist senior executives as they develop an e-commerce strategy and allocate corporate resources to support that strategy. The systems also assist e-commerce managers to evaluate the trade-offs and decide which projects provide the largest net benefit to both short-term financial performance and the long-term success of the firm. The careful identification and measurement of the payoffs also permits e-commerce and IT managers to demonstrate the impact on corporate profitability and value creation.

It also provides information for better corporate resource allocation decisions in the CEO's and CFO's offices, based on a better understanding of the ROI—including a fuller understanding of the benefits and costs of e-commerce. Hence, to implement their e-commerce strategy, companies are faced with a significant challenge: to quantify the link between corporate actions in e-commerce and corporate financial performance.

Indeed, only by making the "business case" for e-commerce expenditures can managers truly integrate potential e-commerce impacts into their business strategies. Yet, many companies have failed to make a case for e-commerce initiatives. Instead, they have often acted because they had a feeling that it was the right thing to do or because their competitors were making the leap into e-commerce ventures. However, projects put into place for these reasons alone are vulnerable to cost overruns and poor ROI, changes in senior management, or shifting corporate or consumer priorities.

To present a clear business case for e-commerce initiatives, senior managers need to identify the metrics of e-commerce performance and how that performance impacts overall long-term corporate profitability. This increased attention to the thorough identification and measurement of the metrics of e-commerce is echoed in popular measurement frameworks such as the popular strategic management system "balanced scorecard."

Frameworks such as balanced scorecard and shareholder value analysis focus on the causal relationships and linkages

within organizations and the actions managers can implement to improve both customer and corporate profitability and drive increased value. However, substantial work is required to establish the relationships that relate specifically to e-commerce strategies.

Undeniably, the identification and measurement of the impact of e-commerce strategies is particularly difficult as they are usually linked to long time horizons, a high level of uncertainty, and impacts that are often difficult to quantify. But this analysis is important to improve resource allocation, decision making, and profitability.

In recent years, companies have placed increasing importance on the development of performance metrics to better measure and manage e-commerce performance. Software programs and information systems have been developed to provide a broader set of measurement tools to incorporate into new strategic management systems. Although the need for performance measures for e-commerce has been identified, a large number of specific metrics have not been proposed. E-commerce analysis has typically been operating without measures that permit an effective evaluation of e-commerce benefits, success, or value. This lack of performance metrics has meant a lack of both actual and perceived accountability for firm e-commerce operations to various stakeholders. It also examines how companies can make a compelling business case for e-commerce programs. Senior managers understand how to measure the value of e-commerce and understand the payoffs of e-commerce investments. Its purpose is to answer the question, "Is it worth it?" for companies deciding to start or expand e-commerce projects. This quandary is compounded as senior managers consider the high costs typically associated with e-commerce and the seemingly small percentage of e-commerce or IT projects that succeed. Sometimes the projects are flawed, but often the measures of success are flawed.

Examples abound where companies have attempted e-commerce initiatives and have either failed dramatically or

have incurred costs that far outweighed the gains. Though some would suggest that those failures occurred when companies were not so well centered on ensuring that IT-related funds were well spent, companies today face similar questions about the value of their e-commerce initiatives.

For most companies, it is not a question of whether or not to invest in e-commerce, but when and how: Should it be a large amount up front, or perhaps a smaller expenditure at a later date? Such decisions are critical and difficult. Key to making these decisions is understanding the causal relationships and identifying and measuring the success of the specific actions that managers can take to drive e-commerce success.

6

Management System for E-Commerce Success

SYSTEMS MANAGEMENT

Senior managers must finally ensure that organizational processes are capable of implementing the e-commerce strategy. Information practices, human resources, performance measures, and customer management are all areas in which traditional systems may require adaptation to implement an e-commerce strategy.

Modernized Internal Processes: Using Information Effectively. The cultural transformation described earlier may be enough to make e-commerce possible, but more must be done to maximize its benefits. Information practices must be adapted to promote transparency and availability. Changes must ensure that information flows freely throughout the company and is not hampered by artificial organizational boundaries or personal ambitions.

— Modernized internal processes
— Incentive-laden HR practices
— Aligned performance measures
— Improved customer management

In addition to information sharing, the decision-making processes of the company should be reconsidered. Cross-functional teams and remotely located teams should be

assembled with greater frequency, with less emphasis on hierarchical reporting. Decision makers should also have greater self-governance and flexibility.

An important internal process is value chain management. Every company should identify ways to leverage the Internet in each part of the value chain, from procurement to distribution to delivery. In fact, failure to adopt e-commerce-specific cost savings will likely put a company at a serious competitive disadvantage. Strong supply chain management is often the basis for providing superior service. In the area of procurement, a company can reduce the cost of goods sold by obtaining products through the Internet. Distribution strategies must not only cut costs but also provide the fastest and most convenient customer service. Delivery strategies should maximize convenience and speed for customers, using both the Internet and the company's existing infrastructure to provide these benefits. The best supply-chain practices, however, depend on the type of offering.

Incentive-Laden HR Practices: Bringing Your People on Board. Compensation systems must be aligned with strategy and structure for the e-commerce venture to be a success. The CIO must be compensated as a member of the senior management team to signal the importance and respect shown for the IT function and the centrality and commitment to improved IT and e-commerce. At lower organizational levels, compensation systems have additional consequences on alignment. By compensating e-commerce managers the same as managers in traditional commerce, the company sometimes fails to create the necessary incentives for e-commerce success. Though parallel compensation systems can often work, both market forces and the need for speed, creativity, flexibility, innovation, and extra diligence often requires additional incentives and rewards.

Differential compensation, often through stock options, can create an incentive to cannibalize from the company's traditional channels. Such practices can cause conflicts with traditional business units but are often necessary to optimize the use of

each channel, especially during the formative years of the e-commerce initiative.

Typically, e-commerce compensation should be tied to the overall success of the venture rather than rewarding individual units or channels for performance. This is particularly relevant when the company is seeking full integration, because it helps ensure cooperation and seamlessness between departments.

The Internet also provides opportunities to improve the hiring process. Cisco is just one company that has found great benefits from hiring online, including lowered costs, faster filling of positions, and higher competence. Companies may also want to consider specialized HR practices for their IT departments.

Aligned Performance Measures: Planning for the Long-Term. Strong measurement practices are among the cornerstones of all good systems. Performance measures for e-commerce must overcome the uncertainty and unique dynamics associated with the Internet, and they may be more frequently adjusted in response to real-time information. With these considerations, it is clear that no company should simply extend its existing performance measures to the e-commerce venture without extensive customization. Still, long-term cost differentials, balanced with a variety of financial, nonfinancial, and leading and lagging indicators, are particularly useful for successful e-commerce implementations.

Some skeptical companies have made unreasonable demands with respect to e-commerce performance. Because they misconceived e-commerce risks and rewards, they had unrealistic expectations of immediate growth and ROI that would not be demanded of any traditional long-term investment. Worse yet, they tied further investment to achievement of these goals, dooming e-commerce before it even could get off the ground.

In most companies, new projects and ventures require short-term ROI, and revenue projections, many of which an e-commerce venture and its related projects may not meet. If the

company decides to enter or expand e-commerce, it cannot hamstring the venture by insisting on such short-term requirements throughout.

E-commerce has also led many companies to create performance measures other than revenue, ROI, and traditional financial indicators. Some of the new, poorly designed performance measures have had a disastrous effect on strategy implementation.

For example, indiscriminate customer acquisition and attempting to maximize revenue through online advertising often have negative implications for long-term profitability. Single-purchase customers and advertising revenue independent of the company's value proposition are not sustainable strategies. Worse still are nonfinancial measures such as Web page hits and registered users, which may not even be tied to a short-term revenue stream.

In addition to measuring the performance of the business, e-commerce brings added importance to measuring the value and functionality of operations. Most e-commerce strategies will have a strong operational component, including cost savings from value chain management and cuts in labour costs for the online channel. Operational measures should be tracked by some dedicated resource and balanced between financial and nonfinancial assessments of operational performance.

Moreover, companies must create a value capture process to evaluate the success of IT projects associated with the e-commerce venture. Looking at nonfinancial performance measures, the value capture process can help convince skeptical employees of the importance of IT. Even with the value capture process, however, the full benefits of IT investment are often underestimated.

Improved Customer Management: Better Service and Better Data. Companies must also reconsider the internal processes required to provide the high levels of customer service necessary in e-commerce. Online customers need access to some level of customer service at all times. There is a trade-off between

service that entails a high level of human input and service that is automated and more cost-efficient. Finding the proper balance is a function of the company's offerings, its customer base, and customer feedback.

Customer data is a significant benefit in e-commerce, because of the vast amount that can be learned about customers during a Web site visit in contrast to an in-store visit. Many Web sites, however, have mistakenly focused only on counting hits and visits, while ignoring the more valuable information that can be gathered.

Tracking of customers' interaction with the Web site can be used to identify customers' price sensitivity and information preferences and to gauge satisfaction with the Web site design and accessibility. Gathering and using customer information is important to refine the value proposition and better allocate internal resources. Marketing strategies for the Web site can also be continually refined, using real-time information gathered from customers during their visits, a practice that Staples has used well.

Once a company has established an e-commerce strategy, organizational structure becomes a primary concern in the process of implementing that strategy. In many cases, e-commerce will not initially fit neatly into the existing organizational structure of a traditional company. E-commerce, even to the most technologically savvy company, represents a new channel for procurement, distribution, and sales. E-commerce ventures also put new demands on individuals and business units at every level of the company.

A dynamic model in which strong and supportive leadership and a well-formulated strategy provide the basis for transforming a company through e-commerce. To implement that strategy, structure and systems must be adapted for e-commerce.

Corporate strategy, structure, systems, resources and the external environment are all both inputs and constraints to the determination of e-commerce strategy, structure, and systems.

Planning for an e-commerce venture should use the existing structure to determine what existing company strengths can be utilized or enhanced with e-commerce. Implicitly, even some companies that have been unsuccessful in e-commerce have grasped this fact.

But instead of treating existing structure as an input, companies have often treated it as an impediment to e-commerce, deciding to create an entirely new structure outside the organization. They believed that they could not create a new e-commerce structure inside the organization that could effectively implement the e-commerce strategy. They also did not believe they could integrate an e-commerce operation into the corporate strategy, structures, or systems. Sometimes e-commerce was split off as a separate company, sometimes it was separated as a separate functional or business unit, and in a few cases it was fully integrated.

These concerns have been at the core in the debate over structure in e-commerce. Through the late 1990s, companies feared the disruptive nature of e-commerce and were unwilling to make changes in existing company structures and systems. Many companies chose to separate e-commerce from the main company structure.

These separate-structure decisions included establishing separate business units far from company headquarters, creating separate management teams, outsourcing of the entire e-commerce platform, and selling large equity ownership of the e-commerce business to venture capitalists and other outside interests.

Many of these companies have belatedly realized the value of an integrated structure for e-commerce. High-profile failures may have served to convince uncommitted leaders, but the rationale for integration runs much deeper than an analysis of past outcomes. The application of fundamental business principles should also make the benefits of an integrated organizational structure abundantly clear. Some previous discussions on e-commerce have divided the debate of e-

commerce structure into a number of separate decision dimensions. Some have encouraged executives to consider integration or separation of equity, brand, management, and operations, while others focused on leveraging two dimensions, the financial and the operational. Although these dimensions are relevant in terms of developing an e-commerce structure, careful choices must be made.

Companies must rely on a well-developed and coordinated implementation of an e-commerce strategy, with aligned e-commerce structure and systems. It would have made little sense, for example, if Wells Fargo had integrated its management structure and operations and then followed in the footsteps of competitors, such as Bank One, by creating a new brand for e-com-merce.

Likewise, Office Depot would likely have destroyed most of the benefits of its operational integration if it had sold equity in OfficeDepot.com to a venture capitalist. In the final analysis, the most fundamental analysis is whether or not to integrate e-commerce, and this choice should direct all the subsequent financial, management, and operational decisions.

The implementation of an e-commerce strategy can take different forms, and the structure and speed of implementation are part of the strategic choices. However, companies should make a commitment to long-term full integration. It is the path to that full corporate integration that is an issue. A lack of commitment to e-commerce integration can cause wavering dedication on the part of the company. While Bank of America is currently a leader in online banking, it faced early obstacles because it initially pursued an integrated e-commerce approach. It later moved on to a separate strategic business unit to foster creativity, and then had to switch back to an integrated approach.

Solutions are also described for problems faced when companies lack the internal capabily to fully implement the e-commerce strategies. Finally, the contexts in which external strategic alliances can be a desirable solution are presented.

SCOPE OF E-COMMERCE

As per the IFA definition, if business is not transacted over internet, it is not e-commerce.

As seen separately, the main tax issue raised by e-commerce is that an assessee can do business in another country without having presence in that country. This has been made eminently possible by internet. However, it is also possible without internet.

There is a tele-marketing channel company - say TCC Ltd. This company is doing marketing of several consumer goods over normal television and cable-television. The telecast is made to several countries around the world.

People place orders by telephone / fax / letters. They send remittances by banks' telegraphic transfer or posting the cheques. Goods are supplied through courier / postal services.

Now this business is almost like an internet marketing. It raises the same issue of tax jurisdiction. TCC Ltd. is doing business in several countries without having physical presence there. Why should this not be considered e-commerce? One can safely assume that the constantly developing technologies will soon offer alternatives better than present internet system. Hence the scope of e-commerce must be kept as open & wide as possible.

Fundamental Principles : NEXUS & Sharing of Jurisdiction.

I believe, the fundamental principles accepted globally for sharing of tax jurisdiction between Governments are :

A Government has the right to tax global income of its residents. (Residential status of the assessee.)

A Government has the right to tax all income sourced within its country even by non-residents. (Location of Source of Income.)

These two principles when accepted by all Governments, by their very nature, create overlapping jurisdictions.

To avoid "Double Tax", following mechanism is accepted.

The "Country of Source" will levy a lower than normal tax on the non-resident's income.

The "Country of Residence" will levy tax on all income and will give relief for taxes paid at the "Country of Source".

These fundamental principles can be applied to all kinds of incomes earned from any activities.

To put these fundamental principles into practice, some machinery provisions are required.

May we reflect on the fact that even 'fundamental principles' have not been clearly stated in the model conventions! They are simply taken for granted.

The experts in the field believe that everyone knows them.

Fact of the life is that most of the assessees, tax practitioners and tax officers; do not know what are 'fundamental principles'.

Machinery Provisions

Concepts of "Permanent Establishment"; and "Categorisation of Payments" are the machinery provisions developed for applying the fundamental principles.

The correct machinery provisions should have been - detailed source rules covering every different kind of income. Once the source rules are there, everything falls in place.

However, for some historical reasons, CFA in OECD did not develop elaborate source rules. They went for broad simple categories of income.

For different categories of incomes, different rules have been provided for sharing of jurisdiction.

It is evident that the underlying thought behind sharing of jurisdiction has to be the source principle. However, this thought has not been stated. The sharing of jurisdiction is linked in a simple manner with categories of income.

It has been presumed that all business income is sourced where the assessee is resident. Except where he has a permanent

establishment (PE) abroad. The "Country of Residence" has the right to tax all the income. "Country of PE" has the right to tax income earned by the PE.

"Country of Residence" will tax even this income (earned by foreign PE) but will give credit for the foreign tax. Can a businessman have his source of income in a country where he is neither resident nor does he have a PE?

This probability was never considered. A presumption was made that the income is sourced only in the countries of residence or PE. Hence a rule is made that the business income will be taxed in the country of residence and PE.

Where is the rental income from immovable property sourced! Very simply the country where the property is located. This is one instance where the category of income and the source of income both give the same results. And hence there are no controversies on this kind of income.

Where is the royalty income "Sourced"? This question has not been raised, so no one has answered it. It was presumed that a businessman does all the research, development and experimentation in the country where he resides. So naturally that is the country of source. Hence it has been accepted that the royalty income should be taxed only in the "Country of Residence".

How wrong can be the presumption! Today there are so many companies that are having their complete technologies developed outside their countries of residence! These technologies are patented globally and become source for continuous royalty income.

If General Motors manufactures a car in U.S.A. and exports it to Mr. Gerald in Germany, which is the "Country of Source"? The German resident Mr. Gerald makes the payment. He uses the car in Germany. So is the "Country of Payment", the "Country of Source"? No. The car is made in U.S.A. ; the entire "value addition" is made in U.S.A. and hence U.S.A. is the "Country of Source".

The "Country of Residence" for General Motors is also the "Country of Source" for the business income. Hence there is no controversy.

However, when it comes to 'Royalty' ; so many Governments have simply presumed that the "Country of Payment" is the "Country of source". Sometimes, they even argue that the technology for which royalty is being paid ; is used in the "Country of Payment" and hence the "Country of Payment" has a right to tax it. The fact that Gerald is using the GM car in Germany does not raise any claims that Germany should tax GM's income. Why should similar situation raise a demand for tax jurisdiction in case of royalty?

Since "Country of Payment" is not the "Country of Source", OECD has clearly recommended that the "Country of Payment" should not levy any tax on the royalty payment. Almost all countries want to levy income-tax on the royalty payments being made from their country. So almost all countries have ignored the OECD recommendation and levied withholding tax on royalty payment.

If we accept that a non-resident's income may be taxed in the "Country of Source"; then both - the presumptions - the "Country of Payment" and the "Country of Residence only" taxing the income become redundant. Tax the income where the substance for royalty income - the source is located.

Categorisation of Incomes

I do not know as a matter of fact, why income was categorised into separate heads. The only logical reason seems to be computation of income. Salary income does not need all the details required for computing business income. Computing dividend income is still a different game. So different provisions have to be made for each category of income. Hence different categories of income.

However, having computed incomes from different sources and categories ; all the incomes constitute one figure of "Total Income". This figure has to be applied normal income-tax.

Sharing of tax jurisdiction has to rest entirely on "source of income" and "residential status of the assessee".

However, as seen in the paragraph on "Machinery Provisions"; World community has made several presumptions. The consequence is that :

Business income is taxed in the country of residence. It is not taxed in the "Country of Source".

Royalty income is taxed in the "Country of Payment" and "Country of Residence". All countries want to levy tax on moneys flowing from their countries. Hence they would like to categorise most "Payments" as "Royalties".

But the non-resident assessees do not want to pay tax in a foreign country. So they would like to categorise most incomes as "Business" incomes. Hence all the controversies and spending of tremendous time and energies over Categorisation of Income.

Professor Richard Doernberg, in his IFA Report on "E-Commerce and taxation" has raised the issue why categorisation at all? "Income is Income - Distinction between different types of incomes are artificial".

I categorically submit that "Categorisation of Payments" should have no role in sharing of tax jurisdiction.

Only "Source of Income" and "Residential Status of the Assessee" are relevant.

The OECD TAG on Categorisation of Payments has not discussed the fundamental issue of 'source' of income. It has simply tried to determine in the 27 illustrations given; whether an income might be categorised as 'Royalty' or "Business Income". Once it is royalty, the country of payment acquires jurisdiction to tax the income on 'gross' basis. If it is "Business Income", there is no right to tax.

E-COMMERCE SUCCESS AND MANAGEMENT SYSTEMS

Over the past five years, e-commerce has rapidly evolved from an experiment for trend-conscious businesses to a vital

channel in the business world that no company can afford to ignore. In response to this change, there has been a plethora of studies on the subject of e-commerce, most of which have focused on the formulation of e-commerce strategies. More recently, the importance of structure has come to the forefront, as the dot.com bust caused a reexamination of failed e-commerce structures and as a trend toward integration has spread throughout business.

The importance of management control systems in e-commerce, however, has often been overlooked by both managers and observers of managerial practices. Although studies of traditional business readily acknowledge the importance of various systems, studies of e-commerce have given rather scant attention to systems, in part because the early e-commerce environment embraced two opposing positions on systems.

One view was that e-commerce changes everything and that traditional systems were obsolete. Many e-commerce startups reveled in their rejection of traditional business systems, embraced creativity as the ultimate virtue, and ran companies that barely resembled traditional businesses. At the most trivial level, this meant behavioral changes, such as the rejection of dress codes and cubicles in the work environment. More important, it comprised the rejection of traditional business models and operating procedures and traditional measures of success. In the stock market, these changes were reflected in huge market capitalizations that had no relation to company profitability. Many traditional companies strived to imitate the startup model and gave their spin-offs similar operating rules.

The second position, held by many traditional companies less convinced of the validity of the e-commerce model, was that e-commerce changed nothing. To many corporate boards, e-commerce was derided as "just technology, " and this condescension was reflected in the type of systems that were set up for e-commerce ventures. Spending was tightly controlled from above, budgeting had to conform to outdated corporate standards, innovation was discouraged, and few incentives were created for employees working in e-commerce. Often, e-

commerce would be a part-time project or diversion for both employees and the executives charged with overseeing it.

We now know that neither of these visions is appropriate for the creation of an e-commerce business or for e-commerce systems. The values that underlie those two visions are certain to doom any e-commerce venture, regardless of the specific strategy or structure. With our new understanding of the proper role of e-commerce, it is necessary to articulate how proper management control systems are critical for a successful e-commerce venture.

As with strategy and structure, the relationship between e-commerce systems and the traditional business is dynamic. There is an ever-changing dynamic relationship between corporate strategy, structure, and systems and e-commerce strategy, structure, and systems. The systems used to implement an e-commerce strategy will have implications throughout the company and its traditional business, and the effects of changed policies and regulations will not be limited to e-commerce. Our general e-commerce business model highlights the importance of e-commerce systems and the relation of these systems to corporate and e-commerce strategy and structure and to organizational systems.

Owing to this dynamism, commenting on e-commerce systems requires two separate but equally important perspectives. One is the extent to which traditional systems must be altered, augmented, or eliminated to create a business environment in which e-commerce success is possible. The second perspective examines how a focus on the success of e-commerce can bring greater effectiveness to the governance of the traditional business.

These e-commerce systems decisions fall into four broad areas: information practices, human resources, measurement processes, and customer service. First, a company's information practices can become the bridge from appropriate corporate culture to successful individual and organizational behaviour. Though strong leadership and resource commitment can help

to create a culture in which IT knowledge and stature are sufficient for starting e-commerce, long-term e-commerce success requires more. The company must categorically promote information sharing and information transparency, instill a sense of urgency, and enable real-time and flexible decision-making processes. The company can also benefit from e-commerce by putting these information practices to use throughout the value chain. E-commerce provides opportunities for cost savings and speed improvements at every stage of the value chain.

Human resources policy and practices is the second area of systems that needs to be carefully managed for e-commerce success. Because e-commerce is characterized by speed, risk-taking, and new business models, a company must create the proper incentives for those overseeing e-commerce. For the CIO and for all IT and e-commerce personnel, employees must sometimes be rewarded outside the traditional compensation structure. Managing incentives and rewards to give organizations equity and the appropriate incentives for creativity, flexibility, and innovation is often a significant challenge. E-commerce can benefit the traditional business in the hiring practices of HR. Using the Internet to stimulate job applications can bring both efficiency and a more IT-knowledgeable applicant base.

Measurement is another area in which the nature of e-commerce demands rethinking traditional systems. E-commerce facilitates improvement in measurement systems throughout the organization, allowing a better flow of timely information to decision makers and an aggregation and disaggregation of data never before possible. It permits an analysis of causal relationships and the business model to better understand the payoffs of various corporate actions.

Finally, the systems that govern customer relationships must adjust to implement the important customer service aspects of an e-commerce strategy. Providing service at all times and across channels makes unique demands on the parts of the company closest to the customer. But e-commerce also

provides unprecedented capabilities to learn about customers, their behaviour, and their interaction with offerings. Mining this customer data is an area that is still maturing and offers new competitive advantages.

Information Practices

For e-commerce to be successful, it is necessary but not sufficient that members of the organization are competent and confident in their use of IT. Strong leadership and investment can bring an organization to that stage, but systems must be created to harness the power of IT for organizational integration. It has recently been emphasized that interactive control systems in traditional business must focus on constantly changing information. These systems provide the sensing and monitoring that is necessary whenever strategic uncertainties are high. In most businesses today, more interactive control systems are needed as strategic uncertainties have been increasing. In e-commerce, these systems become increasingly central to the successful implementation of strategy.

A new policy on information practices must become a central component of the company's systems. Information should be transparent and the sharing of information facilitated. Organizational boundaries must not impede the flow of information. An integration strategy cannot be properly implemented if information about e-commerce stalls within the e-commerce unit and is not disseminated widely. Ideally, internal processes are developed in-house with substantial consultation and communication; obstacles are easily recognized, understood, and dealt with, internally and quickly. Companies such as Amazon and Office Depot not only have garnered more efficient business practices because of their internal development, but also have been able to expand into other markets such as technology consulting and Web design because of their in-house expertise.

Companies can also use the implementation of an e-commerce strategy as a starting point for proper information practices. Prior to moving online, 3M had a fragmented

information system that made it difficult to cross-sell to existing customers. Even having the same customer listed in different systems had additional costs. After moving online, the company created a $20 million data warehouse to store all information, as part of a larger restructuring of information systems. Senior management must set the example of open information practices and transparency, even when the information is bad news for the company or reflects negatively on an individual or business unit. Problems should be discussed openly, without fear of repercussions. As appropriate, information on the company's goals, measures, and progress should be made available to all employees and the public through the company's Web site.

This information is increasingly available to interested parties, and by making it transparent, a company may build trust with its constituent groups. In addition, it is often beneficial to increase the information flow to the public to ensure that accurate information is communicated, rather than to risk inaccurate information being made public by a third party.Further, many organizational processes should be restructured to fully take advantage of e-commerce.

In particular, e-commerce should encourage and facilitate companies to move away from strict hierarchical reporting in some areas and move toward the use of cross-functional remote teams. By collaborating with other business functions and units, the e-commerce initiative is likely to encounter less resistance in the traditional business. Processes should also be adaptable and flexible enough to respond to changes in real-time information. Numerous virtual organization techniques serve these purposes, including:

- Cross-functional teams that form themselves
- Teams that may go into and out of existence regularly
- Use of both in-person and remote meetings
- Teams that span organizational boundaries
- Encouragement of innovation through mutual trust
- Self-governance
- Harnessing global resources to solve local problems

An organization that utilizes these processes should then be able to assemble teams to innovate or to resolve challenges associated with e-commerce. Most important, all these techniques should be fully consistent with an integration strategy, eliminating any need for moving e-commerce outside the organization.

By upgrading these information practices, a company positions itself to make significant improvements throughout the value chain. For many companies, value chain management is an integral part of the e-commerce strategy. But even for those companies that focus primarily on selling online, subtle improvements can be made with minimal extra cost and effort. Thus, improving information practices can create significant benefits for sales, distribution, and procurement, along with various other processes throughout the organization.

Cisco has used its real-time capabilities to create supplier-side processes that vastly improve its supply-chain management. Cisco and its suppliers and manufacturers share extensive information on product quality. This allows Cisco to measure the number of defective products while they are still in the supplier's possession, rather than after they have been delivered. In turn, the supplier can make faster adjustments in its manufacturing process to minimize future quality problems. Dell has mastered the use of e-commerce in limiting the amount of inventory kept on hand. Many component parts such as monitors and peripherals are never kept in inventory by Dell, and their movement and distribution is entirely handled by email communication. But even for parts retained by Dell, real-time ordering forecasts are sent to suppliers to minimize the inventory and buffer stocks on a cycle as short as two hours. This relationship with suppliers, coupled with its information practices, also permits a *negative* cash conversion cycle.

At the delivery end of the supply chain, Tesco spanned traditional organizational boundaries to create the most efficient delivery process. While many in the grocery industry mimicked the Amazon model by attempting to deliver from large, high-tech warehouses, Tesco chose to deliver directly from stock at

local physical locations. While this limited the potential delivery zone, it also saved Tesco the effort and resources of building expensive warehouses with uncertain profitability. Delivering from the store meant no separate inventories and no need for entirely new processes.

Nike, Inc. recently implemented a supply-chain system linking the company with its manufacturing partners. Before these system changes, 30 percent of Nike's total volume of shoe orders were based on estimates; now, only 3 percent of the orders are guesswork, because of better forecasting and planning. Whirlpool Corporation has linked every Whirlpool factory and sales site worldwide through e-business software, allowing factories and sales sites to coordinate with suppliers and key retail partners. This has reduced inventories and increased vital communication.

Krispy Kreme Doughnut is another company that has used e-commerce to its advantage by devising an intranet network linking its stores. The Web system tracks doughnut mix, doles out the right colors of sprinkles, monitors managers' decisions, and permits users to fix errors such as damaged goods, by allowing replacements to be sent. The system allows employees to focus more on customer service, reduce problem orders, and increase productivity.

For proper information practices to improve the success of e-commerce implementations:

- Organizational boundaries should not represent an impediment to the free flow of information in a company.
- Company leadership must set the example of open information practices.
- Companies must be willing to move away from strict hierarchical reporting systems.

SYSTEM MANAGEMENT IN E-COMMERCE

To move forward with e-commerce, the CEO and other senior managers must pursue several initial activities. Leadership comprises words and deeds, explicit and implicit

behaviour, control of purse-strings, and leadership by example. Successful e-commerce leadership has four main characteristics, which can be implemented as follows.

- *Commitment at the Top: The CEO and Other Senior Managers Must Embrace E-Commerce.* Implementing an e-commerce plan requires strong leadership at the top of the organization. The CEO and other senior managers must understand the issues surrounding e-commerce well enough to evaluate the organization's strengths and weaknesses and make appropriate decisions on strategy, structure, and systems. The CEO must view IT and its applications as a vital component of the company's strategy and publicly demonstrate this belief through words and actions. The CEO must also adopt the attitude that e-commerce is not optional. The company may decide to have a larger or smaller role for e-commerce and may develop that role quickly or slowly, and it may sell directly to customers or limit its major initiative to the back-end systems, but it cannot ignore e-commerce entirely.
  - — Commitment at the top
  - — Thorough competitive analysis
  - — Significant financial investment
  - — Cultural transformation

Many CEOs have become e-commerce believers by discussing the topic with more experienced executives at other companies. For example, a conversation with Michael Dell of Dell Computer led Jack Welch at GE to hasten his company's movement into large scale e-commerce activities. Others, such as Howard Lester at Williams-Sonoma, have been convinced by believers within their own firm through some positive pilot e-commerce projects. In any case, the CEO should begin an earnest dialogue with people who understand e-commerce to learn about its successes and failures in relevant industries.

Other leadership roles are also important. The CIO must be a proactive member of the senior management team who

communicates well with the CEO about the usefulness of IT applications. Rather than serving strictly as a technologist, the CIO must also be a strategist. The CIO should serve in a leadership role in cross-functional teams that combine business units, IT, and e-commerce.

The CFO needs to understand the strategic role of IT in the business and consider its ramifications in funding decisions. Other members of the senior management team should have an active role in e-commerce, in a direct advisory role when it relates to specific relevant areas of responsibility and in a support role for other areas of the company. If possible, senior management should include persons who have prior e-commerce experience.

Thorough Competitive Analysis: Determine Company's E-Commerce Position. In crafting an appropriate e-commerce strategy, it is vital for the company first to understand its e-commerce position relative to competitors. At this point, there are few industries where there has not been a first mover in the use of e-commerce. Even in industries where traditional companies have been laggards, pure-play companies have stepped into the void with varying levels of success. In fact, in most industries, a pure-play of some type was the first mover.

This existence of a first-mover competitor does not mean that other companies in an industry cannot gain competitive advantage over their traditional competitors by making significant e-commerce investments and efforts. CEOs who find themselves in an early-mover position should continue to invest and innovate to maintain their advantage. Charles Schwab built a significant advantage over competitor Merrill Lynch, despite having been preceded online by pure-play competitors such as E*Trade.

If a company is a late mover into e-commerce, it can still desire to be the first to provide a particular service, combination of services, or other unique value proposition. Catching up, however, often requires a very high level of investment and a willingness to explore new business models and processes.

Regardless of position, a CEO must adopt a broader mode of thinking about competitors because in e-commerce, industry boundaries are more blurred and competition can come from unlikely sources.

Significant Financial Investment: Determine Appropriate Role of E-Commerce. Once the CEO has evaluated the company's e-commerce position relative to other industry members and specific competitors, a decision must be made as to the appropriate role of e-commerce within the company.

Given the increased usage of the Internet by leading companies in most industries, the senior managers will typically need to move forward with expanding or at least maintaining the company's current e-commerce position relative to its competitors.

The relevant decisions include whether the company is going to sell online and, if so, how its offerings will compare with its traditional offerings. It should also consider the geographic scope of its e-commerce sales, since the Internet permits unlimited worldwide access, which can introduce a myriad of complications and challenges. The extent to which e-commerce will be utilized in procurement and distribution must also be considered, as well as internal functions such as human resources, accounting, and marketing.

Of primary importance is that the company determine appropriate levels of IT activities and provide for appropriate levels of IT funding. This approach requires taking all necessary steps, including acquisitions or strategic alliances, to ensure that the company's IT capabilities are sufficient for a successful e-commerce venture.

The CEO must then work with other executives to ascertain the amount of investment necessary to fully implement the chosen e-commerce strategy. Investment decisions should be primarily strategic, and returns should be viewed, including the measurement of both short-term and long-term value creation, with a broad view of potential impacts.

Cultural Transformation: Determine Implementation Needs. Since structure and systems can be used to implement strategy, most systems decisions are made after an e-commerce strategy has been formulated. But at an attitudinal level, cultural transformation will usually begin even earlier. Senior managers have a responsibility to establish a minimum level of IT acceptance and competence throughout the company by demonstrating and communicating commitment and creating appropriate training programs. Some companies will be better prepared for this transition than others; senior managers must carefully consider the required preparation and the implications for implementation speed.

To rapidly implement an e-commerce strategy, IT and e-commerce basics and the purpose of e-commerce must be understood. Communicating purpose is one of the most important actions of a CEO. Employees must realize that e-commerce represents an important challenge and opportunity rather than a threat.

Whether the e-commerce strategy is to be implemented within a month or a year, a sense of urgency is required. The CEO must present e-commerce as having the power to transform the organization in a positive way. Equivocation at every level, from the CFO's hesitation to fund technology to the salesperson's fear that e-commerce will decrease personal commissions, must be avoided. That does not mean reckless risk-taking to move forward, but it does mean a committed acceptance of e-commerce throughout the organization.

STARTING THE SYSTEMS DEVELOPMENT PROCESS

Do we have business problem (or opportunity)? What is causing the problem? Would a new or improved information system help solve the problem? What would be a feasible information system solution to our problem? These are the questions that have to be answered in the system investigation stage-the first step in the systems development process. This

stage may involve consideration of proposals generated by an information systems planning process.

Feasibility Studies

The process of developing a major information system can be costly, the systems investigation stage frequently requires a preliminary study called a feasibility study. A feasibility study is a preliminary study which investigates the information needs of prospective users and determines the resource requirements, costs, benefits, and feasibility of proposed project. You would use the methods of gathering information to collect data for a feasibility study. Then you might formalize the findings of this study in written report that includes preliminary specifications and a development plan for the proposed system. If management approves the recommendations of the feasibility study, the development process can continue. The goal of feasibility studies is to evaluate alternative systems and to propose the most feasible and desirable systems for development. The feasibility of a proposed system can be evaluated in terms of four major categories.

The focus of organizational feasibility is on how well a proposed information system supports the objectives of the organization and its strategic plan for information systems. For example, projects that do not directly contribute to meeting an organization's strategic objectives are typically not funded.

Economic feasibility is concerned with whether expected cost savings, increased revenue, increased profits, reductions in required investment, and other types of benefits will exceed the costs of developing and operating a proposed system. For example, if a project can't cover its development costs, it won't be approved, unless mandated by government regulations or other considerations. Technical feasibility can be demonstrated if reliable hardware and software capable of meeting the needs of a proposed system can be acquired or development by the business in the required time.

Finally, operational feasibility is the willingness and ability of the management, employees, customers, suppliers, and others

to operate, use, and support a proposed system. For example, if the software for a new system is too difficult to use, employees may make too many errors and avoid using it. Thus, it would fail to show operational feasibility.

Cost/Benefit Analysis. Feasibility studies typically involve cost/benefit analysis. If costs and benefits can be quantified, they are called tangible costs are the costs of hardware and software, employee salaries, and other quantifiable costs needed to develop and implement an IS solution. Intangible costs are difficult to quantity; they included the loss of customer goodwill or employee morale caused by errors and disruptions arising from the installation of a new system.

Tangible. Benefits are favorable results, such as the decrease in payroll costs caused by a reduction in personnel or a decrease in inventory carrying costs caused by a reduction in inventory. Intangible benefits are harder to estimate. Such benefits as better customer service or faster and more accurate informations for management fall into this category.

Database Management Systems

A database management system (DBMS) consists of software that operates databases, providing storage, access, security, backup and other facilities.

Database management systems can be categorized according to the database model that they support, such as relational or XML, the type(s) of computer they support, such as a server cluster or a mobile phone, the query language(s) that access the database, such as SQL or XQuery, performance trade-offs, such as maximum scale or maximum speed or others. Some DBMS cover more than one entry in these categories, e.g., supporting multiple query languages. Examples of some commonly used DBMS are MySQL, PostgreSQL, Microsoft Access, SQL Server, FileMaker,Oracle,Sybase, dBASE, Clipper,FoxPro etc. Almost every database software comes with an Open Database Connectivity (ODBC) driver that allows the database to integrate with other databases.

Components of DBMS

Most DBMS as of 2009 implement a relational model. Other DBMS systems, such as Object DBMS, offer specific features for more specialized requirements. Their components are similar, but not identical.

RDBMS Components

- Sublanguages— Relational DBMS (RDBMS) include Data Definition Language (DDL) for defining the structure of the database, Data Control Language (DCL) for defining security/access controls, and Data Manipulation Language (DML) for querying and updating data.
- Interface drivers—These drivers are code libraries that provide methods to prepare statements, execute statements, fetch results, etc. Examples include ODBC, JDBC, MySQL/PHP, FireBird/Python.
- SQL engine—This component interprets and executes the DDL, DCL, and DML statements. It includes three major components (compiler, optimizer, and executor).
- Transaction engine—Ensures that multiple SQL statements either succeed or fail as a group, according to application dictates.
- Relational engine—Relational objects such as Table, Index, and Referential integrity constraints are implemented in this component.
- Storage engine—This component stores and retrieves data from secondary storage, as well as managing transaction commit and rollback, backup and recovery, etc.

ODBMS Components

Object DBMS (ODBMS) has transaction and storage components that are analogous to those in an RDBMS. Some DBMS handle DDL, DML and update tasks differently. Instead of using sublanguages, they provide APIs for these purposes.

They typically include a sublanguage and accompanying engine for processing queries with interpretive statements analogous to but not the same as SQL. Example object query languages are OQL, LINQ, JDOQL, JPAQL and others. The query engine returns collections of objects instead of relational rows.

Types of Analytical Database

Analysts may do their work directly against a data warehouse or create a separate analytic database for *Online Analytical Processing*. For example, a company might extract sales records for analyzing the effectiveness of advertising and other sales promotions at an aggregate level.

Data Warehouse

Data warehouses archive modern data from operational databases and often from external sources such as market research firms. Often operational data undergoes transformation on its way into the warehouse, getting summarized, anonymized, reclassified, etc. The warehouse becomes the central source of data for use by managers and other end-users who may not have access to operational data. For example, sales data might be aggregated to weekly totals and converted from internal product codes to use UPCs so that it can be compared with ACNielsen data. Some basic and essential components of data warehousing include retrieving and analyzing data, transforming,loading and managing data so as to make it available for further use. Operations in a data warehouse are typically concerned with bulk data manipulation, and as such, it is unusual and inefficient to target individual rows for update, insert or delete. Bulk native loaders for input data and bulk SQL passes for aggregation are the norm.

Hypermedia Databases

The World Wide Web can be thought of as a database, albeit one spread across millions of independent computing systems. Web browsers "process" this data one page at a time, while Web crawlers and other software provide the equivalent of database indexes to support search and other activities.

Distributed Database

These are databases of local work-groups and departments at regional offices, branch offices, manufacturing plants and other work sites. These databases can include segments of both common operational and common user databases, as well as data generated and used only at a user's own site.

End-User Database

These databases consist of data developed by individual end-users. Examples of these are collections of documents in spreadsheets, word processing and downloaded files, even managing their personal baseball card collection.

External Database

These databases contain data collected for use across multiple organizations, either freely or via subscription. The Internet Movie Database is one example.

Operational Database

These databases store detailed data about the operations of an organization. They are typically organized by subject matter, process relatively high volumes of updates using transactions. Essentially every major organization on earth uses such databases. Examples include customer databases that record contact, credit, and demographic information about a business' customers, personnel databases that hold information such as salary, benefits, skills data about employees, Enterprise resource planning that record details about product components, parts inventory, and financial databases that keep track of the organization's money, accounting and financial dealings.

Models jof Object Database Models

In recent years, the object-oriented paradigm has been applied in areas such as engineering and spatial databases, telecommunications and in various scientific domains. The conglomeration of object oriented programming and database technology led to this new kind of database. These databases

attempt to bring the database world and the application-programming world closer together, in particular by ensuring that the database uses the same type system as the application programme. This aims to avoid the overhead (sometimes referred to as the *impedance mismatch*) of converting information between its representation in the database (for example as rows in tables) and its representation in the application programme (typically as objects). At the same time, object databases attempt to introduce key ideas of object programming, such as encapsulation and polymorphism, into the world of databases. A variety of these ways have been tried for storing objects in a database. Some products have approached the problem from the application-programming side, by making the objects manipulated by the programme persistent. This also typically requires the addition of some kind of query language, since conventional programming languages do not provide language-level functionality for finding objects based on their information content. Others have attacked the problem from the database end, by defining an object-oriented data model for the database, and defining a database programming language that allows full programming capabilities as well as traditional query facilities..

Post-Relational Database Models

Some of these extensions to the relational model integrate concepts from technologies that pre-date the relational model. For example, they allow representation of a directed graph with trees on the nodes. The German company *sones* implements this concept in its GraphDB. Some post-relational products extend relational systems with non-relational features. Others arrived in much the same place by adding relational features to pre-relational systems. Paradoxically, this allows products that are historically pre-relational, such as PICK and MUMPS, to make a plausible claim to be post-relational.

Storage Structures

Databases may store relational tables/indexes in memory or on hard disk in one of many forms:

- ordered/unordered flat files
- ISAM
- heaps
- hash buckets
- logically-blocked files
- Fractal Tree indexes
- B+ trees.

The most commonly used are B+ trees and ISAM. Object databases use a range of storage mechanisms. Some use virtual memory-mapped files to make the native language (C++, Java etc.) objects persistent. This can be highly efficient but it can make multi-language access more difficult. Others disassemble objects into fixed- and varying-length components that are then clustered in fixed sized blocks on disk and reassembled into the appropriate format on either the client or server address space.

Another popular technique involves storing the objects in tuples (much like a relational database), which the database server then reassembles into objects for the client. Other techniques include clustering by category (such as grouping data by month, or location), storing pre-computed query results, known as materialized views, partitioning data by range (e.g., a data range) or by hash. Memory management and storage topology can be important design choices for database designers as well. Just as normalization is used to reduce storage requirements and improve database designs, conversely denormalization is often used to reduce join complexity and reduce query execution time.

Indexing

Indexing is a technique for improving database performance. The many types of indexes share the common property that they eliminate the need to examine every entry when running a query. In large databases, this can reduce query time/cost by orders of magnitude. The simplest form of index is a sorted list

of values that can be searched using a binary search with an adjacent reference to the location of the entry, analogous to the index in the back of a book.

The same data can have multiple indexes (an employee database could be indexed by last name and hire date.) Indexes affect performance, but not results. Database designers can add or remove indexes without changing application logic, reducing maintenance costs as the database grows and database usage evolves. Given a particular query, the DBMS' query optimizer is responsible for devising the most efficient strategy for finding matching data. The optimizer decides which index or indexes to use, how to combine data from different parts of the database, how to provide data in the order requested, etc. Indexes can speed up data access, but they consume space in the database, and must be updated each time the data is altered. Indexes therefore can speed data access but slow data maintenance. These two properties determine whether a given index is worth the cost.

Transactions

As every software system, a DBMS operates in a faulty computing environment and prone to failures of many kinds. A failure can corrupt the respective database unless special measures are taken to prevent this. A DBMS achieves certain levels of fault tolerance by encapsulating in database transactions units of work (executed programmes) performed upon the respective database.

The ACID Rules

Most DBMS provide some form of support for transactions, which allow multiple data items to be updated in a consistent fashion, such that updates that are part of a transaction succeed or fail in unison. The so-called ACID rules, summarized here, characterize this behaviour:

- Atomicity: Either all the data changes in a transaction must happen, or none of them. The transaction must be completed, or else it must be undone (rolled back).

- Consistency: Every transaction must preserve the declared consistency rules for the database.
- Isolation: Two concurrent transactions cannot interfere with one another. Intermediate results within one transaction must remain invisible to other transactions. The most extreme form of isolation is serializability, meaning that transactions that take place concurrently could instead be performed in some series, without affecting the ultimate result.
- Durability: Completed transactions cannot be aborted later or their results discarded. They must persist through (for instance) DBMS restarts.

In practice, many DBMSs allow the selective relaxation of these rules to balance perfect behaviour with optimum performance.

Concurrency Control and Locking

Concurrency control is essential for the correctness of transactions executed concurrently in a DBMS, which is the common execution mode for performance reasons. The main concern and goal of concurrency control is isolation.

Isolation

Isolation refers to the ability of one transaction to see the results of other transactions. Greater isolation typically reduces performance and/or concurrency, leading DBMSs to provide administrative options to reduce isolation. For example, in a database that analyzes trends rather than looking at low-level detail, increased performance might justify allowing readers to see uncommitted changes ("dirty reads".)

A common way to achieve isolation is by locking. When a transaction modifies a resource, the DBMS stops other transactions from also modifying it, typically by locking it. Locks also provide one method of ensuring that data does not change while a transaction is reading it or even that it does not change until a transaction that once read it has completed.

Lock Types

Locks can be *shared* or *exclusive*, and can lock out *readers* and/or *writers*. Locks can be created *implicitly* by the DBMS when a transaction performs an operation, or *explicitly* at the transaction's request. Shared locks allow multiple transactions to lock the same resource. The lock persists until all such transactions complete. Exclusive locks are held by a single transaction and prevent other transactions from locking the same resource. Read locks are usually shared, and prevent other transactions from modifying the resource. Write locks are exclusive, and prevent other transactions from modifying the resource.

On some systems, write locks also prevent other transactions from reading the resource. The DBMS implicitly locks data when it is updated, and may also do so when it is read. Transactions explicitly lock data to ensure that they can complete without complications. Explicit locks may be useful for some administrative tasks. Locking can significantly affect database performance, especially with large and complex transactions in highly concurrent environments.

Lock Granularity

Locks can be coarse, covering an entire database, fine-grained, covering a single data item, or intermediate covering a collection of data such as all the rows in a RDBMS table.

Deadlocks

Deadlocks occur when two transactions each require data that the other has already locked exclusively. Deadlock detection is performed by the DBMS, which then aborts one of the transactions and allows the other to complete.

Replication

Database replication involves maintaining multiple copies of a database on different computers, to allow more users to access it, or to allow a secondary site to immediately take over, if the primary site stops working. Some DBMS piggyback

replication on top of their transaction logging facility, applying the primary's log to the secondary in near real-time. Database clustering is a related concept for handling larger databases and user communities by employing a cluster of multiple computers to host a single database that can use replication as part of its approach.

Security

Database security denotes the system, processes, and procedures that protect a database from unauthorized activity. DBMSs usually enforce security through access control, auditing, and encryption:

- Access control manages who can connect to the database via authentication and what they can do via authorization.
- Auditing records information about database activity: who, what, when, and possibly where.
- Encryption protects data at the lowest possible level by storing and possibly transmitting data in an unreadable form. The DBMS encrypts data when it is added to the database and decrypts it when returning query results. This process can occur on the client side of a network connection to prevent unauthorized access at the point of use.

Confidentiality

Law and regulation governs the release of information from some databases, protecting medical history, driving records, telephone logs, etc. In the United Kingdom, database privacy regulation falls under the Office of the Information Commissioner. Organizations based in the United Kingdom and holding personal data in digital format such as databases must register with the Office.

7

Electronic Business

Specifically, E-business includes EDI (Electronic Data Interchange), ERP (Enterprise Resource Planning), manufacturing supply chains, CRM (Customer Resource Management), health care billing, automotive supply, global customer support, anywhere/anytime banking and brokerage, and business-to-business integration.

These focused solutions demonstrate positive returns on investment. It includes the electronic notification of orders through such time-proven supply chains as EDI, wire transfers, facsimile ordering, telephone ordering, catalog sales, credit card payments, extension of business credit, voice mail, and e-mail. E-business sibling, e-commerce, which like it is just vague term, generally refers to business-to-business initiatives, such as the integration of backend systems with customers and vendors.

In aggregate, business-to-business communications and transaction processing represents more than 99.9% of all E-business transactions. In contrast, greater than 90% of E-business is EDI, which is unlikely to vanish. It is likely to transition into new forms of end-to-end integrated transaction processing, including XML (Extended Markup Language, which is just a presentation method) and EDI performed using XML. At the least, EDI will not disappear although it might get a new name just as Information Technology (IT) is transforming into E-business.

About 9% of e-business is transacted as banking and credit card events through clearing houses, payment transfer systems, check reimbursements, and proprietary channels. I-business (Internet catalog sales) represents 1% of US retail sales, a blip in the E-business statistics, which are 0.06%. Equating Internet-driven sales with E-business misrepresents the potential for any other global E-business agenda and downplays proven IT skills thereby undermining a successful business agenda.

Although Intel, Dell, Compaq, and other companies—independently—have announced Internet and E-business sales volumes in excess of $1 US Billion per month (June 1999), it is misleading to view these efforts as successful I-business ventures at this time. Two important business assessments remain fuzzy. First, these sales are cannibalizing existing direct, wholesale, and value-added sales, creating high-profile channel conflicts and fulfillment dislocations in preexisting structures and relationships.

For example, Levi Strauss upset Federated and its other wholesale buyers by competing for retail share. Second, although these I-business sales volumes are enormously large, the companies and their auditors have yet to justify the margins against the fully-burdened Internet site and marketing costs. Few retail pure I-business ventures show profits at this time, less than 1%, as reported by the U.S. Department of Commerce (recently broken out as a new statistical tracking category) or by many independent research organizations.

However, other E-business ventures are enormously profitable, without financial transactions of any kin d. For example, National Semiconductor, in particular, as a low-cost manufacture competing against worldwide labor and currency markets, benefits by forecasting exact preproduction sales levels with 3O (sigma) accuracy. The logistics for global E-business require multiple languages and multiple currencies. The point is that E-business is not purely an Internet play, not even a pure sales transaction process, but rather business enabled through integrated communications and processing.

E-business reflects a substantial and explosively growing component of business. Information technology has transitioned to E-business, even if the terms seem different. Communications has transitioned to E-business. Wide area networking has transitioned to E-business.

Local area networks, desktop computing, and Internet-distributed processing is becoming part of E-business and losing any standalone importance apart from IT or E-business. If anything concrete, E-business is the convergence of communication and information processing technology supporting the core business. To represent E-business as anything else, such as a technical tour de force or a radical business method, overvalues technology and deflates existing business skills. The agenda for profitable E-business is to enable traditional business and financial decision-making, sometimes with greater efficiency and faster speeds.

EMERGING TRENDS IN E-BUSINESS

As social media, app stores and global availability become standard, many companies are looking to enhance the online customer experience. And while retail and other transactions via Internet are customary, more than ever companies are simplifying the ways in which customers interact with their website and ultimately make online purchases. Here are eight trends happening right now in global e-commerce that seek to enhance the user experience:

Micro-payments

Among the most revolutionary changes in the coming months—not years—is the use of micro-payment systems from a variety of financial firms, e.g., Paypal, Visa, WesternUnion, among others, including banks. This trend is facilitated by the W3C working group that approved these protocols and technical standards for the interworking. These systems will change not only how we carry money but how we value money and think about purchases. (Consider how a purchase of $4.99 feels in a mobile app store vs. at Dunkin' Donuts.) Payment systems that

make it easier to buy online, coupled with mobile technologies will accelerate the usage of global e-commerce applications.

Mobile technologies

More people access the Internet on their mobile devices than on any other device. We are rapidly approaching the time (if we are not already there) where designs must be created for the mobile web first, and for the desktop second. Mobile technologies facilitate comparison shopping; with the advent of barcode reader apps and price-comparison databases, a consumer could snap a bar code in Walmart and quickly reference product reviews and prices on walmart.com (or compare prices with Walmart competitors). Mobile technologies also facilitate impulse buys – especially with the advent of micro-payments tied to the mobile device. Just recently, Starbucks customers can not only place an order with their Smartphone, but also make a purchase.

Social media

As Facebook has become the most visited site on the Web, the role of social media, including Facebook and its local clones such as Twitter, is increasingly important. Social media sites increasingly act as points of entry to e-commerce sites, and vice versa, as e-commerce sites build rating, loyalty and referral systems tied to social media. Group buying (e.g., Groupon) is also gaining mainstream ground, with many "deal of the day" sites competing for an increasingly savvy consumer base, but improvements lie ahead as the social aspects and user experience are refined.

Fulfillment options

I believe that users will want to have multiple fulfillments and return options when interacting with a vendor: ship to address, courier, pick-up in store, return to store, etc. Having many fulfillment options is how customers view their overall customer experience. Some companies have made a business proposition online by being exceptional in service to the online channel (e.g., Zappos).

Global availability

Increasingly, consumers want the availability to buy products from foreign sites and have them delivered locally. Thus, currency and customs will be of growing concern to many online retailers. Along with this, there will be concerns with local privacy laws and restrictions on related data collection and storage.

Localization

While the trend is to globalize, what's often more important is to localize. User Centric's (now GfK's User Experience team) research clearly shows that sites that 'feel' local – with proper imagery, language, time/date, weights/measures, currency, etc. – resonate far more than sites that seem culturally distant or sterile.

Customizability

Consumers want control, and want to be able to design the details of the items they purchase.

Time-based availability

Some of the hottest and most successful sites are those that have a time-critical response component. Sites like Groupon, Gilt and others capitalize on the perception of limited-time availability. Creating a sense of urgency drives traffic and purchase behavior.

As user experience experts, we constantly evaluate the latest trends and technology with the end user in mind. As companies race to add components to or modify existing Web pages to stay 'on trend,' they must also continually evaluate how their end users will be affected and how a negative user experience will affect customer retention and, ultimately, the bottom line.

Emerging Trends in e –Business

E-commerce has helped expand industries and telecommunications enabling small-scale businesses to flourish

and spread internationally. This new form of interaction has brought along many new trends, a few of which are given below:

1. Deals: Offline deals and coupons were always a trend, but have not been taken up online. Depending on certain seasons, anniversaries or holidays, businesses offer their promising customers with irresistible deals and coupon codes. Upon making your purchase, these deals will significantly lower the cost of what you desire.
2. Innovations: From being a site that offers only information about hotels, or just offers bookings, these have been consistently transformed and recreated. Jovago.com offers its customers with not only the best deals on hotels and destinations, but also detailed reviews and pictures about them.
3. Online Sales: Massive department sales have been transferred online, with exclusive online sales occurring that encourage online shopping. Brands enjoy sample sales, distributing samples to their valued customers!
4. Global Consumption: Through e-commerce, purchase of foreign goods has become easily accessible. This has resulted in more vendors featuring their products online that facilitates further consumption and sales.
5. Virtual advertising: Since shopping has become readily available online, so has the advertisement of such goods. Visual and video imagery is very popular, featured on television, Internet and spread further through sponsorships.

BUSINESS PROCESS MANAGEMENT

Business process management (BPM) is a holistic management approach focused on aligning all aspects of an organization with the wants and needs of clients. It promotes business effectiveness and efficiency while striving for innovation, flexibility, and integration with technology. BPM attempts to improve processes continuously. It can therefore

be described as a "process optimization process." It is argued that BPM enables organizations to be more efficient, more effective and more capable of change than a functionally focused, traditional hierarchical management approach. An empirical study by Kohlbacher (2009) indicates that BPM helps organizations to gain higher customer satisfaction, product quality, delivery speed and time-to-market speed.

A business process comprises a "series or network of value-added activities, performed by their relevant roles or collaborators, to purposefully achieve the common business goal." These processes are critical to any organization: they may generate revenue and often represent a significant proportion of costs. As a managerial approach, BPM considers processes to be strategic assets of an organization that must be understood, managed, and improved to deliver value added products and services to clients. This foundation is very similar to other Total Quality Management or Continuous Improvement Process methodologies or approaches. BPM goes a step further by stating that this approach can be supported, or enabled, through technology to ensure the viability of the managerial approach in times of stress and change. In fact, BPM is an approach to integrate a "change capability" to an organization-both human and technological. As such, many BPM articles and pundits often discuss BPM from one of two viewpoints: people and/or technology.

Roughly speaking, the idea of (business) process is as traditional as concepts of tasks, department, production, outputs. The current management and improvement approach, with formal definitions and technical modelling, has been around since the early 1990s. Note that in the IT community, the term 'business process' is often used as synonymous of management of middleware processes; or integrating application software tasks. This viewpoint may be overly restrictive-a limitation to keep in mind when reading software engineering papers that refer to "business processes" or to "business process modelling".

Although the initial focus of BPM was on the automation of business processes with the use of information technology,

it has since been extended to integrate human-driven processes in which human interaction takes place in series or parallel with the use of technology. For example (in workflow systems), when individual steps in the business process require human intuition or judgment to be performed, these steps are assigned to appropriate members within the organization.

More advanced forms such as human interaction management are in the complex interaction between human workers in performing a workgroup task. In this case, many people and systems interact in structured, ad-hoc, and sometimes completely dynamic ways to complete one to many transactions.

BPM can be used to understand organizations through expanded views that would not otherwise be available to organize and present. These views include the relationships of processes to each other which, when included in a process model, provide for advanced reporting and analysis that would not otherwise be available. BPM is regarded by some as the backbone of enterprise content management.

Because BPM allows organizations to abstract business process from technology infrastructure, it goes far beyond automating business processes (software) or solving business problems (suite). BPM enables business to respond to changing consumer, market, and regulatory demands faster than competitors-creating competitive advantage.

As of 2010 technology has allowed the coupling of BPM to other methodologies, such as Six Sigma. BPM tools allow users to:

- Vision-strategize functions and processes
- Define-baseline the process or the process improvement
- Model-simulate the change to the process.
- Analyse-compare the various simulations to determine an optimal improvement
- Improve-select and implement the improvement
- Control-deploy this implementation and by use of User defined dashboards monitor the improvement in real

time and feed the performance information back into the simulation model in preparation for the next improvement iteration.

- Re-engineer-revamp the processes from scratch for better results.

This brings with it the benefit of being able to simulate changes to business processes based on real-life data (not assumed knowledge). Also, the coupling of BPM to industry methodologies allows users to continually streamline and optimize the process to ensure that it is tuned to its market need.

BPM Life-cycle

Business process management activities can be grouped into six categories: vision, design, modelling, execution, monitoring, and optimization.

Vision

Functions are designed around the strategic vision and goals of an organization. Each function is attached with a list of processes. Each functional head in an organization is responsible for certain sets of processes madeup of tasks which are to be executed and reported as planned. Multiple processes are aggregated to function accomplishments and multiple functions are aggregated to achieve organizational goals.

Design

Process Design encompasses both the identification of existing processes and the design of "to-be" processes. Areas of focus include representation of the process flow, the actors within it, alerts & notifications, escalations, Standard Operating Procedures, Service Level Agreements, and task hand-over mechanisms. Good design reduces the number of problems over the lifetime of the process. Whether or not existing processes are considered, the aim of this step is to ensure that a correct and efficient theoretical design is prepared. The proposed improvement could be in human-to-human, human-to-system,

and system-to-system workflows, and might target regulatory, market, or competitive challenges faced by the businesses.

Modelling

Modelling takes the theoretical design and introduces combinations of variables (e.g., changes in rent or materials costs, which determine how the process might operate under different circumstances). It also involves running "what-if analysis" on the processes: *"What if I have 75% of resources to do the same task?" "What if I want to do the same job for 80% of the current cost?"*.

Execution

One of the ways to automate processes is to develop or purchase an application that executes the required steps of the process; however, in practice, these applications rarely execute all the steps of the process accurately or completely. Another approach is to use a combination of software and human intervention; however this approach is more complex, making the documentation process difficult.

As a response to these problems, software has been developed that enables the full business process (as developed in the process design activity) to be defined in a computer language which can be directly executed by the computer. The system will either use services in connected applications to perform business operations *(e.g.* calculating a repayment plan for a loan) or, when a step is too complex to automate, will ask for human input. Compared to either of the previous approaches, directly executing a process definition can be more straightforward and therefore easier to improve. However, automating a process definition requires flexible and comprehensive infrastructure, which typically rules out implementing these systems in a legacy IT environment. Business rules have been used by systems to provide definitions for governing behaviour, and a business rule engine can be used to drive process execution and resolution.

Monitoring

Monitoring encompasses the tracking of individual processes, so that information on their state can be easily seen, and statistics on the performance of one or more processes can be provided. An example of the tracking is being able to determine the state of a customer order *(e.g.* ordered arrived, awaiting delivery, invoice paid) so that problems in its operation can be identified and corrected. In addition, this information can be used to work with customers and suppliers to improve their connected processes. Examples of the statistics are the generation of measures on how quickly a customer order is processed or how many orders were processed in the last month. These measures tend to fit into three categories: cycle time, defect rate and productivity.

The degree of monitoring depends on what information the business wants to evaluate and analyse and how business wants it to be monitored, in real-time, near real-time or ad-hoc. Here, business activity monitoring (BAM) extends and expands the monitoring tools generally provided by BPMS.

Process mining is a collection of methods and tools related to process monitoring. The aim of process mining is to analyse event logs extracted through process monitoring and to compare them with an *a priori* process model. Process mining allows process analysts to detect discrepancies between the actual process execution and the *a priori* model as well as to analyse bottlenecks.

Optimization

Process optimization includes retrieving process performance information from modelling or monitoring phase; identifying the potential or actual bottlenecks and the potential opportunities for cost savings or other improvements; and then, applying those enhancements in the design of the process. Overall, this creates greater business value.

Re-engineering

When the process becomes too noisy and optimization is not

fetching the desire output, it is recommended to re-engineer the entire process cycle. BPR has become an integral part of manufacturing organization to achieve efficiency and productivity at work.

Practice

Whilst the steps can be viewed as a cycle, economic or time constraints are likely to limit the process to only a few iterations. This is often the case when an organization uses the approach for short to medium term objectives rather than trying to transform the organizational culture. True iterations are only possible through the collaborative efforts of process participants. In a majority of organizations, complexity will require enabling technology to support the process participants in these daily process management challenges.

To date, many organizations often start a BPM project or program with the objective to optimize an area that has been identified as an area for improvement.

In financial sector, BPM is critical to make sure the system delivers a quality service while maintaining regulatory compliance.

Currently, the international standards for the task have only limited to the application for IT sectors and ISO/IEC 15944 covers the operational aspects of the business. However, some corporations with the culture of best practices do use standard operating procedures to regulate their operational process. Other standards are currently being worked upon to assist in BPM implementation.

BPM Technology

Some define the BPM System or Suite (BPMS) as "the whole of BPM." Others will relate the important concept of information moving between enterprise software packages and immediately think of Service Oriented Architecture (SOA). These are partial answers and the technological offerings continue to evolve. The BPMS term may not survive. Today it encompasses the concept of supporting the managerial approach

through enabling technology. The BPMS should enable all stakeholders to have a firm understanding of an organization and its performance. The BPMS should facilitate business process change throughout the life cycle stated above. This will assist in the automation of activities, collaboration, integration with other systems, integrating partners through the value chain, etc. For instance, the size and complexity of daily tasks often requires the use of technology to model efficiently. These models facilitate automation and solutions to business problems. These models can also become executable to assist in monitoring and controlling business processes. As such, some people view BPM as "the bridge between Information Technology (IT) and Business.". In fact, an argument can be made that this "holistic approach" bridges organizational and technological silos.

There are four critical components of a BPM Suite:

- Process Engine – a robust platform for modelling and executing process-based applications, including business rules
- Business Analytics — enable managers to identify business issues, trends, and opportunities with reports and dashboards and react accordingly
- Content Management — provides a system for storing and securing electronic documents, images, and other files
- Collaboration Tools—remove intra-and interdepartmental communication barriers through discussion forums, dynamic workspaces, and message boards.

BPM also addresses many of the critical IT issues underpinning these business drivers, including:

- Managing end-to-end, customer-facing processes
- Consolidating data and increasing visibility into and access to associated data and information
- Increasing the flexibility and functionality of current infrastructure and data
- Integrating with existing systems and leveraging emerging service oriented architecture (SOAs)

- Establishing a common language for business-IT alignment.

Validation of BPMS is another technical issue that vendors and users need to be aware of, if regulatory compliance is mandatory. The validation task could be performed either by an authenticated third party or by the users themselves. Either way, validation documentation will need to be generated. The validation document usually can either be published officially or retained by users.

THE BASIC E BUSINESS MODELS

The emerging e-business market affords companies of all sizes and types the opportunity to leverage their existing assets, employees, technology infrastructure, and information to gain or maintain marketshare. For example, in the telecommunications industry, service, rather than technology, is now the key differentiator. With lower barriers to entry, new competitors are rapidly entering the market offering new services, such as online bill presentment and payment, and leveraging their unique digital assets.

Information technology research analysts agree that e-business is any net-enabled business activity that transforms internal and external relationships to create value and exploit market opportunities driven by new rules of the connected economy. However, today's e-business requires more. Industry analysts further point out that e-business involves the continuous optimization of an organization's value proposition and value-chain position through the adoption of digital technology.

The challenge for an organization is to turn the vision and the market opportunity into a viable business. Developing the marketing strategy and plans and designing and deploying the business solution is key.

Those who successfully architect, develop, and deploy e-business solutions will need to formulate and adopt a comprehensive business plan. Because of the critical role of

Internet technologies and integration requirements, it is recommended that organizations need a comprehensive planning framework—an actual e-business model. This structured planning approach enables the organization to assess, plan for, and implement the multiple aspects of an e-business.

Building an e-business (an integrated value chain) that leverages the Internet's communications capabilities is a complex undertaking. The complex integration requirements of the business solutions, all performing at extremely high levels of availability and scalability, require an e-business model architectural approach.

The value chain (comprised of the traditional supply chain management functions, planning, procurement, and inventory management, coupled with the customer-facing functions, typically referred to as customer relationship management) has integration and performance demands that exceed the requirements seen in traditional businesses.

In a successful e-business, all of these areas are tightly integrated to provide an organization the ability to quickly and efficiently sell, manufacture, and deliver products or services.

Furthermore, in a successful e-business, this value chain rests on a foundation that leverages the organization's existing core operational business systems, as well as meets the new business-critical operational requirements for reliability, scalability, flexibility, and $24 \times 7 \times 365$ availability in a highly volatile, electronic marketplace. An e-business model includes three essential elements:

- Solid strategies
- Knowledge management techniques applied to a company's information and intellectual assets
- Effective e-business processes typically grouped in the customer relationship management (CRM), supply chain management (SCM), and core business operations domains.

Solid Strategies

Strategy and execution are key to developing and sustaining a successful e-business. Only those organizations that successfully integrate key business strategies and processes dramatically increase their efficiencies. To be successful, organizations must also form the right strategic relationships and develop efficient business processes with robust backend solutions that are able to meet users' demands for real-time service today and into the future.

In the past, businesses had the luxury of developing business strategies in the boardroom and IT strategies in the IT department. They then brought these strategies together to run the overall business. E-businesses cannot afford this luxury. The ability to react and change direction is critical. Speed is everything. Grounding the organization with sound, winning strategies is key.

In the new economy's competitive electronic environment, it is easier for an organization to be global, but it is also harder to maintain consistency in the levels of services offered around the world. E-businesses must be ready and able to adjust their business and IT strategies rapidly, depending on unpredictable competitors and market pressures. Today's e-business climate requires the continuous optimization of an organization's business and IT strategies. Because IT now has such a significant impact on every business process (from order taking to inventory to billing), both business and IT strategies are now developed in parallel.

The best example of this is Dell Computer. From the start, the company's business strategy was tightly aligned with its IT strategy, allowing Dell to successfully integrate every aspect of its business (from order taking to inventory to billing) with both its customers and suppliers. Dell vaulted to the forefront of its industry when it came to market with a winning strategy, the unique just-in-time-delivery model. Unlike traditional computer suppliers, Dell's business strategy was founded on the premise of zero inventory.

Similarly, online brokerage companies have been leaders in the area of integrating IT and business strategies. The rapid adoption of Internet technologies combined with market globalization, industry deregulation, and media convergence has afforded these companies the opportunity to gain share and create value in the e-business marketplace.

Turning an organization's intellectual assets into knowledge is a key business differentiator. In addition to a continually optimized business strategy, successful e-businesses must establish solid knowledge management practices. Knowledge management is the definitive way to leverage an organization's information and intellectual assets for business advantage. It is the formalized, integrated approach that every organization must take to "know" its business.

Knowledge Management Techniques

Every business has both tacit and explicit knowledge. One is undocumented, and the other is documented about what is "known" in the company. This knowledge may include information about products and services or information about how the company works with a particular supplier. No matter what type of knowledge an e-business has, the company must put into place processes for organizing that knowledge.

Knowledge management includes managing intellectual capital, such as best practices, critical business processes, and operating metrics. Establishing ongoing processes for acquiring, organizing, and distributing this knowledge about customers, products, and processes is critical to success. The business domains, CRM, SCM, and core business operations, are dependent on this information and these intellectual assets.

Effective E-Business Processes

In every successful e-business, the business process domains (CRM, SCM, and core business operations) are an integral part of the continuous optimization process. The advantage and, thus, the return on investment for an e-business integrating its business process domains is that it extends the organization's

business directly to customers and suppliers. When business process domains are integrated, they can increase productivity and improve customer and supplier satisfaction. For example, when a repeat customer views a successful e-business's Web site, an integrated CRM system presents that individual with offers or items of interest based on previous orders. After the customer places an order, this same e-business allows that individual to view the status of his order in real time as it moves through the supply chain.

Business process domains are aggregations of core business processes. Although there is growing popularity of business process domains as their own entities (CRM, SCM, and core business operations), they are commanding a mind-share in the marketplace (and each has attracted various vendors and products to support it).

These domains must operate together as a key component to the overall e-business strategy. In a successful e-business, convergence is the driving connection of all of the business process domains. When there appears to a customer or a supplier to be no barrier between departments, the business process domains are tightly integrated with the business and IT strategies.

BENEFITS OF E-BUSINESS

Expand Market Coverage E-Business eliminates these limitations of geography and time zones. The whole world is the available market, 24 hours a day, 7 days a week, 365 days in a year. Worldwide business professionals, buyers, and decision-makers have access to the Internet, spanning all time zones. The buyer conducts business "where" and "when" they want to without traditional limitations. So, with e-Business a firm creates a global, "365x24x7" availability to its customers.

The firms can offer complimentary and supplementary products, and add-on promotions as buyers make selections. This leads to a larger volume of ordering, creating a higher revenue stream at a marginally low cost per transaction. It makes previously uneconomical markets attractive. This

increases the size of the available market by turning marginal segments into profitable ones. This ability to turn frogs into princes is powered by e-Business's low variable costs for addressing marginal segments. The power of the add-on products can also be sold into these previously unprofitable segments, turning them into substantially profitable ones.

Reduce Costs: The major cost-reduction benefit is the promise of changing the distribution of products and services to customers. Products requiring little or no experience in the buying cycle can be purchased by the customer on the Internet and delivered directly without intermediaries. The elimination of various layers of distribution is the major cost reduction benefit to the market.

The National Association of Purchasing Management outlines the following benefits:

- Reduction in process variations
- Reductions in costs and errors
- Vendor sourcing strategy support
- Improvements in process capability
- Procurement paradigm shift from passive to acti
- Elimination of unwanted paper trail
- Improved access to information
- Reduction in costs and cycle times.

Strengthen Customer Relationships

The purpose of a business is to find and keep customers. E-Business has the ability to deliver benefits that can address both aspects of this statement, by delivering better purchase experiences to the buyer. Buyers are migrating to Internet buying in situations when it's faster, better, and cheaper than traditional methods.

Faster e-Business assures faster delivery of products and services by speeding up order fulfillment, and delivering into just-in-time upstream processes, particularly in Business-to-Business environments.

Better Paper and client-server based systems with their "version control" limitations created problems that set limits to their efficiency. The "write-once, read-many" environment of e-Business assures that internal and external audiences see and work with the same up-to-date, accurate data. Additionally, where little customer-vendor interaction is required, e-Business creates an opportunity for virtual self-service counters.

Cheaper The Internet turns every vendor into an equal in a competitive bid. The customer now has more choice in suppliers. The customer has more alternate vendors, and lower prices are anticipated in all e-Business driven markets.

E-commerce is the process of buying, transferring, or exchanging products, services, and/or information via computer networks, including the internet, seeks to add revenue streams, build and enhance relationships with clients and partners and to improve efficiency. E-Commerce that is conducted between businesses is referred to as business-to-business or B2B. B2B can be open to all interested parties (e.g. commodity exchange) or limited to specific, pre-qualified participants (private electronic market). Electronic commerce that is conducted between businesses and consumers, on the other hand, is referred to as business-to-consumer or B2C. This is the type of e-commerce conducted by companies such as Amazon.com. E-Commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of the business transactions.

E-mail is a method of exchanging digital messages. E-mail systems are based on a store-and-forward model in which e-mail computer server systems accept, forward, deliver and store messages on behalf of users, who only need to connect to the e-mail infrastructure, typically an e-mail server, with a network-enabled device for the duration of message submission or retrieval. Email advertising becoming widely used as a means of distributing advertising messages to people on internet. Email advertising is being tied to the use of promotions and gimmicks. The main advantage of email advertising is that it is cheap to implement and can include feedback facility.

E-mailing Postal services and telecommunications companies are losing market share to the electronic communication, especially, e-mail. It combines the strength of a phone call is its immediacy and the letter has the advantage that everything is in written form. The internet enables instant communication in written form, either by e-mail or on line chat.

More and more businesses are talking digitally to each other. Other than a phone call, e-mails can contain more than just a text. It is possible to attach files like formatted documents, presentation, images or sound. Information can be shared much more easily-mail does also change the way to people communicate. Instead of writing down every aspect in a single letter; thoughts may be spread over multiple e-mails.

E-procurement The registered users look for buyers or sellers of goods and services. They may specify costs or invite bids. Transactions can be initiated and completed. Ongoing purchases may qualify customers for volume discounts or special offers. E-procurement software may make it possible to automate some buying and selling. Companies can control inventories more effectively, reduce purchasing agent overhead, and improve manufacturing cycles.

There are seven main types of e-procurement

- Web-based ERP Creating and approving purchasing requisitions, placing purchase orders and receiving goods and services by using a software system based on Internet.
- E-MRO (Maintenance, Repair and Overhaul) same as web-based ERP except that the goods and services ordered are non-product related MRO supplies.
- E-sourcing Identifying new suppliers for a specific category of purchasing requirements using Internet.
- E-tendering Sending requests for information and prices to suppliers and receiving the responses of suppliers through Internet.
- E-reverse auctioning Using Internet to buy goods and services from a number of known or unknown suppliers.

- E-informing Collection and distribution of purchase information both from and to internal and external parties.
- E-market sites buying communities can access preferred suppliers' products and services, add to shopping carts, create requisition, and seek approval, receipt purchase orders and process electronic invoices with integration to suppliers' supply chains and buyers' financial systems.

The e-procurement value chain consists of Indent Management, e-Tendering, e-Auctioning, Vendor Management, Catalogue Management, and Contract Management. Elements of e-procurement include Request For Information, Request For Proposal, Request For Quotation, RFx (the previous three together), and eRFx (software for managing RFx projects).

E-shopping is the process of purchasing products or services over the Internet. An online shop, e-shop, e-store, internet shop, web shop, web store, online store, or virtual store evokes the physical analogy of buying products or services at a bricks-and-mortar retailer or in a shopping mall. The metaphor of an online catalogue is also used, by analogy with mail order catalogues. All types of stores have retail web sites, including those that do and do not also have physical storefronts and paper catalogues. Online shopping is a type of electronic commerce used for business-to-business (B2B) and business-to-consumer (B2C) transactions.

E-auction is a type of auction in which the roles of buyers and sellers are reversed. In an ordinary auction which is also known as a forward auction, buyers compete to obtain a good or service, and the price typically increases over time. In a reverse auction, sellers compete to obtain business, and prices typically decrease over time. A buyer contracts with a market maker to help make the necessary preparations to conduct the reverse auction. This includes: finding new suppliers, training new and incumbent suppliers, organizing the auction, managing the auction event, and providing auction data to buyers to facilitate decision making. Reverse auction is a strategy used

by many purchasing and supply management organizations for spend management, as part of strategic sourcing and overall supply management activities.

The prices that buyers obtain in the reverse auction reflect the narrow market which it created at the moment in time when the auction is held. Thus, it is possible that better value-i.e. lower prices, as well as better quality, delivery performance, technical capabilities, etc.-could be obtained from suppliers not engaged in the bidding or by other means such as collaborative cost management and joint process improvement.

The buyer may award contracts to the supplier who bid the lowest price. Or, a buyer could award contracts to suppliers who bid higher prices depending upon the buyer's specific needs with regards to quality, lead-time, capacity, or other value-adding capabilities.

Reverse auctions are used to fill both large and small value contracts for public and private commercial organizations. Buyers, sellers, and market makers should adhere to auction rules and industry codes of conduct for the use of reverse auctions, if they exist. Problems arise when one or more parties fail to conform to auction rules. Buyers should not assume that reverse auctions will, in every case, deliver savings-either on a unit price or total cost basis. Reverse auction savings can range from negative to neutral to positive savings.

E-auctioning benefits include;

- Helps to reduce prices up to 35%
- Shorten the negotiation process
- Comprehensive dynamic pricing engine
- Multi attribute multiproduct, multi language and multicurrency
- Several auction timing models to fit our needs on an auction basis
- Full support of total cost of ownership calculations
- Free training support tools
- Customizable to suit our company image.

E-banking means any user with a personal computer and a browser can get connected to his bank-s website to perform any of the virtual banking functions. All the services that the bank has permitted on the internet are displayed in menu. Any service can be selected and further interaction is dictated by the nature of service.

Once the branch offices of bank are interconnected through terrestrial or satellite links, there would be no physical identity for any branch. It would a borderless entity permitting anytime, anywhere and anyhow banking. The network which connects the various locations and gives connectivity to the central office within the organization is called intranet. E-banking facilities include

- Access accounts round the clock, even on weekends
- See balances online and find out clearance of cheque deposit
- Transfer funds between accounts
- Download information directly into personal finance software
- Receive or pay bills online.

The Reserve Bank of India constituted a working group on Internet Banking. The group divided the internet banking products in India into 3 types based on the levels of access granted. They are:

Information Only System General Purpose information like interest rates, branch location, bank products and their features, loan and deposit calculations are provided in the banks website. There exist facilities for downloading various types of application forms. There is no interaction between the customer and bank's application system. No identification of the customer is done. In this system, there is no possibility of any unauthorized person getting into production systems of the bank through internet.Electronic Information Transfer System The system provides customer-specific information in the form of account balances, transaction details, and statement of accounts. The information is still largely of the 'read only' format. Identification

and authentication of the customer is through password. The application systems cannot directly access through the internet.

Fully Electronic Transactional System This system allows bi-directional capabilities. Transactions can be submitted by the customer for online update. This system requires high degree of security and control. It comprises technology covering computerization, networking and security, inter-bank payment gateway and legal infrastructure.

- Automated Teller Machine (ATM) It is operated by plastic card with its special features. The plastic card is replacing cheque, personal attendance of the customer, banking hour's restrictions and paper based verification. ATMs used as spring board for Electronic Fund Transfer. It can provide information about customers account and also receive instructions from customers.It is capable of handling cash deposits, transfer between accounts, balance enquiries, cash withdrawals and pay bills. It may be on-line or 0ff-line.
- Credit Cards/Debit Cards The Credit Card holder is empowered to spend wherever and whenever he wants with his Credit Card within the limits fixed by his bank. Credit Card is a post paid card. Debit Card, on the other hand, is a prepaid card with some stored value. Every time a person uses this card, the Internet Banking house gets money transferred to its account from the bank of the buyer. The buyers account is debited with the exact amount of purchases. The customer can never overspend because the system rejects any transaction which exceeds the balance in his account. The bank never faces a default because the amount spent is debited immediately from the customers' account.
- Smart Card Banks are adding chips to their current magnetic stripe cards to enhance security and offer new service, called Smart Cards. Smart Cards allow thousands of times of information storable on magnetic stripe cards. In addition, these cards are highly secure, more reliable and perform multiple functions. They hold

a large amount of personal information, from medical and health history to personal banking and personal preferences.

E-stock trading Companies such as e-trade, datek online allow us to trade stocks, bonds, mutual funds etc. on the internet. These companies offer to trade at a small cost compared to discount brokers. The steps involved are-place a request to trade-the system responds with current prices on the web-confirm trade or cancel.

The benefits of such trading are;

- Reduced cost
- Convenience of trading from anywhere
- Access to variety of information in different sites.

E-employment Several kinds of services are provided here;

- sites give advice on developing our resumes and to post our resumes on the web
- recruiters use website to post available jobs
- match making facilities for jobs and jobseekers based on a specifications
- use of agents to do the search.

E-retailing offers the following benefits;

- Provision of online catalogue to browse different categories of goods
- Provision of search engine
- Provision of shopping cart
- Personalization of store layouts deals, promotions
- Distribute digital goods directly
- Online salesperson to help customers to navigate through the site
- An order status checking facility.

Decide Suitable Distribution Mechanism

E-stores and e-malls sell a large number of product lines rather than very few. In an e-mall, cyberspace is rented out

to cyber e-stores that wish to sell their goods. Several product lines can be present in a single e-mall in an e-mall; each store is under its own management.

Mall management is responsible only for creating the cyber sites that-can be rented and can support services and marketing of the mall. It provides webhosting services. They also provide software tools, which can be utilised by a prospective e-store-to create and maintain its e-store. The advantage is that it is grouped together with other stores in a well known e-mall site.

E-brokers Brokers provide comparison shopping, ordertaking and fulfillment and services to a customer. The models of e-brokers include;

- Provide registration service
- Directory search facilities-payment facilities
- Ascertain requirement such as price
- Provide comparison-shopping between products.

E-CRM solutions can be deployed and managed to provide increased revenues and reduced costs. E-CRM goals can be achieved with internet business strategies, web based CR M specification development, web system design and project management electronic publishing and interactive interface.

They are valuable to companies face the following circumstances

- Business is driven by mission-critical customer service requirements
- Current costs for crm run high
- Large volume of information is distributed
- A complete customer care solution is required.

E-directories Telephone directories with white pages for private telephone numbers and the yellow pages for the businesses is essential to locate a person of business. Now the telephone companies allowed people to call in and ask for information. The data base is located in a single place providing a centralized functionality, offering to anyone at anytime, thus

making a decentralized solution. The internet facilitates replication of phone directories without hassles. The internet makes the retrieval easier as well as more difficult.

E-engineering has also changed dramatically in the recent years. Internet changed the speed of the design. It enabled electronic collaboration to much a higher degree than n before. The location of the engineer s has become easier. The internet changed the speed of the design. It enabled electronic collaboration to a much higher degree than was possible ever before. The location of the engineers does not play a role anymore. Everyone with an internet connection is able to take part in the development. New tools concurrent development has been developed to support the possibilities of the internet. Through the internet has also become possible to develop continuous engineer ring by letting engineers participate from all overt the world. Open source development is done that way very efficiently. Anybody is able to take part and can donate a piece of code whenever there has been some time to programme it. This will vary for every person involved.

E-franchising The re-sellers are called franchising partners. By offering a set of products and brands the franchising company guarantees a certain success for the retailer as people tend to like buying these products, as the brands are well known. The advantage of the franchising companies is that they do not need to invest in shop personnel, for example, the franchising g partners is responsible or the employees and financial success of the single outlet. Electronic franchising works very similarly. It has become much easier on the internet. Moving digital products, processes and brands is extremely easy. The affiliation programmes of the large book sellers on the internet have their own store. But they allow franchising partners to exclusively distribute their products on the partner's websites. The advantage of this system is that there is no distribution costs involved. It is possible to link to the original products without letting the customers know.

E-gambling Although there is a moral issue about gambling, it is one of the most profitable businesses on the internet. In

the real world gambling is restricted by many laws, making it difficult to access the casinos. The owners of the games often need to pay high taxes to the state, which makes it so difficult to create competition. Gambling is still not legal in some states and the taxes are still high in these states, but the business has moved to places where gambling is legal and only low taxes need to paid. The companies who operate the gambling websites are able to provide the full program of games, without any restrictions. As the owners have their companies in countries where gambling is legal, they are able to operate without fearing the intervention of the state. But other than the real world casinos which are restricted to the geographical location, online casinos are able to attract gamblers from all over the world with a mouse click.

E-learning is a revolutionary way to empower, a work force with the skills and knowledge it needs to turn changes to on advantages.It is faster chapter and more productive then class room instruction.Electronic learning educating employees using web enabled materials deployed via the net offers in its most sophisticated incarnations such bells and whistles as streaming audio and video, built –in power point presentation, hot links to related information the web, animation, flipbooks and self-running screen-capture display programme. E-learning is a significantly cheaper and more protective and can be delivered with more timeliness than either classroom learning or traditional computer-enhanced teaching.

E-Marketing is a traditional marketing using electronic methods affecting traditional marketing in two ways. It increases efficiency in established marketing function and transforms many marketing strategies. Internet serves as efficient marketing tools for both secondary and primary data collection. In addition electronic technologies affect the 4ps.

- Product Internet technologies spawned a variety of innovative product for creating, delivering and reading messages as well as services such as reverse auctions, business to business (B 2 B), market exchanges and interactive games.

- Pricing The net turned pricing strategies upside down.Bartering, bidding, dynamic pricing, and individualized pricing are now quite on line.
- Place The e-marketers used the net for direct distribution of digital productsand for electronic retailing.
- Promotion The net assists with two way communication; one to one web pages-mail conversations, and e-main conferencing via news group and mailing lists. E-marketers also use the net for promotions, and sending electronic coupons and digital products samples directly to consumers.

E-Operational Resource Management Beside the goods that are needed for production, companies need to buy operational resources, these are the non production goods are services that are required and managed on a daily basis to run the day-to –day business.

Operational resources allow companies to manage operational resources more strategically, by using the internet and its connectivity to provide a communication infrastructure, where buyer and supplier can together on a direct basis without losing control over the spending. E-Supply Manufacturers, logistics companies, senders, receiver and retailers all work together to co-ordinate the order generation and order taking.

The order fulfillment and the distribution of the products, services, or information are organized together by the supply chain management. By digitalizing the products, the processes and the communication the internet has a great potential linking and managing this organization.

E-Trading Before the internet, buying and selling stock war restricted to people with access to financial network. The internet has changed the way stocks are traded. E-trading also called E-brokering offers the real –time stock price to every desk throughout the world. People are able in real time to change in the stock market. Every one with on internet bank account is able to buy and sell stock. This enables anyone to participate in the stock market and earn money by investing.

STRATEGIES FOR BUSINESS OVER WEB

The advantages of moving your business to the web are endless. On top of the benefit of having access to more potential customers and the ability to grow your business at a faster rate, selling digitally can also be a much less expensive option.

One of the difficulties of getting started in the digital sphere is that it can be a confusing process if you've spent most of your business career gaining customers through a store-front and face-to-face interaction. Fortunately, there are several resources out there that can help get you started and guide you in the right direction.

Let's take a look at five strategies that you can start utilizing today to earn customers online and grow your business:

Create and Grow an E-Commerce Website

While most businesses already have a website for marketing purposes, many have yet to make the move to creating an e-commerce site that allows them to sell their products online. Whether that is because they're fearful of the technological aspect of maintaining an e-commerce website or the lack of time to do so, there is a tremendous amount of growth opportunity with e-commerce.

According to a recent survey, over 55% of US consumers shop online. With the population of the US being just above the 315 million mark, that means that over 155 million consumers have shopped online at some point.

The opportunity to reach that many consumers is something that every business should take advantage of. But what if you're unaware of how to create a website or think that it would be too difficult to maintain?

Fortunately, with today's technology, starting and growing an e-commerce website is as easy as ever. Easy to use website builders like Shopify and Volusion make the process of developing a website super simple. They have guides and resources that allow even novice internet users to easily create

a professional looking website that can generate profits for their business.

With the information and technology that is now available on the internet, there is simply no excuse not to have an e-commerce store for your business.

Use Content Marketing to Solve Problems for Your Target Market

One of the most popular ways for businesses to earn customers online is by utilizing content marketing to solve problems for their target market. If you're unfamiliar with content marketing, it can be described simply as a digital marketing strategy that involves creating and sharing online content.

If you view yourself as an authority in your industry and understand the problem's that your target customers face, this can be a huge opportunity to develop your brand and earn customers. Content marketing can be done in a variety of different ways. Some companies have created blogs while others have focused on creating informational products such as e-books, white papers, how-to and tutorial videos, and intensive guides. While many companies have seen success with their content marketing strategies, many others still leave a lot to be desired. Creating a goal that aims towards developing content that solves the problems of your customers can be highly effective because it can both build your brand and build trust among consumers in your target market.

While entire books have been written on how to create a successful content marketing strategy, the Content Marketing Institute provides a lot of great information for businesses that are unsure of how to get started. No matter what type of content you decide to create, focusing on solving problems for your target market is a proven way to earn customers online.

Develop Systems for Digital Marketing

From email and content marketing to social media and SEO marketing, there are several different types of digital

marketing strategies out there for businesses to utilize. While getting started with any one of them can be a difficult process, doing so becomes much simpler when you start by creating a system for your digital marketing strategies.

For example, if you want to get started in content marketing, develop a system for how you are going to create and promote your content. This can involve developing a content creation schedule as well as creating methods for promoting your content through social media. You can even integrate email marketing into this concept by creating a landing page that encourages potential customers to subscribe to regular emails from your business.

Developing a system for your digital marketing strategies allows you to continually improve upon those strategies and creates consistency in how your marketing is handled. This is essential to earning trust in customers as they're able to see that you're consistently able to provide them with quality content and may begin to even look forward to receiving that content.

Create Useful Videos

Creating videos has also become a popular strategy for online marketers as the attention span of consumers continues to decrease. According to Video Brewery, 90% of online shoppers find that video is helpful in making their purchasing decisions. While this is a fairly new concept for many business owners, it is an tremendous opportunity to get ahead of the competition, especially if you're competing locally.

Videos can be created for several purposes. While some businesses will use tutorial and how-to videos in their content marketing strategies, descriptive videos about your product or service can also be useful. Showing your product in use allows customers the chance to picture themselves using that product, therefore increasing their willingness to buy.

Even if you have no idea how to create online videos, there is an abundance of information online that can help you with the process. Online services like Flixpress also make it easy for

you to create several different types of video even if you are unsure of how to get started.

Build a Social Media Presence

The impact of a social media presence on earning customers online has been debated since platforms like Facebook, Pinterest, and Twitter became household names on the web. What can't be debated, however, is that social media provides the opportunity to increase brand awareness and earn trust with potential customers. Consultants such as ShoutOurBiz and TapInfluence provide services that can significantly improve a company's reach.

Creating a social media presence can be a difficult task, and it requires consistency and a plan to experience success. Entrepreneur provides a lot of good information about choosing the right platform for your business and, once again, there is plenty of information online about how to continually increase your social media following.

The Final Word

At the end of the day, earning customers online can be done in a variety of ways. Different strategies will have varying effectiveness depending on your business and the industry you operate within. The strategy that you choose will more than likely also come down to what you currently have to work with as far as time and employees.

Even if you feel that you don't have the necessary time or amount of employees, getting started online is not as difficult as you may think. The technology and resources available throughout the web are endless and getting started with even one of these methods can be done in less than a day.

Overall, the opportunities available to you to earn customers online are endless. This article should serve as a guide to get you started but be aware that it is important that you continually test different strategies to figure out which will work best for your business.

If you commit yourself to getting started and develop systems for utilizing these strategies, there is no doubt that you will have an opportunity to earn customers online and grow your business exponentially faster than you can offline.

Business On The Web: Strategies and Economics

The advent of the Internet as a viable business tool is likely to have the same impact on businesses and their information systems as the spread of personal computers during the early 1980s. The literature falls short of discussion of two important aspects of this technology: strategies and economics of doing business on the Internet. Amid the myriad of practices, lessons, and anecdotes, there is a clear need for developing an understanding of the commonalty as well as the uniqueness of Web-based business with respect to the traditional general business. In particular, it is important to know whether or not the strategic planning methods of general business still apply to this new branch of business, and if so, how?

Striving towards answering this question, we mainly delve into two classic representative paradigms, viz., value chain analysis and transaction cost economics, and our previous research on Strategic Information Systems and the Value of Information to come up with a strategy formulating framework for doing business on the Internet. We first analyze and apply these paradigms to Internet-based business in the next two sections and then present the planning framework in Section 6 with examples.

From Strategic Thinking to Strategic Planning

Even before the businesses realized the potentials of the Web to attain competitive advantage, they realized the strategic importance of information systems and planning for such systems. Strategic Information Systems Planning (SISP), is the analysis of a corporation's information and processes using business information models together with the evaluation of risk, current needs and requirements. The result is an action

plan showing the desired course of events necessary to align information use and needs with the strategic direction of the company. Some characteristics of strategic IS planning which help in providing a framework for doing business on the Web are:

- Main task: strategic/competitive advantage, linkage to business strategy.
- Key objective: pursuing opportunities, integrating IS and business strategies
- Direction from: executives/senior management and users, coalition of users/management and information systems.
- Main approach: entrepreneurial (user innovation), multiple (bottom-up development, top down analysis, etc.) at the same time.

Strategic Information Systems Planning, with or without the Web, is not an easy task because such a process is deeply embedded in business processes. These systems need to cater to the strategic demands of organizations, i.e., serving the business goals and creating competitive advantage as well as meeting their data processing and MIS needs.

The key point here is that organizations have to plan for information systems not merely as tools for cutting costs but as means to adding value. The major impact of information technology is in re-defining, re-engineering businesses rather than in data processing/MIS roles. Web-based business opportunities open a new set of possibilities in the use of Information Technology in an organization.

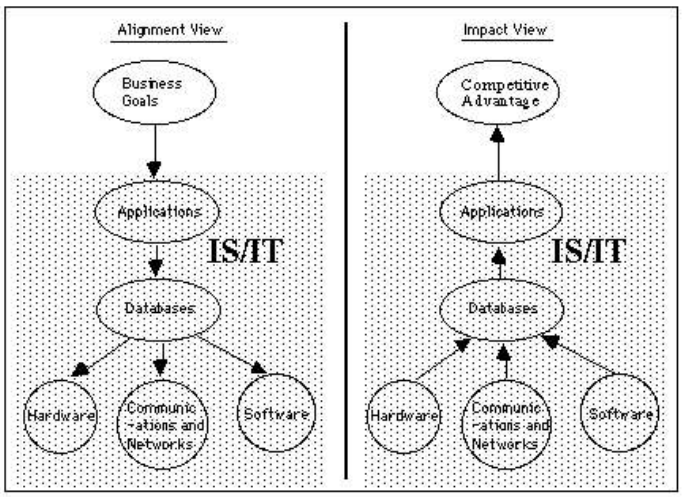
The technology transforms the business, even becoming business in some cases. As Keen has morbidly but realistically pointed out that organizations not planning for strategic information systems may fail to spot the business implications of competitors' use of information technology until it is too late for them to react.

In situations like this, when information technology changes the basics of competition in an industry, 50% of the companies

in that industry disappear within ten years. This observation of Keen's assumes more sinister proportions for Web-based businesses because the present technology of putting a business on the Web is well within the technical and financial reach of even very small businesses.

Two Frameworks for Strategic Systems Planning

Vitale, et al. classify SISP methodologies into two categories: impact and alignment. Impact methodologies help create and justify new uses of IT, while the methodologies in the "alignment" category align IS objectives with organizational goals.



Which perspective of planning for Internet connection for an organization and doing business over the Web will be used will depend on the proposed use for the Internet/WWW in the business. If the Internet is used merely for e-mail/Usenet or even intra-firm connectivity, the alignment perspective will apply. However, if the Web is used as an alternative medium for doing business — reaching out to customers, suppliers and vendors, creating virtual organizations and teams, transacting actual commerce including financial transactions, then the impact view will prevail. And this is what doing business on the Web is mostly about — an electronic alternative to the real

marketplace, which is not only viable, but is also far more efficient, cuts across geographical boundaries and time zones, is growing at an unprecedented rate, has low entry barriers, is innovating fast, and to confound matters further, relies on different business paradigms. This is what the media attention is all about ; the Boston Globe reported over three thousand articles in the press about Internet in nine months in 1995 and this is where the emerging visions of Electronic Data Interchange (EDI), Virtual Corporations (VC), and the National Information Infrastructure (NII) (Information Superhighway), etc., have their roots.

Value Chain — A Framework For Internet Strategy Formulation

The value chain analysis is a powerful tool used by strategists to diagnose and enhance competitive advantage. Value chain analysis allows the managers to separate the underlying activitiesa firm performs in designing, producing, marketing and distributing its product or service. It is these activities from which competitive advantage ultimately stems. By showing how all the firms activities can be examined in this integrated way, Porter provided an original, practical perspective of competitive advantage.

Value Chain Analysis provides an appropriate framework for planning Web based businesses because it deals with the value added (and not merely cost saving) aspect of a system and thus helps in assessing the impact of an information technology on the business. The concept of value chain is to treat every firm as a collection of activities that are performed to design, produce, market, deliver, and support its product with information technology being one major support activity for the value chain. Information systems technology is particularly pervasive in the value chain, since every value activity creates and uses information and therefore can substantially affect competitive advantage of firms. A firm that can discover a better technology for performing an activity than its competitors gains competitive advantage. Thus, essentially,

value chain analysis is a form of business activity analysis which decomposes an enterprise into its parts and helps in adopting a technology which increase the overall profit available to a firm. It also helps in identifying the potential for mutual business advantages of component businesses, in the same or related industries which is available from information interchange. Value chain analysis concentrates on value-adding business activities and is independent of organizational structure.

Internet positively affects all parts of the value chain of a firm. In respect of Primary Activities, namely, Inbound logistics, Operations, Outbound logistics, Marketing and sales and service noticeable impact of the Internet is as follows:

- Inbound logistics — fast, inexpensive, reliable connection to suppliers.
- Operations — Intrafirm connectivity— Lotus Notes like connectivity through the Web — customer participation, quicker response to changing needs.
- Outbound logistics — fast, inexpensive, reliable connection to suppliers.
- Marketing and sales — greatest value added in this area at present. Cost of advertising a product on the Web is just a fraction of the cost of a newspaper advertising. Similar cost comparisons will hold for the cost of advertising the same product over TV/radio versus the Internet.
- Service — high impact, similar to that on marketing and sales.

The Internet also affects the Support activities like Corporate structure, Human resources, Technological development and Purchasing positively. Some examples of such positive impact of the Internet are:

- Corporate structure — flatter organizations, disappearing middle layer, whole organization becomes externally oriented.

- Human resources — Internet as a vast training and recruiting tool kit.
- Technological development — faster, richer interaction with the rest of the world, sharing of information, software. Collaborative advantage.
- Purchasing — similar advantages as in marketing.

Besides the above visible effects of the Internet on the value-adding activities of a firm, the Internet offers many other significant benefits, namely:

- customization of information as per user needs.
- interactivity
  - o helps the seller to understand the consumer's needs fully.
  - o product promotion and transaction processing is possible in one step. Because of this capability of the Web, it can be considered to perform the entire marketing function by itself.
- unusual feed back, not only what consumers buy, but also what they don't buy, might buy.
- timeliness of information put out by a firm.
- information updated frequently.
- market niche coverage — can be made very specific by targeting product promotion towards very specific target groups.

However, associated with the apparent low cost of marketing a product on the Web is the issue that a big chunk of the marketing cost is passed on to the consumer (it is s/he who buys the computer, modem, Internet connection, etc.). It is likely that as the technology matures and becomes widespread, a large number of consumers will have Internet connectivity through moderately priced, perhaps dedicated, Internet computers. When that happens, the cost function will be similar to that applied to TV and marketing channels on TV, where consumers invest in technology and services for their entertainment/educational value of the technology as well as

the convenience of shopping from home. Thus, a detailed value chain analysis as outlined above will help a firm in formulating its Web-based business strategy in many important ways:

1. it will provide a robust and intuitive framework for assessing the impact of Internet in a firm.
2. lay out innovative ways of forward and backward chaining to derive maximum value from using the Internet.
3. with sufficient insight gained into the inter and intra-firm information interchange, a firm can also devise ways to re-engineer its business.
4. by studying the customization and interactivity potentials of the Web, firms can attempt to implement all the emerging visions of just-in-time, total quality management, mass customization, involving customers in the design of products and services, quicker turn around time in responding to changing customer demands, etc. However, firms doing the above analysis need to keep in mind that a number of the above benefits, as in case of most new technology investments, are qualitative and cannot be measured with the precision of traditional accounting systems. That, however, is a limitation of accounting systems and not of the technology.
5. give better insight into the augmentation of the value chain whereby some information flows themselves be marketed as products. Such crystallization and marketing of *information products* is greatly facilitated by interactive connectivity achieved through the Internet.

Economics of Web Based Business

We need an economic model to complete the analysis carried out in the above sections. Transaction cost analysis provides a viable economic frame work for understanding the business on the Web.

Transaction Cost Economics

Transaction Cost Economics owes its origin to Ronald Coase and was further developed by Oliver Williamson. A key concept in production is the firm. A firm is an economic institution that transforms factors of production into consumer goods. A firm (a) organizes factors of production, (b) produces goods, and/or (c) sells produced goods to individuals. The firm operates within a market, but simultaneously, it is a negation of the market in the sense that it replaces the market with command and control.

How an economy operates—which activities are organized through markets, and which activities are organized through firms—depends upon transaction costs—costs of undertaking trades through the market—and the rent or command over resources that organizers can appropriate to themselves by organizing production in a certain way.

Markets, on their part, reduce the cost of exchanges (transaction costs) as people dealing through market mechanisms do not need to negotiate and enforce individual contracts as well as do not need to acquire and process information about alternatives.

Generally, the less organized the market, the higher the transaction costs. Historically, the less costly it has become to disseminate information through technological improvements, the more transaction costs have fallen.

Transaction Cost Economics moves away from the simplistic assumption of classical economics that exchange mechanisms taking place through the price mechanism are homogeneous. In actuality additional transactions take place outside simplistic price mechanisms in our complex modern world, and they all entail a cost. These "non-price" costs, transaction costs, are treated as basic unit of analysis in Transaction Cost Economics.

As opposed to the costs of producing real products, transaction costs are the costs of organizing economic activity. These costs come from four major sources, the first two arising from a characteristic of human nature while the other two from

environmental factors. Web based business helps in reducing all of the four types of transaction costs.

1. *Bounded Rationality.* Human beings have a limited capacity to receive, store and process information. Because of this limitation, an uncertainty is introduced in the decision making process even though all the data needed for a rational decision making is theoretically available. This uncertainty is different from and is in addition to the market uncertainty.
2. *Opportunism.* This is a type of behavior in which individuals attempt to realize gains "through a lack of candor or honesty in transactions" and seek self interest. More generally, opportunism refers to the incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse.
3. *Market Uncertainty.* This refers to the unpredictable change of price, quality, supply, or demand for the intermediate product. Uncertainty arises from random acts of nature, unpredictable changes in consumer preferences and lack of communication.
4. *Asset Specificity.* Transaction costs due to asset specificity arise when traders' options for transferring their businesses to alternative suppliers or buyers are limited. This happens in the common situation where parties are engaged in trade that is supported by non-trivial investments in transaction specific assets. Characteristics of asset specificity are:
   - specific, substantial investments in special-purpose equipment
   - small number of buyers and sellers, few alternative buyers of products
   - small numbers bargaining power due to a small market, producer gets locked into a specific investment in capital and firm specific human capital.

Besides these four factors, Williamson introduces another concept of "information impactedness" which is a condition where private information about a transaction is exploited for opportunistic behavior, thus compounding the increase in transaction costs. From the perspective of Information Technology, transaction costs are the costs of all the information processing necessary to coordinate the work of people and machines that perform the primary processes, like determining the design, price, quality, delivery schedule and similar factors for products transferred between adjacent steps in a value chain. Purpose of Information Technology is to bring down transaction costs and that is the criterion against which we will evaluate the business use of the Web.

Transaction Costs and Business on the Web

Bounded Rationality: The World Wide Web, or for that matter any other technology, can do little to improve or supplant human thinking or information processing capacity. All the promises of AI based "smart machines" which were at one time thought to greatly parallel human thinking haven't yet materialized. What modern computers have however done is: (a) due to their increased data processing capacity, they have helped in producing information faster and cheaper and (b) the Internet, arising out of its near zero marginal cost of providing information to an additional user, has produced a great Information surplus, the proverbial "information overload".

Despite this limitation of the technology, it has the potential to reduce transaction costs due to bounded rationality in two ways: (i) by providing search engines, the older ones like Veronica, Archie, WAIS and the newer ones like Yahoo!, Lycos, OpenText, etc. These search engines have the potential to provide the right and timely information to decision makers, although the real technology still has quite a way to go towards making information retrieval quick and easy (ii) secondly, and *this is where the real power of Internet might lie*, the Internet opens all echelons of management, indeed the entire organization, to vast information resources. Therefore, more

and more heads in the organization get involved into processing information. Thus, although individual information processing capacity doesn't go up, *the collective information processing capacity of the organization increases.* Reaping benefits of this aspect of bringing an organization on Internet, will however require some fundamental changes in organizational culture and thinking. A parallel to this culture is the quality circle concept used successfully in Japanese manufacturing firms.

Another important benefit which can accrue from bringing Internet to an entire organization is that traditionally overworked and time-constrained top management have been responsible for scanning the external environment for new product/service idea to support/formulate strategy for the organization. In Internet linked companies, practically the whole organization can perform (or atleast assist in) this process by participating in forums like Usenet and visiting interesting home pages. Obviously such a firm wide participation requires an open and trusting management style as well as a careful, Internet training program.

Opportunism: The Web reduces transaction costs associated with opportunism in an interesting manner: not by altering the human nature (which, probably is the job of priests!) but by reducing information impactedness. And this has to do with the nature of the Internet, and not human nature.

The entire culture of Internet has been open, collaborative and non-hierarchical. This is quite the antithesis of opportunism. Infact doing business on the Internet changes the business in major ways. In their recent article, Benjamin and Wigand have demonstrated how doing business on the Internet can reduce profits in the value chain and reduce the cost to the customer. This, obviously, would result in a smaller pie for the industry which goes on the Web. However, because of the reduced costs to customers, the number of pies would increase and the overall profitability will most likely remain unchanged, if not go up.

It might well be that the Internet will help businesses move towards the ideal of perfect competition with the buyers and

sellers having complete and ready information about one another, as was envisaged by Adam Smith in his classic Wealth of Nations. In the long run Web-based business will be good for the economy because as a rule an innovation that cuts costs and raises productivity will tend to raise economic well-being and create new industries and opportunities.

The definition of opportunism, that "...opportunism refers to the incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse" very aptly applies to modern day advertising. And the modern day advertising as well as the media which carry them, especially the TV, have been criticized for their unhealthy effects on consumers. If advertising on the Web is any indication of the role of advertising in future, a major source of opportunism will either disappear or atleast will be substantially curtailed. Basic reasons for this are in the nature and culture of the Internet itself as well as in the interactive nature of this medium. Also, consumers have more time and space than the traditional 30 seconds on TV or 10 lines (and fine print) in the newsmedia to evaluate a product. Advertising on the Web is more in the nature of informing the customers by way of making substantial data and "white papers" available to them. Then there is the power of the Usenet where products, services and software are discussed and evaluated with free abandon. One case in point is the careful evaluation of travel agents providing air-tickets to travel to India. These travel agents are constantly evaluated by regular feedback from users and their responses are archived and made publicly available on the Internet. Consequently, a travel agent now requires to be "net certified" before her/his services are bought.

Market Uncertainty: Some of the arguments given in the section on bounded rationality apply here also. Also, because of certain unique marketing functions performed by the Internet, market uncertainty can be reduced more from the data collected by the Web pages maintained by a business than by other traditional means like market research.

The Web affords the provision of marketing information which was not otherwise available. Analysis of the log files for the Web server access show which pages are being browsed by visitors. As stated elsewhere, it is now possible to see what consumers who do not make a purchase look at. This can provide timely and unique market intelligence. Also, on-line surveys can help in collecting users responses and provide useful demographic data. Infact for a number of high activity sites, the only "price" which a visitor pays is in terms of time in filling out an on-line subscription form.

Asset Speicificity: The Web can help in reducing transaction costs associates with asset specificity arising out of both, a specific investment in capital and firm specific human capital. The Web changes the modes of doing business from intensely competitive to collaborative. For example, firms which get involved in electronic commerce, view their vendors and suppliers more as collaborators who have similar information systems to facilitate EDI and electronic commerce. Thus firms tend to move from a large number of suppliers to a smaller number, losing some of their bargaining power in terms of price of raw material etc. to gain greater standardization of information technology. This standardization across an industry and increased collaboration between firms will help reduce transaction costs due to asset specificity.

Another way in which the Web can help in reducing asset specific transaction costs is by greatly facilitating formation of virtual organizations and teams, which are put together for the purpose of carrying out a very specific project. A case of such virtual teams getting involved in a major automobile project is reported in Rayport and Svikola. Ford's "global car", Contour sedan, was developed by virtual work teams formed around the world. Such an effort not only extracts the best talent and the broadest vision, but also reduces asset specificity as investment in some asset specific capital, human or otherwise, is easily shared across a firm, across industry, and between industry and research/academic institutions.

Free and ready access to a great amount of software and code available on the Internet is another example of reduction of asset specific transaction costs. Software developed by firms, big and small, are regularly beta-tested by users over the Internet as well as large amounts of publicly available code are regularly used by programmers and developers. The quality of such "shareware" is very high, because the software is so widely distributed through the Internet, any bugs or glitches are reported and fixed right away by the user community. The improvement cycle is much faster than with most because there is a tendency to share enhancements freely.

E-COMMERCE MANAGEMENT AND SEPARATE E-COMMERCE BUSINESS UNITS

While the spin-offs were failing, companies looked for other creative ways of achieving "separation" without spinning the e-commerce venture off entirely. One method has been to create a separate business unit so divorced from company headquarters as to seem to be its own organization. This separation may be achieved by physical distance, radically different business unit structure, systems, rewards, and culture, or the selection of leadership to run the unit. Some companies have elected to have entirely separate management structures. One concern is whether these structures can aid in the implementation of an effective e-commerce strategy that is focused on ultimate company-wide integration of e-commerce. For many companies, the preferred approach is to establish an e-commerce unit flexible enough to foster innovation but integrated enough to be consistent with a well-formulated e-commerce strategy.

This type of unit should largely resemble the company's other business units, serving as a profit centre and reporting through normal channels and the existing hierarchy on issues ranging from the effectiveness of e-commerce initiatives to the integration of those initiatives within the overall structure of the company. It may, however, have different management control systems from the rest of the company, especially in the areas of performance measures and incentive systems. It is

these differences, not pretenses of geographic distance or office design, that can truly foster innovation.A successful separate business unit for e-commerce displays numerous attributes.

- The SBU should be well integrated into the traditional business management structure so that the goals of the SBU are aligned with those of the company.
- A primary function of the SBU should be to lead the company's integration effort to the point where the e-commerce initiative becomes a part of every level of the company, not just the original SBU, to both increase revenues and decrease costs.
- The SBU should be given enough freedom to utilize e-commerce in ways that were not possible for the traditional business of the company.
- The SBU should be charged with specific goals regarding the company's e-commerce strategy and integration efforts.

The e-commerce unit, however, may also take on some characteristics of a traditional functional unit. Depending on their breadth, these units are sometimes treated instead as cost centers to serve the business units rather than external customers.

In addition to integrating the Web channel with other channels and business units, the unit (whether functional or business unit) may also provide e-commerce solutions to other parts of the company and integrate the company's back-end systems.

Some examples of separate business units and the forms they have taken include the following.

- UPS formed a wholly-owned subsidiary, e-Ventures, in 2000 to provide services for small and medium e-commerce companies. The unit operated semi-autonomously but used the same trucks and warehouses as the rest of the company. The unit boosted its capabilities by acquiring a number of smaller logistics firms.

- Tesco built its grocery internet unit out of Tesco Direct, a small unit that began direct retailing in the mid 1990s, and opened a Web site in 1996. Tesco.com was also a 100 percent-owned subsidiary, although at one point there was discussion of a possible spin-off. Internal investment in the unit was cautious, with an eye on gradual geographical expansion. The unit chose not to build inhouse warehouses, instead supplying customer orders directly from the physical stores' shelves. The Web site did, however, offer more heterogeneous product offerings, including music, small electronics, and dishware.
- Wells Fargo runs e-commerce from a very tightly integrated "total business unit" that treats the Internet as another delivery channel. There is strong integration on both the front end and back end, with offline customers automatically signed up for an online account, and aggressive cross-promotion. The unit does not separately track profitability for e-commerce, but it points to lower attrition rates and higher purchase rates as measures of success.

Some successful companies have chosen not to create a separate business unit for e-commerce, instead treating the Web as a co-equal with other sales channels and integrating it throughout the organization.

Still others have created a hybrid business unit that combines e-commerce and other parts of the business, such as catalog sales, in a much more limited fashion than full integration. The rationale is that catalog sales and Web sales have much in common, especially in contrast with a physical store channel. Moreover, because of the expenses associated with mailing catalogs and maintaining catalog call centers, an effort to shift catalog customers to the Internet is highly cost-effective. Nordstrom Direct, which evolved after Nordstrom.com was folded back into the parent company, is an example of this structure.

Keeping e-commerce management internal is vital to implementing e-commerce strategy, but the successful implementation of e-commerce must also allow for flexibility in the management structure. The IT backbone that implements back-end systems for e-commerce should also provide the basis for a highly networked organizational structure. As such, the company can reap the benefits of decentralization without incurring the high costs or loss of the advantages of a more centralized and integrated structure.

Outsourcing

Though typically not desirable, outsourcing of IT as a part of e-commerce is not always a harmful decision. In limited contexts, the benefits of outsourcing can outweigh the costs of contradicting the integration paradigm. Back-end capabilities should, however, be developed internally in cases where they are related to a core competence, represent a source of competitive advantage, or involve unique or idiosyncratic activities. To understand those proper contexts, one must examine the range of IT capabilities relevant to e-commerce.

- IT infrastructure is a first priority for a company seeking an integrated e-commerce effort, and speed is a strong consideration. Although a company's legacy systems may have their unique characteristics, the software and hardware in this area is highly imitable and does not represent a likely source of competitive advantage. Therefore, a company should feel equally comfortable outsourcing this task or acquiring the capabilities and handling it internally.
- In functional areas such as payroll and human resources, e-commerce can also provide ample opportunities for cost savings. Software packages in these areas are also commodities and an unlikely source of competitive advantage. If upgrading capabilities in these areas is a part of the overall integration of e-commerce and it is not a core organizational competency, outsourcing may be an acceptable approach. For smaller firms, these

commoditized solutions can provide relatively similar, if not superior, capabilities in areas such as payroll and human resources at a fraction of the cost of an in-house approach.

- Logistics is a third area in which a company has a reasonable choice between internal fulfillment and outsourcing. If logistics has been a core competency in traditional commerce, such as was the case with Wal-Mart, it should continue to be handled internally for e-commerce. If, however, fulfillment capabilities cannot be quickly and cost-effectively developed from within, outsourcing may be an acceptable alternative, in that it is unlikely to matter to customers by whom the order is fulfilled.

Despite its spin-off model of e-commerce, Staples showed an understanding of this contrast through its model of IT development. Its IT department focused on solutions that directly impacted the customer, while it outsourced back-end operations to a single vendor. This single-vendor form of outsourcing sometimes increases costs in the short term, but it often saves costs related to future vendor competition and is a good alternative to internal development because of uniformity and clear lines of responsibility. It also facilitates a much easier integration if the company decides to bring the capabilities inside at a later date. When operational capabilities involve direct interaction with the customer, outsourcing becomes a generally undesirable choice. Web site design and customer service related to the Web site must be core competencies for any large company seeking success in e-commerce.

Failure to develop core competencies in these areas is an indication that a company has not made enough of a commitment or investment in e-commerce. Proceeding without developing these competencies is likely to do considerable damage to the brand name and future customer acquisition and retention efforts.

Web Site Design and Internet Platform

Building a Web platform is an activity that should typically be handled internally.

Web site design expertise is widely available and may be acquired if necessary. Though utilizing consultants and Web site design firms can provide some valuable needed guidance and experience, handing the task off completely to a consulting firm often prevents the company from imparting vital business-specific knowledge into building the site.

It also lengthens the learning period for employees who will need to understand the site's design, while at the same time handicapping the company's future e-commerce development by not cultivating this knowledge internally.The design of the site is closely tied to the customer service and support capabilities of the site, which are among the most vital capabilities to develop from within.

Many companies that have gone outside the company for Web site design have done so because of the service capabilities provided by their partner. The highest profile examples have been alliances between Amazon and Toys'R'Us, Borders, and Target, among others. No one story describes the relationships with the companies that have partnered with Amazon.

- Toys 'R' Us partnered with Amazon because of its failure to develop internal e-commerce capabilities, especially in the area of fulfillment. Even as a venture capital-funded spinoff, the e-commerce venture of Toys 'R' Us was running out of money and had created too much damage to the company's reputation to grow revenue.
- Borders joined Amazon because they realized that Amazon's first-mover advantage within the bookstore industry prevented Borders from becoming an industry leader in e-commerce capabilities. This union permitted Borders to have a relatively easy-to-maintain digital "storefront" for its traditional brick-and-mortar operations, without competing against Amazon on the electronic front.

- Target's agreement sought to capitalize on Amazon's unique customer-care capabilities while eliminating the need for separate fulfillment partners. Target had rejected the spin-off model of e-commerce initially attempted by competitors Wal-Mart and Kmart but determined that its brand-driven integration strategy would not work without stronger fulfillment capabilities.

These alliances notwithstanding, a company often sacrifices a substantial amount by turning its customer service capabilities over to a third party. Amazon's reputation and capabilities are unique online, and since not every company can hope to strike a similar alliance with Amazon, its example should not be viewed as a generalizable model for e-commerce success. The more reliable approach is to build and acquire the necessary resources to handle customer service from within and integrate both online and physical channels for maximum customer convenience.

8

E-Commerce Application in Banking Industry

BANKING INDUSTRY : E-COMMERCE APPLICATION

New information technologies and emerging business forces have triggered a new wave of financial innovation – electronic banking (e-banking). The banking and financial industry is transforming itself in unpredictable ways (Crane and Bodie 1996), powered in an important way by advances in information technology (Holland and Westwood 2001).

Since the 1980s, commercial banking has continuously innovated through technology-enhanced products and services, such as multi-function ATM, tele-banking, electronic transfers and electronic cash cards. Over the past decade, the Internet has clearly played a critical role in providing online services and giving rise to a completely new channel. In the internet age, the extension of commercial banking to the cyberspace is an inevitable development (Liao and Cheung 2003).

E-banking creates unprecedented opportunities for the banks in the ways they organize financial product development, delivery and marketing via the internet. While it offers new opportunities to banks, it also poses many challenges such as the innovation of IT applications, the blurring of market boundaries, the breaching of industrial barriers, the entrance

of new competitors and the emergence of new business models. Now the speed and scale of the challenge are rapidly increasing with the pervasiveness of the internet and the extension of information economy (Holland and Westwood 2001).

Products Offered: All of the major banks in India have an internet presence offering a range of products directly to consumers by way of proprietary internet sites. While the initial focus of the banks has been in the retail-banking sector, there is a growing range of small to medium enterprise ("SME") and corporate banking products and services being offered. The products available include

Funds Transfer and Payment Systems: The major banks offer a range of online financial services including;

(i) Payment of bills;

(ii) Transfer of funds;

(iii) Remittances;

(iv) Applications for letters of credit; and

(v) Settlement through the MAS Electronic Payment System.

B2B E-Commerce: At least one of the major commercial banks offers an integrated B2B e-commerce product directly through its website, involving product selection, purchase order, invoice generation, and payment. However, integrated B2B products and services are not as yet generally available directly from the banks.

Securities Placement and Underwriting/Capital Markets Activities: Most commercial banks offer securities services such as online payment for shares and subscriptions for initial public offerings directly though their websites. However, more sophisticated online brokering services are generally only available through the banks' share-broker subsidiaries.

Securities Trading: A full range of online securities services are provided by the specialist securities subsidiaries of the major commercial banks including online trading.

Retail Banking: All of the major commercial banks have established websites for retail services. Typically such sites will offer the following services:

(i) a full range of personal account services, including foreign currency accounts;

(ii) funds transfers;

(iii) Bill payments;

(iv) Credit card services;

(v) Investment services; and

(vi) Online application for loan services including

(a) Car loans;

(b) Renovation loans;

(c) Home loans; and

(d) Personal credit lines.

E-Commerce has provided the platform that enables the implementation of core banking solutions (CBS). Today all the major banks have gone on to implement CBS. And with time being a premium among bank customers, banks have been ideating and developing newer modes of delivering banking services. Today there is a whole plethora of such platforms available ranging from the ATM to the mobile.

Banks like State Bank of India and its associates are recording over 100,000 transactions on a daily basis through their 5,000 plus network of ATMs. Incidentally the profile and usage pattern of ATMs in India matches that of ATMs abroad with an overwhelming (more than 80%) being used for cash withdrawal. Today with over 20,000 ATMs, India is recording one of the fastest growth in terms of ATM proliferation, though the per capita availability of ATMs doesn't compare anywhere to markets like Japan or the US.

With most banks now providing Internet banking facility, bankers say that customers are using the bank for a variety of purposes. One commonly used service being booking of rail tickets. Bankers also say that customers are using bank

networks for online shopping. Most of the online banking channels are linked to major retailers. Estimates also indicate that today over 40% of the share transactions are being put through the internet.

DEVELOPMENT OF INTERNET BANKING

Numerous factors — including competitive cost, customer service, and demographic considerations — are motivating banks to evaluate their technology and assess their electronic commerce and Internet banking strategies. Many researchers expect rapid growth in customers using online banking products and services. The challenge for national banks is to make sure the savings from Internet banking technology more than offset the costs and risks associated with conducting business in cyberspace.

Marketing strategies will vary as national banks seek to expand their markets and employ lower cost delivery channels. Examiners will need to understand the strategies used and technologies employed on a bank-by-bank basis to assess the risk. Evaluating a bank's data on the use of their Web sites, may help examiners determine the bank's strategic objectives, how well the bank is meeting its Internet banking product plan, and whether the business is expected to be profitable.

Some of the market factors that may drive a bank's strategy include the following:

Competition — Studies show that competitive pressure is the chief driving force behind increasing use of Internet banking technology, ranking ahead of cost reduction and revenue enhancement, in second and third place respectively. Banks see Internet banking as a way to keep existing customers and attract new ones to the bank.

Cost Efficiencies — National banks can deliver banking services on the Internet at transaction costs far lower than traditional brick-and-mortar branches. The actual costs to execute a transaction will vary depending on the delivery channel used. For example, according to Booz, Allen & Hamilton,

as of mid-1999, the cost to deliver manual transactions at a branch was typically more than a dollar, ATM and call center transactions cost about 25 cents, and Internet transactions cost about a penny. These costs are expected to continue to decline.

National banks have significant reasons to develop the technologies that will help them deliver banking products and services by the most cost-effective channels. Many bankers believe that shifting only a small portion of the estimated 19-billion payments mailed annually in the U.S. to electronic delivery channels could save banks and other businesses substantial sums of money. However, national banks should use care in making product decisions. Management should include in their decision making the development and ongoing costs associated with a new product or service, including the technology, marketing, maintenance, and customer support functions. This will help management exercise due diligence, make more informed decisions, and measure the success of their business venture.

Geographical Reach — Internet banking allows expanded customer contact through increased geographical reach and lower cost delivery channels. In fact some banks are doing business exclusively via the Internet — they do not have traditional banking offices and only reach their customers online. Other financial institutions are using the Internet as an alternative delivery channel to reach existing customers and attract new customers.

Branding — Relationship building is a strategic priority for many national banks. Internet banking technology and products can provide a means for national banks to develop and maintain an ongoing relationship with their customers by offering easy access to a broad array of products and services.

By capitalizing on brand identification and by providing a broad array of financial services, banks hope to build customer loyalty, cross-sell, and enhance repeat business.

Customer Demographics — Internet banking allows national banks to offer a wide array of options to their banking customers.

Some customers will rely on traditional branches to conduct their banking business. For many, this is the most comfortable way for them to transact their banking business. Those customers place a premium on person-to-person contact. Other customers are early adopters of new technologies that arrive in the marketplace. These customers were the first to obtain PCs and the first to employ them in conducting their banking business. The demographics of banking customers will continue to change. The challenge to national banks is to understand their customer base and find the right mix of delivery channels to deliver products and services profitably to their various market segments.

TYPES OF INTERNET BANKING

Understanding the various types of Internet banking products will help examiners assess the risks involved. Currently, the following three basic kinds of Internet banking are being employed in the marketplace:

- Informational — This is the basic level of Internet banking. Typically, the bank has marketing information about the bank's products and services on a stand-alone server. The risk is relatively low, as informational systems typically have no path between the server and the bank's internal network. This level of Internet banking can be provided by the bank or outsourced. While the risk to a bank is relatively low, the server or Web site may be vulnerable to alteration. Appropriate controls therefore must be in place to prevent unauthorized alterations to the bank's server or Web site.
- Communicative — This type of Internet banking system allows some interaction between the bank's systems and the customer. The interaction may be limited to electronic mail, account inquiry, loan applications, or static file updates (name and address changes). Because these servers may have a path to the bank's internal networks, the risk is higher with this configuration

than with informational systems. Appropriate controls need to be in place to prevent, monitor, and alert management of any unauthorized attempt to access the bank's internal networks and computer systems. Virus controls also become much more critical in this environment.

- Transactional — This level of Internet banking allows customers to execute transactions. Since a path typically exists between the server and the bank's or outsourcer's internal network, this is the highest risk architecture and must have the strongest controls. Customer transactions can include accessing accounts, paying bills, transferring funds, etc.

Internet Banking Risks

Internet banking creates new risk control challenges for national banks. From a supervisory perspective, risk is the potential that events, expected or unexpected, may have an adverse impact on the bank's earnings or capital. The OCC has defined nine categories of risk for bank supervision purposes. The risks are credit, interest rate, liquidity, price, foreign exchange, transaction, compliance, strategic, and reputation. These categories are not mutually exclusive and all of these risks are associated with Internet banking.

Credit Risk

Credit risk is the risk to earnings or capital arising from an obligor's failure to meet the terms of any contract with the bank or otherwise to perform as agreed. Credit risk is found in all activities where success depends on counterparty, issuer, or borrower performance. It arises any time bank funds are extended, committed, invested, or otherwise exposed through actual or implied contractual agreements, whether on or off the banks balance sheet. Internet banking provides the opportunity for banks to expand their geographic range. Customers can reach a given institution from literally anywhere in the world. In dealing with customers over the Internet, absent any personal contact, it is challenging for institutions to verify the bonafides

of their customers, which is an important element in making sound credit decisions. Verifying collateral and perfecting security agreements also can be challenging with out-of-area borrowers. Unless properly managed, Internet banking could lead to a concentration in out-of-area credits or credits within a single industry. Moreover, the question of which state's or country's laws control an Internet relationship is still developing.

Effective management of a portfolio of loans obtained through the Internet requires that the board and management understand and control the bank's lending risk profile and credit culture. They must assure that effective policies, processes, and practices are in place to control the risk associated with such loans.

Interest Rate Risk

Interest rate risk is the risk to earnings or capital arising from movements in interest rates. From an economic perspective, a bank focuses on the sensitivity of the value of its assets, liabilities and revenues to changes in interest rates. Interest rate risk arises from differences between the timing of rate changes and the timing of cash flows (repricing risk); from changing rate relationships among different yield curves affecting bank activities (basis risk); from changing rate relationships across the spectrum of maturities (yield curve risk); and from interest-related options embedded in bank products (options risk). Evaluation of interest rate risk must consider the impact of complex, illiquid hedging strategies or products, and also the potential impact that changes in interest rates will have on fee income. In those situations where trading is separately managed, this refers to structural positions and not trading portfolios. Internet banking can attract deposits, loans, and other relationships from a larger pool of possible customers than other forms of marketing. Greater access to customers who primarily seek the best rate or term reinforces the need for managers to maintain appropriate asset/liability management systems, including the ability to react quickly to changing market conditions.

Liquidity Risk

Liquidity risk is the risk to earnings or capital arising from a bank's inability to meet its obligations when they come due, without incurring unacceptable losses. Liquidity risk includes the inability to manage unplanned changes in funding sources. Liquidity risk also arises from the failure to recognize or address changes in market conditions affecting the ability of the bank to liquidate assets quickly and with minimal loss in value. Internet banking can increase deposit volatility from customers who maintain accounts solely on the basis of rate or terms. Asset/liability and loan portfolio management systems should be appropriate for products offered through Internet banking. Increased monitoring of liquidity and changes in deposits and loans may be warranted depending on the volume and nature of Internet account activities.

Price Risk

Price risk is the risk to earnings or capital arising from changes in the value of traded portfolios of financial instruments. This risk arises from market making, dealing, and position taking in interest rate, foreign exchange, equity, and commodities markets.

Banks may be exposed to price risk if they create or expand deposit brokering, loan sales, or securitization programs as a result of Internet banking activities. Appropriate management systems should be maintained to monitor, measure, and manage price risk if assets are actively traded.

Foreign Exchange Risk

Foreign exchange risk is present when a loan or portfolio of loans is denominated in a foreign currency or is funded by borrowings in another currency. In some cases, banks will enter into multi-currency credit commitments that permit borrowers to select the currency they prefer to use in each rollover period. Foreign exchange risk can be intensified by political, social, or economic developments. The consequences can be unfavorable if one of the currencies involved becomes

subject to stringent exchange controls or is subject to wide exchange-rate fluctuations.

Transaction Risk

Transaction risk is the current and prospective risk to earnings and capital arising from fraud, error, and the inability to deliver products or services, maintain a competitive position, and manage information. Transaction risk is evident in each product and service offered and encompasses product development and delivery, transaction processing, systems development, computing systems, complexity of products and services, and the internal control environment.

A high level of transaction risk may exist with Internet banking products, particularly if those lines of business are not adequately planned, implemented, and monitored. Banks that offer financial products and services through the Internet must be able to meet their customers' expectations. Banks must also ensure they have the right product mix and capacity to deliver accurate, timely, and reliable services to develop a high level of confidence in their brand name. Customers who do business over the Internet are likely to have little tolerance for errors or omissions from financial institutions that do not have sophisticated internal controls to manage their Internet banking business. Likewise, customers will expect continuous availability of the product and Web pages that are easy to navigate. Software to support various Internet banking functions is provided to the customer from a variety of sources. Banks may support customers using customer-acquired or bank-supplied browsers or personal financial manager (PFM) software. Good communications between banks and their customers will help manage expectations on the compatibility of various PFM software products.

Attacks or intrusion attempts on banks' computer and network systems are a major concern. Studies show that systems are more vulnerable to internal attacks than external, because internal system users have knowledge of the system and access. Banks should have sound preventive and detective controls to

protect their Internet banking systems from exploitation both internally and externally.

Contingency and business resumption planning is necessary for banks to be sure that they can deliver products and services in the event of adverse circumstances. Internet banking products connected to a robust network may actually make this easier because back up capabilities can be spread over a wide geographic area. For example, if the main server is inoperable, the network could automatically reroute traffic to a back up server in a different geographical location. Security issues should be considered when the institution develops its contingency and business resumption plans. In such situations, security and internal controls at the back-up location should be as sophisticated as those at the primary processing site. High levels of system availability will be a key expectation of customers and will likely differentiate success levels among financial institutions on the Internet. National banks that offer bill presentment and payment will need a process to settle transactions between the bank, its customers, and external parties. In addition to transaction risk, settlement failures could adversely affect reputation, liquidity, and credit risk.

Compliance Risk

Compliance risk is the risk to earnings or capital arising from violations of, or nonconformance with, laws, rules, regulations, prescribed practices, or ethical standards. Compliance risk also arises in situations where the laws or rules governing certain bank products or activities of the bank's clients may be ambiguous or untested. Compliance risk exposes the institution to fines, civil money penalties, payment of damages, and the voiding of contracts. Compliance risk can lead to a diminished reputation, reduced franchise value, limited business opportunities, reduced expansion potential, and lack of contract enforceability. Most Internet banking customers will continue to use other bank delivery channels. Accordingly, national banks will need to make certain that their disclosures on Internet banking channels, including Web sites, remain

synchronized with other delivery channels to ensure the delivery of a consistent and accurate message to customers.

Federal consumer protection laws and regulations, including CRA and Fair Lending, are applicable to electronic financial services operations including Internet banking. Moreover, it is important for national banks to be familiar with the regulations that permit electronic delivery of disclosures/notices versus those that require traditional hard copy notification. National banks should carefully review and monitor all requirements applicable to electronic products and services and ensure they comply with evolving statutory and regulatory requirements.

Advertising and record-keeping requirements also apply to banks' Web sites and to the products and services offered. Advertisements should clearly and conspicuously display the FDIC insurance notice, where applicable, so customers can readily determine whether a product or service is insured. Regular monitoring of bank Web sites will help ensure compliance with applicable laws, rules, and regulations.

Application of Bank Secrecy Act (BSA) requirements to cyberbanking products and services is critical. The anonymity of banking over the Internet poses a challenge in adhering to BSA standards. Banks planning to allow the establishment of new accounts over the Internet should have rigorous account opening standards. Also, the bank should set up a control system to identify unusual or suspicious activities and, when appropriate, file suspicious activity reports (SARs).

The BSA funds transfer rules also apply to funds transfers or transmittals performed over the Internet when transactions exceed $3,000 and do not meet one of the exceptions. The rules require banks to ensure that customers provide all the required information before accepting transfer instructions. The record keeping requirements imposed by the rules allow banks to retain written or electronic records of the information.

The Office of Foreign Asset Control (OFAC) administers laws that impose economic sanctions against foreign nations and individuals. This includes blocking accounts and other

assets and prohibiting financial transactions. Internet banking businesses must comply with OFAC requirements. A bank needs to collect enough information to identify customers and determine whether a particular transaction is prohibited under OFAC rules.

Strategic Risk

Strategic risk is the current and prospective impact on earnings or capital arising from adverse business decisions, improper implementation of decisions, or lack of responsiveness to industry changes.

This risk is a function of the compatibility of an organization's strategic goals, the business strategies developed to achieve those goals, the resources deployed against these goals, and the quality of implementation.

The resources needed to carry out business strategies are both tangible and intangible. They include communication channels, operating systems, delivery networks, and managerial capacities and capabilities.

The organization's internal characteristics must be evaluated against the impact of economic, technological, competitive, regulatory, and other environmental changes.

Management must understand the risks associated with Internet banking before they make a decision to develop a particular class of business. In some cases, banks may offer new products and services via the Internet. It is important that management understand the risks and ramifications of these decisions. Sufficient levels of technology and MIS are necessary to support such a business venture.

Because many banks will compete with financial institutions beyond their existing trade area, those engaging in Internet banking must have a strong link between the technology employed and the bank's strategic planning process.

Before introducing a Internet banking product, management should consider whether the product and technology are consistent with tangible business objectives in the bank's

strategic plan. The bank also should consider whether adequate expertise and resources are available to identify, monitor, and control risk in the Internet banking business.

The planning and decision making process should focus on how a specific business need is met by the Internet banking product, rather than focusing on the product as an independent objective.

The bank's technology experts, along with its marketing and operational executives, should contribute to the decision making and planning process. They should ensure that the plan is consistent with the overall business objectives of the bank and is within the bank's risk tolerance.

New technologies, especially the Internet, could bring about rapid changes in competitive forces. Accordingly, the strategic vision should determine the way the Internet banking product line is designed, implemented, and monitored.

Reputation Risk

Reputation risk is the current and prospective impact on earnings and capital arising from negative public opinion. This affects the institution's ability to establish new relationships or services or continue servicing existing relationships. This risk may expose the institution to litigation, financial loss, or a decline in its customer base.

Reputation risk exposure is present throughout the organization and includes the responsibility to exercise an abundance of caution in dealing with customers and the community. A bank's reputation can suffer if it fails to deliver on marketing claims or to provide accurate, timely services. This can include failing to adequately meet customer credit needs, providing unreliable or inefficient delivery systems, untimely responses to customer inquiries, or violations of customer privacy expectations.

A bank's reputation can be damaged by Internet banking services that are poorly executed or otherwise alienate customers and the public. Well designed marketing, including disclosures,

is one way to educate potential customers and help limit reputation risk. Customers must understand what they can reasonably expect from a product or service and what special risks and benefits they incur when using the system.

As such, marketing concepts need to be coordinated closely with adequate disclosure statements. A national bank should not market the bank's Internet banking system based on features or attributes the system does not have. The marketing program must present the product fairly and accurately.

National banks should carefully consider how connections to third parties are presented on their Web sites. Hypertext links are often used to enable a customer to link to a third party. Such links may reflect an endorsement of the third party's products or services in the eyes of the customer. It should be clear to the customer when they have left the bank's Web site so that there is no confusion about the provider of the specific products and services offered or the security and privacy standards that apply. Similarly, adequate disclosures must be made so that customers can distinguish between insured and noninsured products.

National banks need to be sure that their business continuity plans include the Internet banking business. Regular testing of the business continuity plan, including communications strategies with the press and public, will help the bank ensure it can respond effectively and promptly to any adverse customer or media reactions.

Risk Management

Financial institutions should have a technology risk management process to enable them to identify, measure, monitor, and control their technology risk exposure. Examiners should refer to OCC Bulletin 98-3, "Technology Risk Management" for additional guidance on this topic. Risk management of new technologies has three essential elements:

- The planning process for the use of the technology.
- Implementation of the technology.

- The means to measure and monitor risk.

The OCC's objective is to determine whether a bank is operating its Internet banking business in a safe and sound manner. The OCC expects banks to use a rigorous analytic process to identify, measure, monitor, and control risk.

Examiners will determine whether the level of risk is consistent with the bank's overall risk tolerance and is within the bank's ability to manage and control.

The risk planning process is the responsibility of the board and senior management. They need to possess the knowledge and skills to manage the bank's use of Internet banking technology and technology-related risks.

The board should review, approve, and monitor Internet banking technology-related projects that may have a significant impact on the bank's risk profile.

They should determine whether the technology and products are in line with the bank's strategic goals and meet a need in their market.

Senior management should have the skills to evaluate the technology employed and risks assumed. Periodic independent evaluations of the Internet banking technology and products by auditors or consultants can help the board and senior management fulfill their responsibilities.

Implementing the technology is the responsibility of management.

Management should have the skills to effectively evaluate Internet banking technologies and products, select the right mix for the bank, and see that they are installed appropriately. If the bank does not have the expertise to fulfill this responsibility internally, it should consider contracting with a vendor who specializes in this type of business or engaging in an alliance with another provider with complementary technologies or expertise.

Measuring and monitoring risk is the responsibility of management. Management should have the skills to effectively

identify, measure, monitor, and control risks associated with Internet banking. The board should receive regular reports on the technologies employed, the risks assumed, and how those risks are managed. Monitoring system performance is a key success factor. As part of the design process, a national bank should include effective quality assurance and audit processes in its Internet banking system. The bank should periodically review the systems to determine whether they are meeting the performance standards.

THE ROLE OF BANKS IN THE INTERNET WORLD

Initially, banks promoted their core capabilities, being products, channels and advice, through the Internet. Then, they entered internet commerce market as providers/distributors of their own products and services. "The trend toward electronic delivery of products and services is occurring dramatically in the financial service industry (something we call "e-Finance") where the shift is party a result of consumer demand, but also of a ruthlessly competitive environment" [Geyer 1997]. More recently, due to advances in Internet security and the advent of relevant protocols (e.g. Integrion, OFX, SET etc.), banks discovered that they can play again their primary role as financial intermediators and facilitators of complete commercial transactions via electronic networks and especially via the Internet.

However, "financial service organizations are implementing multiple styles of electronic financial services" [Schiller 1997]. Some have chosen a 'direct web presence', others have opted either for 'owners of an financial services organization-centric electronic marketplace', or for 'participants in a non-financial services organization-centric electronic marketplace' [Schiller 1997]. However, this scheme is very abstract and vague and does not support any decision-making process for the banking institutions to define a niche market for them to invest on and compare with their rivalries.

An Internet Commerce Market Structure Model

The following model charts the Internet commerce market, by distinguishing the types of business activities of the Internet commerce and, thus, categorizing the role that they various participants, including banks, play in this market.

Technology Providers

The technology infrastructure is an integral part of the Internet commerce edifice. Telecommunication organizations, Internet Service Providers, Web hosting services organizations, Web development software houses and IT integrators are technology providers who have flourished by the presence of the Internet commerce business. A few banks are considering to spin-off their web technology resources and start-up a new business as Internet technology providers.

Content Providers

The richness of the medium's content has been a critical success factor in attracting a sharply growing number of web sites visitors and commercial users. Content providers are the source of the raw material that flows through the medium and upon which intermediators offer added value. Four major categories of content providers have been identified. For example, banks feed their web sites with their content which usually includes a corporate profile, product and pricing information, rates, some application forms etc.

- *Producers, owners, manufacturers, retailers*. They possess a good, service, piece of information that want to advertise, promote, sell, distribute over the Internet. Most banks operate a web site with a catalogue of their products and services for promotion and communication purposes. A growing number of banks worldwide offer e-banking/web banking/internet banking, whereby their customers manipulate their personal finances and execute transactions via the internet.
- *E-brokerage.* Activities or firms that offer an interface to the end-user/customer for access to various products/

services. An e-brokerage activity may be an agent that presents a variety of products (e.g. loans), rates them, makes suggestions and facilitates purchasing. Or it can be a means to trading.

A special type for e-brokerage is *information brokerage*. Web sites that give access to databases of special interest topics are information brokers. Downloading can be free-of-charge or not. Some banks' sites act as information brokers because they provide access to rates, indices, economic information and reports pertaining to the whole sector in which they operate in, rather than giving information pertaining to their own organization only.

- *E-services providers.* These business activities are not carried out in brick-and-mortar premises, but they are realized in the virtual world. Usually they provide services for participants of the Internet commerce world.

  Virtual banks can offer cheaper rates due to the lack of labour and premises costs. The comfort of remote, self-service banking that virtual banks offer augments the quality of service perceived by their customers.
- *'add-on' material providers:* In this category fall the advertisers and infomediaries ("sole or main source of revenue derives from capturing consumer information and developing detailed profiles of individual customers for use by selected third-party vendors" [Hagel 1997]). Banks advertise their products, such as cards, loans etc. by using banners or other advertisement tricks on other's web pages, paying a fee to the owner of the advertisement space.

Context Providers

This type of Internet commerce business is about new intermediaries. They 'accommodate' context in a manner that adds value to its content components. Generally, context providers are e-marketplaces owners. The content scope of an e-marketplace may extend vertically or horizontally, addressing the interests of an industry sector, a user community, a special

purpose or it may aggregate material from various general or related areas.

- *e-marketplaces:* "Marketplaces that connect buyers and sellers are up and running in many product categories, and are creating value by making trading more efficient. […] There are three types of marketplace: those controlled by sellers, those controlled by buyers, and those controlled by neutral third parties [Berryman 1998]". In most of the cases, e-marketplaces are neutral, i.e. they are set up by third-party intermediaries which host sellers/merchants. Buyer-or Seller-driven marketplaces are often encountered in e-procurement, where products are asked for or offered, respectively. Specific applications include e-mall owners, e-auction houses, portal owners, and directory services owners. There are banks that host an e-mall putting forward their brand name as a guarantee for on-line shopping trust. A bank could also serve as an e-auction house because it can assure the securitization of the bidders, but, to the best of our knowledge, no banks have entered into this area yet.

Enablers

These are value adders that enable more transactions in the internet commerce market. Typical enablers are payment service providers, clearing houses, and trust guarantors. Banks are increasingly building payment infrastructure with various security mechanisms (SSL, SET etc.) because there is tremendous potential for profit as more and more payments will pass through the Internet. The challenge for banks is to offer a payments back-bone system that will be open enough to support multiple payment instruments (credit cards, debit cards, direct debit to accounts, e-checks, digital money etc.) and scalable enough to allow for a stable service regardless of the workload.

Certification authorities enable secure transactions by managing the distribution and circulation of digital certificates,

either SET certificates or not. Banks are qualified to play the role of a certification authority first at their customers and then offer it as a service. Security and trust infrastructures are obviously within the scope of banking in its broader sense. An example of such an infrastructure is Barclays' Endorse. "Endorse is a digital signature service enabling individuals and businesses to transact with trust over the Internet. The Endorse smart card creates the Members digital signature, which is used to guarantee the identity of the individual signing electronic data. The signature also protects the integrity of the data by detecting alteration during transmission". Based on the security and trust ingredients, other enabling services, such as copyright and intellectual property enforcement, can be offered by banks. "Magex secures the distribution of content and processing payments for digital information. Not only does Magex enable the delivery of digital content (music, films, agents, books, commercial information) but also offers persistent protection of copyright and collects the micro-payments" [SemaGroups brochure].

9

E-Commerce Security and Technology

AN INTRODUCTION TO E-COMMERCE SECURITY TECHNOLOGY

The success of e-Commerce depends on the security of data like personal details and credit card numbers transmitted over the Internet. The domain name system Internet protocol that makes IP addresses readable by humans is insecure. Security measures need to be taken in e-Commerce systems to prevent compromising the systems. Some of these measures include building firewalls, incorporating cryptography and authentication, and using secure connections.

Cryptography

Cryptography is a science that provides secure communication over vulnerable channels. Cryptography is fundamental to the success of the Internet and e-Commerce. Governments regulate cryptographic technology because of its importance to national security.

In cryptography a message, like a credit card number, is encrypted using a key and the encrypted message is transmitted. The receiver uses the key to decrypt the message and convert it back to its original form. The basic elements of a cryptographic system are algorithms, protocols and key management. An example of key management is the secret-key encryption

algorithms. These algorithms are 'secret' because only the receiver and sender know the secret key.

Cryptography is used to provide secure transmission of data over the Internet. Private data like credit card details or digital signatures are encrypted and then transmitted over the Internet. Cryptography can keep a message secret and act as a gateway for identifying senders and receivers. It provides the secure electronic transaction technology for credit card transactions on the Internet.

Authentication

Authentication procedures are used to establish the identity of an individual or another computer system. Authentication procedures can be hardware-or software-based. Authentication procedures make use of personal items of knowledge or possession such as secret names or birth dates. Good authentication systems make use of two-factor authentication, such as a place name and memorable date known to the user. Some banking systems make use of three-factor authentication before allowing customers to make online account transfers.

Secure Socket Layer

The secure socket layer (SSL) is a layer of security between the application and the transport protocol. The purpose of SSL is to enable secure and reliable data transmission and communication over the Internet. The SSL provides private connection, making use of encryption and secret-key cryptography.

Authentication in SSL is achieved using public-key cryptography, which consists of a private key that is never made public chosen by one participant in the data exchange, and a public key chosen by the other participant in the exchange. Either key may be used for encryption. Reliability of data transmission is achieved by using secure hash functions like SHA or MD5. Secure hash functions check the integrity of a message. SSL is commonly used in e-Commerce systems.

SECURITY

Security is an essential part of any transaction that takes place over the internet. Customers will lose his/her faith in e-business if its security is compromised.

Following are the essential requirements for safe e-payments/transactions “

- Confidentiality “ Information should not be accessible to an unauthorized person. It should not be intercepted during the transmission.
- Integrity “ Information should not be altered during its transmission over the network.
- Availability “ Information should be available wherever and whenever required within a time limit specified.
- Authenticity “ There should be a mechanism to authenticate a user before giving him/her an access to the required information.
- Non-Repudiability “ It is the protection against the denial of order or denial of payment. Once a sender sends a message, the sender should not be able to deny sending the message. Similarly, the recipient of message should not be able to deny the receipt.
- Encryption “ Information should be encrypted and decrypted only by an authorized user.
- Auditability “ Data should be recorded in such a way that it can be audited for integrity requirements.

Measures to ensure Security

Major security measures are following “

- Encryption “ It is a very effective and practical way to safeguard the data being transmitted over the network. Sender of the information encrypts the data using a secret code and only the specified receiver can decrypt the data using the same or a different secret code.
- Digital Signature “ Digital signature ensures the authenticity of the information. A digital signature is

an e-signature authenticated through encryption and password.

- Security Certificates " Security certificate is a unique digital id used to verify the identity of an individual website or user.

Security Protocols in Internet

We will discuss here some of the popular protocols used over the internet to ensure secured online transactions.

Secure Socket Layer (SSL)

It is the most commonly used protocol and is widely used across the industry. It meets following security requirements "

- Authentication
- Encryption
- Integrity
- Non-reputability

Secure Hypertext Transfer Protocol (SHTTP)

SHTTP extends the HTTP internet protocol with public key encryption, authentication, and digital signature over the internet. Secure HTTP supports multiple security mechanism, providing security to the end-users. SHTTP works by negotiating encryption scheme types used between the client and the server.

Secure Electronic Transaction

It is a secure protocol developed by MasterCard and Visa in collaboration. Theoretically, it is the best security protocol. It has the following components "

- Card Holder's Digital Wallet Software " Digital Wallet allows the card holder to make secure purchases online via point and click interface.
- Merchant Software " This software helps merchants to communicate with potential customers and financial institutions in a secure manner.

- Payment Gateway Server Software " Payment gateway provides automatic and standard payment process. It supports the process for merchant's certificate request.
- Certificate Authority Software " This software is used by financial institutions to issue digital certificates to card holders and merchants, and to enable them to register their account agreements for secure electronic commerce.

TECHNOLOGY AND SECURITY STANDARDS

The overall security framework should ensure.

- Encrypted messaging/session between consumer's phone and third party service provider/telecom company. Minimum encryption standards to be specified to make the transaction banking grade (E.g. Min 128 bit SSL)
- All subsequent routing of messages to the bank's servers must be with the highest level of security with dedicated connectivity like leased lines/VPNs.
- If any sensitive information is stored in third party systems, banks must ensure that access to this information is restricted with appropriate encryption and hardware security standards.
- All transactions that affect an account (those that result in to an account being debited or credited, including scheduling of such activity) should be allowed only after authentication of the mobile number and the mPIN associated with it. Transactions only for information such as balance enquiry, mini statements, registered payee details, etc. may be allowed with either mobile number or PIN.
- Unless fool proof security is used in compiling and deploying the mobile banking applications, the PIN number should not be allowed to be stored in the mobile banking application on the phone. As, generally the application installed on the phone would be developed in Java, it may be possible to decompile it extract the

mPIN. Alternatively, the application should be so compiled that it should not be feasible to extract the PIN on decompilation.

- All accounts, credit or debit cards allowed to be transacted through the mobile phones should have the mobile phone number linked to the account, credit or debit card. This mobile number should be used as the second factor authentication for mobile transactions.
- During the transaction, the PIN should not travel in plain text. Doing this, there is risk of the PIN being snooped out of the phone from sent items and also it being exposed at the SMSC level. Also, it may be able to snoop out the PIN during transmission, although, this is very difficult in cellular communications.
- Proper level of encryption should be implemented for communicating from the mobile handset to the mobile payments service provider's server. It has been assumed that proper security checks would be made by the banks to ascertain the security levels of the service providers. This may include PCI DSS certification in addition to bank's own audits.
- Proper system of verification of the phone number should be implemented, wherever possible. This is so as to guard against spoofing of the phone numbers as mobile phones would be used as the second factor authentication.
- It is also recommended that Internet Banking login ids and passwords may not be allowed to be used through the mobile phones. As fraudsters get more sophisticated, the chances of phishing attacks on mobile phones would become more probable. Allowing Internet banking login id and password usage on the mobile phone may compromise their usage on the Internet banking channel. This restriction may be communicated to the customers through an industry wide effort so as to ensure that Internet banking passwords are not compromised through mobile phones.

- The payment authorisation message from the user's mobile phone should be securely encrypted and checked for tampering by the service provider or the bank. It should not be possible for any interceptor to change the contents of the message.
- Provided the above security recommendations are reviewed, the mobile payment service could use any of the preferred mode of communication viz., SMS, IVRS, WAP/GPRS, USSD and NFC. There are couple of security issues in some of these modes of communications, which are listed below:
  a. SMS is the simplest form of communication, but is vulnerable to tampering. As long as there is a second level of check on the details of the transaction so as to guard against data tampering and the mPIN does not travel in plain text, this mode of communication can be used.
  b. IVRS is also a simple mode of communication and therefore does not have any inbuilt security measures. The system should be capable of encrypting the DTMF tone entries, if required to be stored or transmitted.
  c. USSD communication uses its inbuilt encryption technology to talk between the cell phone and the operator's server. However, the decryption of the information happens at the cell phone operator's server. Vulnerability of data may exists at this point. This information should be re-encrypted and transmitted to the service provider.
- Any of the following modes of user interface may be used, provided the above listed security measures are taken into consideration:
  a. SMS
  b. Menu driven application
  c. Menu driven USSD application
  d. WAP/GPRS website.

- Formats need to be specified for exchange of information between banks. On the debit/credit card front, the exiting ISO 8583 message format may be used for communication between bank switches. However, for account number based mobile transfers, a message format may need to be frozen.
- Banks should designate a network and database administrator with clearly defined roles as indicated in the technology Group's report
- Banks should have a security policy duly approved by the Board of Directors. There should be a segregation of duty of Security Officer/Group dealing exclusively with information systems security and Information Technology Division which actually implements the computer systems. Further, Information Systems Auditor will audit the information systems.
- Banks should introduce logical access controls to data, systems, application software, utilities, telecommunication lines, libraries, system software, etc. Logical access control techniques may include user-ids, passwords, smart cards or other biometric technologies
- At the minimum, banks should use the proxy server type of firewall so that there is no direct connection between the Internet and the bank's system. It facilitates a high level of control and in-depth monitoring using logging and auditing tools. For sensitive systems, a stateful inspection firewall is recommended which thoroughly inspects all packets of information, and past and present transactions are compared. These generally include a real time security alert.
- All the systems supporting dial up services through modem on the same LAN as the application server should be isolated to prevent intrusions into the network as this may bypass the proxy server.
- The information security officer and the information system auditor should undertake periodic penetration tests of the system, which should include:

- Attempting to guess passwords using password-cracking tools.
- Search for back door traps in the programs.
- Attempt to overload the system using DDoS (Distributed Denial of Service) & DoS (Denial of Service) attacks.
- Check if commonly known holes in the software, especially the browser and the e-mail software exist.
- The penetration testing may also be carried out by engaging outside experts (often called 'Ethical Hackers')

- Physical access controls should be strictly enforced. Physical security should cover all the information systems and sites where they are housed, both against internal and external threats.
- Banks should have proper infrastructure and schedules for backing up data. The backed-up data should be periodically tested to ensure recovery without loss of transactions in a time frame as given out in the bank's security policy. Business continuity should be ensured by setting up disaster recovery sites. These facilities should also be tested periodically.

INFORMATION SECURITY

Information Security Components: or qualities, i.e., Confidentiality, Integrity and Availability (CIA). Information Systems are decomposed in three main portions, hardware, software and communications with the purpose to identify and apply information security industry standards, as mechanisms of protection and prevention, at three levels or layers: Physical, personal and organizational. Essentially, procedures or policies are implemented to tell people (administrators, users and operators)how to use products to ensure information security within the organizations. Information security means protecting information and information systems from unauthorized access, use, disclosure, disruption, modification or destruction.

The terms information security, computer security and information assurance are frequently incorrectly used interchangeably. These fields are interrelated often and share the common goals of protecting the confidentiality, integrity and availability of information; however, there are some subtle differences between them.

These differences lie primarily in the approach to the subject, the methodologies used, and the areas of concentration. Information security is concerned with the confidentiality, integrity and availability of data regardless of the form the data may take: electronic, print, or other forms.

Computer security can focus on ensuring the availability and correct operation of a computer system without concern for the information stored or processed by the computer.

Governments, military, corporations, financial institutions, hospitals, and private businesses amass a great deal of confidential information about their employees, customers, products, research, and financial status. Most of this information is now collected, processed and stored on electronic computers and transmitted across networks to other computers.

Should confidential information about a business' customers or finances or new product line fall into the hands of a competitor, such a breach of security could lead to lost business, law suits or even bankruptcy of the business. Protecting confidential information is a business requirement, and in many cases also an ethical and legal requirement. For the individual, information security has a significant effect on privacy, which is viewed very differently in different cultures.

The field of information security has grown and evolved significantly in recent years. As a career choice there are many ways of gaining entry into the field. It offers many areas for specialization including: securing network(s) and allied infrastructure, securing applications and databases, security testing, information systems auditing, business continuity planning and digital forensics science, to name a few.

History

Since the early days of writing, heads of state and military commanders understood that it was necessary to provide some mechanism to protect the confidentiality of written correspondence and to have some means of detecting tampering. Julius Caesar is credited with the invention of the Caesar cipher c50 B.C., which was created in order to prevent his secret messages from being read should a message fall into the wrong hands.

World War II brought about many advancements in information security and marked the beginning of the professional field of information security.

The end of the 20th century and early years of the 21st century saw rapid advancements in telecommunications, computing hardware and software, and data encryption. The availability of smaller, more powerful and less expensive computing equipment made electronic data processing within the reach of small business and the home user. These computers quickly became interconnected through a network generically called the Internet or World Wide Web.

The rapid growth and widespread use of electronic data processing and electronic business conducted through the Internet, along with numerous occurrences of international terrorism, fueled the need for better methods of protecting the computers and the information they store, process and transmit. The academic disciplines of computer security, information security and information assurance emerged along with numerous professional organizations-all sharing the common goals of ensuring the security and reliability of information systems.

IMPLEMENTING INFORMATION AND DATA SECURITY

In the most basic terms, Data Security is the process of keeping data secure and protected from not only unauthorized access but also corrupted access. The main focus of data security

is to make sure that data is safe and away from any destructive forces. Data is stored as rows and columns in its raw form in the databases, PCs as well as over networks. While some of this data may be not that secretive, other might be of private value and importance. But unauthorized access to such private information or data can cause many problems such as corruption, leakage of confidential information and violation of privacy.

Thus, the importance of Data Security comes into play. Data Security is in the form of digital privacy measures that are applied to avoid this unauthorized access to websites, networks and databases. There are many ways of protecting or securing data which is important and some of them include encryption, strong user authentication, backup solutions and data erasure. There are many international laws and standards that govern data security measures. Data Protection Acts are implemented to ensure that personal data is accessible to those whom it may concern.

Business data protection

While all kinds of personal data are important, one aspect where the need and requirement of data security are most rampant is businesses and industries. Most businesses have massive amounts of data or information which they may want to keep confidential and protected from others. The process of protecting this kind of data is known as Business Data Protection. Often, organizations struggle to create real-time security policies as the data keeps growing. It also finds it tough to monitor all data from one central location in big data platforms. But special IT teams are then created to solve these matters and provide complete data protection.

Data management

Besides securing and protecting data, it is also important to properly manage and monitor it. Data management is the development as well as the execution of the processes, procedures, architectures and policies which administers the complete data lifecycle requirements of a company. This

particular definition of data management is very broad and can be applied to any profession or field.

Data management is important because, without proper management of data, it would be difficult to monitor and protect it. If data is not well defined, it could be misused in various types of applications. If data is not well defined, it would be impossible to meet the needs of the users.

Why is Data Security Important?

Data security is very important or critical for most companies and businesses. Besides formal organizations, it is also very critical for home computer users as well. Information like client details, bank details, account details, personal files, etc. must be well protected for everyone on the planet because if it gets into wrong hands, it can be misused easily. Such information can be hard to replace and potentially dangerous. By securing such data or information, one can protect the files and avoid facing any difficulties.

The following are some of the reasons why data security is important:

- Your reputation may be affected – You work very hard to establish the name of your business but when a data breach occurs, the reputation that you built may be affected by just a single stroke. This is because your business also has confidential information of customers or clients, and once data is lost, you might fall short of all explanations.
- Threats are on an increase – Another reason why data security is important is because the threats are on an increase these days and without securing your data, you cannot expect to run a business or even go on as a home PC user. This is because of the emergence of mobile devices, internet, and cloud computing, etc.
- It's expensive and complicated to fix – One may recover from the dent in the reputation but rebounding from the technical aspects of data breaches can be tough. It is

diffiult to fix such problems without spending great deal of time and money.

What could a data breach cost a business?

- Damage to reputation – A data breach could be very harmful to an organization. It does not only cause loss of data, but also causes damage to the reputation of a company. The company whose data is breached may be seen by others as one which was casual in terms of data protection.
- Loss of files – Accidental loss of files or database of the customers may leave a company unable to carry out further marketing.
- Loss of confidentiality – Once private and confidential information is accessed by a second party or unauthorized party, disclosure of sensitive data may occur, and this may be bad for any company or business.
- Threat of money loss – When loss of important bank account details and other such data occurs, there is a threat of money loss as well. When an unauthorized person or party gets to know bank details, then this may lead them to use passwords to steal money.

How data security and privacy help your company?

- Prevention of data breaches – One of the main reasons for the importance of data security is that it helps in the prevention of data getting into the wrong hands or breaching. By avoiding disclosure or leakage of sensitive information, one can also avoid loss of finances.
- Protection of privacy – While there is some information that is business related, there is some which is just of private value. Thus by protecting data, one also tends to achieve protection of privacy.
- Reduce compliance cost – Another reason data security is helpful is because it can also help reduce the compliance costs. It does so by automating and

centralizing controls and simplifying audit review procedures.

- Ensure data integrity – It helps to prevent unauthorized data changes, data structures, and configuration files.

How To Secure Data?

Data Securing Technologies

- Disk Encryption: Disk encryption is one of the most commonly opted for data security technology or methods. This is a technology through which encryption of data on a hard disk drive takes place. This technology takes place in two major ways – software or hardware. In disk encryption, data is converted into unreadable codes that cannot be accessed or deciphered by anyone who is unauthorized. There are several ways and tools to carry out disk encryption, and these tools may vary in the security offered and features used. Even though there are many benefits of using this method, there are also certain weaknesses or vulnerabilities.
- Software and hardware based ways to protect data: Besides disk encryption, both software and hardware based ways can also be used to protect data. On one hand, software-based security solutions encrypt the data to protect it from theft, on the other, hardware-based solutions can prevent read and write access to data. Hardware based security solutions offer very strong protection against unauthorized access and tampering. But in the case of software-based solutions, a hacker or a malicious program can easily corrupt the data files and make the system unusable and files unreadable. This is why, hardware-based solutions are mostly preferred over software based ones. The hardware-based systems are more secure due to the physical access required to compromise them. This system is much more effective in the situation where an operating system is more vulnerable to threats from viruses and hackers.

- Backups: One of the easiest yet most effective ways to avoid data loss or to lose important and crucial files is by taking a backup of your data regularly. There are many ways to take backup and it is up to you how many copies of your data you wish to keep. While external hard disks are a common way to take backup, these days cloud computing too proves to be a cheap and easy way to maintain a backup of all files at a safe location. Of course, a backup won't prevent data loss but would at least ensure that you don't lose any information of importance.
- Data masking: Data masking is another data securing technology that can be brought into use by those who wish to secure their data. Another term that is used to refer to data masking is data obfuscation and is the process through which one can hide original data with random characters, data or codes. This method is especially very useful for situations where you wish to protect classified data and do not want anyone to access it or read it. This is a good way to let the data be usable to you but not to the unauthorized hacker or user.
- Data erasure: Data erasure, which is only known as data wiping and data clearing is a software-based method of overwriting information or data and aims to totally destroy all data which may be present on a hard disk or any other media location. This method removes all data or information but keeps the disk operable.

DATA PROTECTION PRINCIPLES

The Data Protection Act requires one to follow certain rules and measures when it comes to securing or protecting data. These rules apply to everything one does with personal data, except the case when one is entitled to an exemption. The following are the main data protection principles one must follow:

- Personal Data must be processed lawfully and fairly.

- Personal data should be relevant, adequate and not excessive in relation to the purpose or purposes due to which they have been processed.
- Personal data must be obtained just for one or more than one specified and lawful reasons and must not be processed in any way that is not compatible with those reason/reasons.
- Personal data should be accurate and should be kept up to date wherever it is necessary to keep it up to date.
- Personal data which is processed for any reason or reasons should not be kept for any time longer than required for that reason or reasons.
- Personal data should not be processed according to the rights of data subjects under this Act.
- The suitable technical, as well as organizational measures, must be taken against any unauthorized processing or unlawful processing of personal data and also against any accidental destruction or loss of or damage of personal data.
- Personal data shall not be transferred to a territory or country outside the economic area of the data owner unless that region ensures the right level of protection for the freedom and rights of data subjects in relation to data's processing.

Essential Steps Every Business Must Take to Secure Data

- Establish strong passwords: The first step that every business must most take is to establish strong passwords for all your accounts, bank details and other kinds of accounts. Also, one must try to keep very strong passwords that may not be easily guessed by anyone. The passwords must be a combination of characters and numbers. The password must be easy to remember for you but should not be your birthday, your name, or any other personal detail that anyone else could guess. The password must be between 8-12 characters long, at least.

- Strong Firewall: Like antiviruses are for your files, firewalls are for protection. You must establish a strong firewall in order to protect your network from unauthorized access or usage. The firewall protects your network by controlling internet traffic that comes into and goes out of your business. A firewall works pretty much the same way across the board. Make sure you select a very strong firewall to ensure network safety.
- Antivirus protection: Antivirus and antimalware solutions are also extremely important for data security and must be installed on your systems. You must opt for the strongest antivirus protection software not just on your PCs and laptops but also on your mobile devices. They help you to fight unwanted threats to your files and data.
- Secure Systems: Data loss can also be caused in case your laptop or mobile device is stolen. Thus, you must take some extra steps to ensure the further safety of these devices. The easiest way to secure your laptops is to encrypt them. Encryption software help to make the information look coded so that no one who is unauthorized can view or access your data without a password. Besides this, you must protect your laptop falling into the wrong hands. Make sure you never leave it in your car on unattended in the office, etc.
- Secure Mobile Phones: Smartphones too hold a lot of important and confidential data such as messages, bank account details, and emails, etc. thus it is important to secure mobile phones as well. There are many ways to secure your mobile phones and some of them include, establishing strong passwords, to have encryption software, to have remote wiping enabled and to opt for phone finding apps so that you can locate your mobile phone if it is lost or stolen.
- Backup regularly: In order to avoid loss of data due to violation of data security, it is important to backup all

your data regularly and keep it stored somewhere safe where it cannot be accessed or violated by anyone. One of the best way to backup your data is to either store it on hard disks or store it over cloud computing. One must backup data regularly, most preferably every week. This ensures that even if data is lost, you can have access to it, and it isn't compromised.

- Monitor well: Another practice that you must follow in order to secure your data is to monitor it well and diligently. You must always keep track of your data, know which data is stored where and use good monitoring tools that can help prevent data leakage. The data leakage software that you choose must have set up of key network touchpoints that help to look for specific information coming out of internal network. Such software can be easily configured or customized to look for codes, credit card numbers or any other kind of information which is relevant to you.
- Surf Safely: Your data safety is in your hands, and if you are careful, there will be no way anyone would be able to violate it. Thus, it is important to be careful how you surf the net and what precautions you follow. It is common for us sometimes to click on certain links or attachments thinking that they are harmless, but they could lead to data hacking or planting of malicious files. This may infect your system and may squeeze out information. Thus, it is important to surf safely, use internet security software and never give out personal information and bank details to sites that are not trustworthy. Always beware of the vulnerabilities and do your best to avoid being casual when using the internet.

E-COMMERCE SECURITY ISSUES AND THREATS

Security is very important in online shopping sites. Now days, a huge amount is being purchased on the internet, because

it‘s easier and more convenient. Almost anything can be bought such as music, toys clothing, cars, and food. Even though some of these purchases are illegal we will be focusing on all the item‘s you can buy legally on the internet. Some of the popular websites areeBay, iTunes, Amazon, HMV, Mercantila, dell, Best Buy and much more.

Purpose Of Security:

1. Data Confidentiality – is provided by encryption / decryption.
2. Authentication and Identification – ensuring that someone is who he or she claims to be is implemented with digital signatures.
3. Access Control – governs what resources a user may access on the system. Uses valid IDs and passwords.
4. Data Integrity – ensures info has not been tampered with. Is implemented by message digest or hashing.
5. Non-repudiation – not to deny a sale or purchase. Implemented with digital signatures.

E-commerce Security Threats:

1. Intellectual property threats: Some browsers use the information personally from a website without permission of the website owner. For example, music downloads, software pirating etc. To get rid of this problem website owners have to use secured authentication system
2. Client computer threats: Sometimes client computers may impose for electronic threats like Trojan horse, viruses. Which enters the client computer without user’s knowledge, steal the data and destroy or crash the client computer. To avoid these types of threats we need to use good antivirus system which should be updated regularly. The website owners should implement a strong privacy policy.
3. Communication channel threats: As internet allows anyone to send and receive information through many

networks. Data may be stolen, modified by unauthorized users of hackers. Hackers can develop software to steal the user Identification and pass words as well. Spoofing is another major threat while data is being transmitted electronically. Denial of service is also one of communication channel threat, where hackers' sends unlimited number of requests to the target server, which big number of requests may not be handled by the server. Obviously the genuine user will find websites of that server are always busy.

We can overcome the communication channel threats using public key encryption and private key encryption. We can also use proper protocols to get rid of communication channel threats.

Digital signatures are another way we can follow to minimize these kinds of threats. Where the actual message which we need to send is decrypted and bound with sender's private key and a signature is added to that will be send to the receiver. The receiver uses sender's public key and signature for decryption to see the actual message.

4. Server threats: Denial of service is a major threat for the servers, where hackers generate a program which sends many requests from the client side that cannot be handled by the server. Spamming is another important threat for the servers. To protect our server from the above threats we can use authentication for web access, digital signatures and firewalls. Firewalls check the incoming requests packets and if anything which does not match with the server related data, they simply reject those requests.

Some of the tools to achieve the security they are encryption, firewalls, security tools, access controls, proxy systems, authentication and intrusion detection. Feel free to contact E-SPIN for E-Commerce infrastructure and application security, infrastructure availability and performance monitoring solution.

ELECTRONIC COMMERCE THREATS

The world today is coming closer. From communicating to one person sitting at the other end of the world to finalizing business deals, everything has become fast and quick. The reason for this is the massive internet boom which has made life easier for the average person by providing a plethora of options. What's more it has also made your shopping experience a more interesting and enjoyable one. You can now get practically everything from online shopping.

The E-commerce splash

This boom we would call as the 'e-commerce' boom. It has been a total game changer of sorts for shopping to the people. The consumer can now do more personalized shopping with a hoard of options available. The whole shopping experience has become very convenient. The thing with e-commerce is that it is not just maximizing but also changing. Today the consumer faces a maze of different online choices which were not available or even imaginable some years ago. However it has also led to a proliferation of cyber-attacks and online threats. One of the main reasons is the inadequate technical built up and proper protection of the systems. Poor security and very high levels of vulnerability in the arrangements is also one of the main reasons for the cyber-attacks.

An e-commerce security

E-commerce security is protection the various e-commerce assets from unauthorized access, its use, or modification.

An e-commerce threat

In simple words, you can say that using the internet for unfair means with an intention of stealing, fraud and security breach. There are various types of e-commerce threats. Some are accidental, some are purposeful, and some of them are due to human error. The most common security threats are phishing attacks, money thefts, data misuse,hacking, credit card frauds and unprotected services.

Inaccurate management-One of the main reason to e-commerce threats is poor management. When security is not up to the mark it poses a very dangerous threat to the networks and systems. Also security threats occur when there are no proper budgets are allocated for purchase of anti-virus software licenses.

Price Manipulation-Modern e-commerce systems often face price manipulation problems. These systems are fully automated; right from the first visit to the final payment getaway. Stealing is the most common intention of price manipulation. It allows an intruder to slide or install a lower price into the URL and get away with all the data.

Snowshoe Spam-Now spam is something which is very common. Almost each one of us deals with spam mails in our mail box. The spam messages problem has never been actually solved but now it is turning out to be a not so general issue. The reason for this is the very nature of a spam message. A spam is something which is sent by one person; but unfortunately a new development is taking place in the cyber world. It is called as snowshoe spam. Unlike a regular spam it is not sent from one computer but is sent from many users. In such a case it becomes difficult for the anti-spam software to protect the spam messages.

Malicious code threats-These code threats typically involve viruses, worms, Trojan horses.

- Viruses are normally external threats and can corrupt the files on the website if they find their way in the internal network. They can be very dangerous as they destroy the computer systems completely and can damage the normal working of the computer. A virus always needs a host as they cannot spread by themselves.
- Worms are very much different and are more serious than viruses. It places itself directly through the internet. It can infect millions of computers in a matter of just few hours.
- A Trojan horse is a programming code which can perform destructive functions. They normally attack your

computer when you download something. So always check the source of the downloaded file.

Hacktivism-The full form of Hacktivism is hacking activism. At first it may seem like you should hardly be aware of this cyber threat. After all it is a problem not directly related to you. Why you should be bothered at all? However that's not the case. Firstly hacktivists do not target directly to those associated only with politics. It can also be a socially motivated purpose. It is typically using social media platforms to bring to light social issues. It can also include flooding an email address with so much traffic that it temporarily shuts down.

Wi-Fi Eavesdropping-It is also one of the easiest ways in e-commerce to steal personal data. It is like a "virtual listening" of information which is shared over a Wi-Fi network which is not encrypted. It can happen on public as well as on personal computers.

Other threats-Some other threats which include are data packet sniffing, IP spoofing, and port scanning. Data packet sniffing is also normally called as sniffers. An intruder can use a sniffer to attack a data packet flow and scan individual data packs. With IP spoofing it is very difficult to track the attacker. The purpose here is to change the source address and give it such a look that it should look as though it originated from another computer.

Ways to combat e-commerce threats

Developing a through implementation plan is the first step to minimize a cyber threat. Encryption-It is the process of converting a normal text into an encoded text which cannot be read by anyone except by the one who sends or receives the message.

Having digital certificates

It is a digital certificate which is issued by a reliable third party company. A digital certificate contains the following things the name of the company (Only in EV SSL Certificate), the most important digital certificate serial number, expiry date

and date of issue. An EV SSL Certificate is necessary which provides a high level of authentication to your website.

The very function of this kind of certificate is to exclusively protect an e-commerce website from unwanted attacks such Man-In_middle Attack. Also there are different Types of SSL Certificates available (such as Wildcard SSL, SAN, SGC, Exchange Server certificate, etc.) which you can choose according to the need of your website. Perform a security audit-a routine examination of the security procedures of the firm.

INTERNET AND WORLD WIDE WEB TECHNOLOGIES

The microcomputer or Personal Computer (PC) forms the basis of e-Commerce. The Internet would not have the wide reach that it has into peoples' homes in the absence of the PC. Most office PCs are linked to a computer network and PCs at home are connected to the Internet via modems or dedicated data transfer cables.

Local area Networks and Wide area Networks

PCs on local area networks (LANs) and wide area networks (WANs) are connected to the Internet. LANs and WANs are digital computer networks that connect PCs to enable sharing of information between separate computers. LANs are limited to a geographical area such as an office, whereas WANs connect computers over a wider geographical area. The computers on a LAN or WAN share information in the form of addressed packets of data. The capacity of a single computer is increased by connecting it to a LAN or WAN, as it can share computer programs and information. A computer that is linked to a network can download and use computer programs and share storage and printing facilities, and take advantage of network capabilities for sending and receiving data and information.

Client-server Architecture

A computer on a LAN or WAN that provides resources like application programs or printer connections is known as a

'server'. A server provides other computers known as 'clients' on the LAN or WAN with software and other resources. This set-up is called client-server computing architecture. A server that is linked to the Internet is called a 'host computer'. A server computer is capable of running server software, which needs to be compatible with the network operating system. The client and server are independent and perform specialized tasks to process information and run computer applications. If you use Microsoft Word on your computer, the client, it is probable that a server will have provided the Microsoft Word software for you to use. The client-server architecture is the basis of the Internet too.

The Internet and Protocols

The Internet is the sum total connection of LANs, WANs and stand-alone computers around the world. The term 'Internet' is short for 'inter-networking' or an interconnected set of networks. It is the global network of computers, whether the computer is on a LAN in an office, or a WAN in an industry extranet, or an independent computer in a private home. An Internet-connected computer is known as an Internet host computer. The Internet is also known as the 'Net', the 'Information superhighway' or 'Cyberspace'.

The set of rules for moving information over the Internet is called a 'protocol'. The transmission control protocol (TCP) is used for sending large amounts of information between host computers on the Internet. Vinton Cerf wrote the basic ideas for TCP on the back of an envelope over lunch, and in 1983 the core protocols of the Internet transmission control protocol/ Internet protocol (TCP/IP) became the standard protocol for transmitting information over the Internet.

Intranet

An intranet consists of networked internal connection of computers owned by an organization and makes use of Web technology. An intranet may be mounted on a LAN or a WAN. An intranet makes use of Internet technology such as TCP/IP,

HTML, Java and HTTP to make it interoperable and to provide it with Web capability. The basic elements of an intranet are a computer network, a computer designated as a server containing server software and the Internet protocols TCP/IP.

An intranet offers several benefits to an organization: improved sharing and communication of information, open standards and cross-platform collaboration. For example, a car manufacturing company may connect its information systems on purchasing with its accounting information systems to form an intranet for sharing and processing information between two departments in the company.

An intranet is a company's own internal information transfer system that offers: e-mail, communication among different computers, connection to remote offices, a Web browser interface and special-interest news groups. For e-Commerce, an intranet is used to provide a corporate image and unified 'experience' for a customer that combines product information, ordering and customer care.

Extranet

An extranet is used for business-to-business (B2B) e-Commerce. It is the networked connection of computers of two or more companies. It is a private communication system to support trade and is used for communication and transactions between business partners, suppliers or special customers. For example, a car manufacturing company may connect its computers with its various suppliers of components for the cars it makes. Another example is the airline industry's OneWorld network, which enables customers to transfer seamlessly between airlines to reach their destinations.

Design principles

Intranets and extranets share the same design principles formulated for the Internet. The Internet design principles are:

Interoperability. There are varying operating systems that control computer functions on the many different computers on the Internet. Normally a given operating system cannot

communicate with a different one. A standard to enable varying operating systems to communicate with each other was introduced by the US Department of Defence, which originally financed the Internet. Interoperability means that independent implementations of Internet protocols can work seamlessly.

Consequently, operating system developers such as Microsoft or Apple incorporate software into their operating systems that enables them to operate with other computers over the Internet. Internet-compatible systems use the TCP/IP common protocol for communication. Interoperability for e-Commerce means that companies and customers do not have to purchase and upgrade software from the same vendors. Their computers will be able to communicate over the Internet because of the standard protocols.

Layering. The Internet can be regarded as a series of layers of software. The structure of the Internet is layered. It is a five-layer system consisting of: interconnect level (National Access Points, NAPs), national backbone providers, regional Internet providers, local Internet service providers, and the business and consumer market.

The bottom layers of software, interconnect and network, are concerned with operating the computer hardware. The higher layers, business and consumer market, come closer to the needs of the person using the Internet. The most relevant layer is the layer that processes the information required by the Internet user; this is called the 'application' layer. These different hardware and application layers need to communicate with each other and they do so by using well defined interfaces. The Internet layering standard has resulted in increased reliability of Internet software and it is invisible to the Internet user.

*Simplicity.*The layering has resulted in simplicity of software design. Each layer is concerned only with its own functionality, making its design simpler. For example, the layer concerned with physical devices like mouse operations are hidden from the higher layers that process information. This kind of simplicity has contributed to increased software reliability too.

Uniform naming and addressing. Each Internet host computer has an Internet Protocol (IP) address that uniquely identifies it on the Internet from the millions of other computers also on the Internet.

The IP address is expressed in a uniform format or 'dotted quad'. An example is: '17.10.2.3'. As the dotted quad is not meaningful to humans the domain name system (DNS) is used to provide a symbolic name for the dotted quad. An example is: 'sol.brunel.ac.uk'. The DNS is capable of translating the symbolic name into the required IP address to enable Internet operations.

End-to-end protocols. The Internet does not process information. It enables the transfer of 'packets' of information between computers. This is called end-to-end protocol. The Internet enables the transfer of information or 'content' of the packet. The transmitting or receiving computers, known as the 'end' system, do the actual processing of information.

The combined use of the Internet, intranets and extranets by companies has resulted in the term 'virtual organization' or 'networked organization'. The virtual organization is to be contrasted with the physical organization; the latter is restricted by geographical, physical space. Companies can combine computer-networking technology with information technology (IT) and information systems (IS) to develop a network of computers that can capture, process and share information and knowledge in virtual or cyberspace, where time and space are defined differently from physical time and space. Amazon.com may be classed as a virtual organization. Virtual organizations tend to be flatter because access to information and knowledge is potentially open to all employees who have access to a PC.

The World Wide Web

The World Wide Web, also known as the 'Web' or 'WWW', consists of pages of information depicted as text, graphics, sound, or video clips. A Web page may contain Java applets - Java programs that are downloaded from the server and run on the local computer.

The Web consists of over a million Web servers, and an untold number of Web browsers. What distinguishes the Web from other computer media is its ability to link Web pages dynamically; this is known as hypertext links or simply links. The Web combines computer network technology with hypertext to provide a 'global information system'. One Web page can be linked to another by a hypertext link and the user merely has to click on the link to display related information. A link appears as highlighted on the Web page. It is this hypertext linking capability of the Web that makes it a powerful source of information. The Web is a client-server architecture system, and a Web user can access the Web servers with a Web browser such as Netscape or Microsoft Explorer.

Hypertext

A document on the Web is composed using hypertext technology. Hypertext is an electronic document system that can be read non-sequentially and interactively. The reader does not have to read it like a book, she/he can click on hyperlinks of related information. The Apollo space programme to record its documentation used a hypertext system. e-Commerce Web sites are built using hypertext documents, and other hypermedia.

Hypertext Transfer Protocol

The Web differs from the Internet by the protocol it uses to transfer information between computers. The Web uses the hypertext transfer protocol (HTTP) to connect and transfer hypertext documents stored on Web servers, also known as Web sites. All the computers on the Internet that use the HTTP protocol compose the Web.

The Web browser

A Web browser is a graphical interface for searching, accessing and viewing hypertext and multimedia files on the Web. The first browser, called Mosaic, was invented by the US company Netscape Communications, founded in 1994 by Marc Andreessen. He set himself the problem of transferring sound

and pictures over the Web. His solution was the first graphical Web browser. It allowed basic functions such as retrieving and displaying hypertext files. The growth of the Internet and the Web is largely because of the invention of the graphical browser which makes it easier for people to search and view information. Two popular browsers are Netscape Communicator and Internet Explorer. They are more sophisticated than the original Mosaic browser and enable e-mail messaging, HTML authoring, and extensions such as scripting, plug-in and multimedia.

Internet search engines

The Internet is unarguably the most voluminous information store in the world. Finding information on the Internet requires complex computer algorithms. These algorithms form the backbone of Internet search engines designed to help people find the information they want. Organizations need search engines to find information about customers or business competitors or partners. Search engines are computer programs that locate specific Web pages, files or multimedia items stored on the Internet. Search engines such as Google or Autonomy use different algorithms or techniques to search for Web pages.

Uniform resource locator

The uniform resource locator (URL) is the address of a particular Web site on the Internet. It consists of domain names and a pathway that locates a particular host computer that is connected to the Internet. An example URL is www.yahoo.com or www.dell.com. A URL consists of the protocol that is to be used to make the Internet connection (the WWW in the examples), the name of the host computer ('Yahoo' or 'Dell') and the domain (.com). In the case of commercial companies, the name of the host computer connected to the Internet is usually the registered name of the company.

Hypertext mark-up language

Hypertext mark-up language (HTML) is used to author information on a Web page. HTML documents are text files

that are interpreted by a Web browser. The browser reads the HTML file and interprets the HTML instructions. The browser has to do this interpretation each time a hypertext file is loaded.

A Web page can be divided into 'frames' or sub-pages. Each frame is used to display separate but relevant information designed by the Web author. Multimedia can be facilitated by extensions to HTML or by 'plug-ins' or add-on programs that make the Web client more versatile to deal with additional media types. An example of extension is Secure HTTP that enables sophisticated encryption and decryption algorithms for sensitive e-Commerce data like payments for transactions.

It takes time to learn to write HTML code. Authoring tools are available for automatically converting documents in Microsoft Word to HTML files, ready to load on to a Web server. Hot Dog Pro, Adobe PageMill and Microsoft FrontPage are examples. A Web site consists of one or more Web pages linked together by hyperlinks. The contents of a Web site are known as 'content'. HTML is not capable of processing or interacting with Internet users. To process data captured through a Web form JavaScript is required.

Multimedia

Multimedia is a tool capable of providing the transfer of sound and images like pictures over the Internet. Multimedia applications require lots of memory and bandwidth - the physical capacity of data cables to carry and transfer data. For example, one minute of music requires 5 MB of data. The transfer of sound and images in real time requires special software which is added to TCP/IP and HTTP protocols. On the client end, a player is required to interpret the data and render it into sound or images.

Multimedia Internet Mail Extensions or MIME is an Internet standard for multimedia Internet e-mail. MIME enables e-mail to be cast as types consisting of HTML, text, images or video. Example MIME types are: image/jpeg, video/ mpeg or application/pdf.

Java, applets, JavaScript and interactivity

The Internet is popular because it is interactive. Interactivity means that the Internet user (or client) can actively request information from and provide information to the server. Such interactivity is important for e-Commerce applications. CGI script and JavaScript provide interactivity on the Internet. Java is a programming language originally intended for programming consumer electronic devices like microwave ovens, dishwashers or electronic clocks. As there are many manufacturers of these products, Java's developer, Sun Microsystems, designed Java to be ubiquitous, meaning that it should be operable on any manufacturer's device. Virtual Java machines that are independent of PC operating systems interpret Java, a feature that makes it ideal for Internet programming. Java programs created for the Internet are called applets. Java applets are embedded in HTML documents.

An applet is a Java programme that is executed on the client machine. It is loaded by the Web browser and restricted to prevent security breaches. The applet is executed on a Java virtual machine in the browser.

JavaScript, originally called LiveScript, was developed independently of Java by Netscape to provide interactivity. It is used to process data captured via forms on the Internet and to create interactive Web sites, and both the server and the client side use it. JavaScript is embedded in HTML and is interpreted by a browser. Web pages that contain JavaScript can be transferred around the Internet, because JavaScript is platform-independent or interpreted. ActiveX is a competitor of JavaScript. Scripts can be used in e-Commerce to validate service or product order form entries.

Common Gateway Interface

CGI programs are text files that consist of line or programming code similar to JavaScript; such programs are called CGI script. Pear is an example of CGI programming. CGI is used to create interactive Web sites that pass information from a Web browser to a server using a form, very useful for

organizational needs. A form is a document that is created to interact with a user, take data from the user and send it to the server for processing, usually via a database.

E-COMMERCE TECHNOLOGY

E-Commerce uses the Internet and the World Wide Web technologies. The evolution of the Internet and World Wide Web to their present state and provide details of the current state of those technologies that enable e-Commerce. These include digital networks and their protocols, which form the basic system technologies required to develop an e-Commerce system, and the client-server architecture and World Wide Web in particular.

As the basis of commerce is transactions between buyers and sellers, e-Commerce requires interactive digital technology that can facilitate transactions over the Internet. Consequently, also introduces interactive technologies such as JavaScript and methods of exchanging data between systems. It also looks at how the Internet, World Wide Web and interactive technologies need to be configured to enable electronic commerce that is secure. Finally, current developments in Internet and World Wide Web technology are considered in terms of their future impact on e-Commerce.

INFORMATION TECHNOLOGY IN E-COMMERCE

Management of personnel is also central to the implementation of e-commerce strategy. Even in the aftermath of the fallout of the dot.com bust in the stock market, e-commerce is still inexorably linked to the notions of large performance bonuses, stock options, Silicon Valley whiz kids, and new-wave office environments. It is still necessary to find ways to develop and retain employees who are creative, flexible, and innovative—in addition to competent and diligent. In this light, a company must endeavor to put systems in place that retain key personnel and make strategic new hires throughout the course of an e-commerce venture.

Designing appropriate compensation systems is instrumental both in attaining initial e-commerce success and in retaining the leaders and employees who made that success possible.

Above all, compensation systems must be properly aligned with strategy and structure. Symbolically, the CIO's compensation is one of the more important decisions a company dedicated to implementing e-commerce will encounter.

CIO compensation should be in line with that of other members of senior management to signal respect for the IT function as a creator of value. Failure to fully and explicitly acknowledge the value of IT and e-commerce contradicts the other messages that must be communicated for e-commerce to succeed.

At lower levels of the company, compensation systems have more practical consequences for alignment. Some companies believe that compensating e-commerce managers the same as managers in traditional commerce fails to create proper incentives for e-commerce and value creation.

Differential compensation sometimes creates an incentive to cannibalize from the company's traditional channels as well as more effectively and more quickly to execute an e-commerce strategy.

But, e-commerce compensation should be tied to the overall success of the venture company-wide, rather than rewarding performance within an individual unit. This is particularly true when the company is seeking full integration, because it helps ensure cooperation between departments.

Companies must be prepared to manage the channel conflict that often arises when e-commerce begins to cannibalize the traditional business.

Cannibalization is necessary to optimize the use of each channel, and an integration strategy cannot succeed if traditional business units do not accept it. Companies must design compensation systems that gradually shift compensation toward the creation of value, particularly in businesses heavily

dependent on salespersons who work on a commission basis. Traditional business units must be placated not by compensating inefficiencies, but by carving out new roles that optimize the use of each channel and produce a successfully integrated and profitable multi-channel coordinated effort.

At aviation parts distributor Aviall Inc., a few weeks after an upper-management shakeup brought in a new CEO in 1996, a new Web-based order-entry system was introduced. In response, Aviall's 300 sales reps feared their jobs were at stake and told customers not to use it.

Despite the benefits to the consumer that were realized through the Web-based system, the role of the sales reps had not been modified to permit them to survive such a drastic change in company strategy.

As companies develop and implement e-commerce strategies, the Internet must be examined and the pre-existing channels must be modified in a way that complements the e-commerce initiative.

While compensation systems must often be reevaluated and reconstructed in e-commerce implementations, hiring practices can be improved simply by using the same Web site that showcases other e-commerce activities. Hiring online can significantly reduce advertising costs associated with print and other listings.

It can also ensure that potential applicants possess at least some skills in using the Internet and implies a confidence and understanding of the importance of e-commerce. Cisco is one company that greatly improved its hiring process by advertising openings online. Further, special attention should be paid to HR policies covering to those who work in e-commerce and IT.

Companies should recognize the fluidity of the IT labour market and must often create more flexible labour policies than for other employees. To ensure that proper human resources practices are employed in an e-commerce implementation;

- Compensation systems for traditional and e-commerce personnel should be properly aligned with the company's new e-commerce strategy.
- Companies must be prepared for channel conflict due to cannibalization of traditional company segments into an e-commerce venture.
- Hiring practices must fully take advantage of the exposure opportunity and cost savings made available by Internet hiring.

10

Role of E-Commerce in 21st Century

E-COMMERCE IN 21ST CENTURY

In the past few years, enterprises across the globe have experienced significant changes in their business information system. Huge investments were made in enterprise resource planning system implementations but still they struggle to get timely information that is needed to make effective business decision and to ensure continuous growth of enterprises. Placing "e" in front of any process or function seemed to be the magic prescription for never ending story of success and rapid returns for enterprises. E-business, e-procurement, e-sales, e-payment, e-banking, e-CRM, e-CAD, e-delivery are just a few. Internet, for example is becoming one of the most popular medium in transmitting various data. Users can find any kind of information within a shorter time compared with conventional method that consumes more time.

The emergence of the Internet through out the world has been contributing such a variety medium in doing business as well as people lifestyle. In fact, Internet is the essential prerequisite for the existence of E-commerce. Electronic commerce or e-commerce has been defined as the ability to perform transactions involving the exchange of goods or services between two or more parties using electronic tools and techniques (Yonah, 1997). The explosion of E-commerce has

created new phenomena in our lifestyle especially in shopping activities. Consumers can easily buy products or services like magazines and airlines tickets via Internet.

Definition of Electronic Commerce

Besides the earlier definition by Yonah (1997) in the paper, National Office for the Information Economy defines e-commerce as type of business transaction or interaction in which the participants prepare or conduct business electronically. This covers a wide range of activities, ranging from use of electronic mail (e-mail), through to Internet based sales and transactions and web based marketing. Dr. Roger Clarke, Principal Xamas Consultancy Pt Ltd., Canberra said that electronic business (e-business) is defined as the conduct of business with the assistance of electronic devices and telecommunications tools, whereas electronic commerce (e-commerce) is defined as the conduct of commerce in goods and services via electronic devices and telecommunications tools.

Different people use different terminology such as 'electronic trading' 'electronic procurement' 'electronic purchasing' or 'electronic marketing'.

From the above definition, we can conclude that electronic commerce is often used in a much broader sense, to mean essentially the same as 'electronic business'. In other words e-commerce includes purchases of goods, services and other financial transactions in which the interactive process is mediated by information or digital technology at both locationally separate, ends of the interchange. Here 'transactions' include both specification of goods and service required and commitment to buy. E-commerce transaction model can be in terms of business to business (B2B), business to customer (B2C) or customer to customer (C2C).

Objective of the Study

The main obstacle now faced by the policy makers and others is lack of comprehensive indicators about the electronic commerce and clear guidelines and consensus on the definition

of e-commerce. Thus, several considerable efforts at the international level like Asia-Pacific Economic Cooperation (APEC) and European Union (EU) members to work towards globally accepted guidelines and methodologies for measuring the electronic commerce. They have realized the potential social and economic benefits that could derive from e-commerce as well as the importance of having readily available data, which would highlight the role of e-commerce in their economies.

With the preceding arguments, the paper conceptualizes the role of e-commerce and it sub activities in creating business success. The paper highlights e-commerce milestones in selected countries. The paper further highlights some suggestions and future strategies of e-commerce in specialized industries in years to come. As an explanatory, conceptual, theoretical and descriptive analysis, the paper is expected to benefit large group of users and instigate further study in the area of electronic commerce.

TRANSFER PRICING IN E-COMMERCE

The dramatic and significant changes in the mode of global business and trade have brought focus to the issues relating to transfer pricing. The international markets have become truly global for most goods, services and especially for financial instruments of all kinds.

This unusual growth in market inter-penetration is making it increasingly difficult for any country to avoid substantial external impacts on its economy. The prices at which goods, services and intangibles are transferred within the global organizations are a very substantial part of the international trade. The *transfer price* relates to this cross-border movement of goods, services, intangibles etc. within the organization and has become an important factor not only to the organization but also for the various governments concerned. From a financial perspective, transfer pricing is probably the most important tax issue in the world. Over sixty percent (60%) of international trade are carried out within the multinational enterprises.

Transfer Pricing

If two or more profit centers are jointly responsible for product development, manufacturing and marketing, each shares in the revenue that the enterprise earns. This provides an opportunity to the multinational enterprise to shift profits from a high taxing country to a country with a low corporate tax or with tax incentives. The transfer pricing is, thus, the mechanism for distributing this revenue. Almost all countries place some constraints to ensure that financial transaction between the units of a controlled taxpayer (a company that can control transactions between domestic and foreign profit centers) are conducted as if the units were independent entities dealing with one another at arm's length.

International transfer pricing signifies adoption of transfer prices in cross border movement of goods, services and intangibles. There are several methods for determining the transfer price. Transfer pricing uses the behaviour of an independent firm as a benchmark for the pricing behaviour that might be expected of a multinational if it were transacting under similar open market conditions. The traditional transactional methods, when applied in practice, make adjustments to the price used by the independent firm to reflect differences in the product and the functions performed, assets employed and the risks assumed by the multinational.

E-commerce has changed the way business was done for it defied all physical boundaries that form the basis for valuation of a transfer price. This is particularly the case with the transfer, license, sale or otherwise transfer of any rights associated with the intangible property over the *World Wide Web* or the *Internet.* The very nature of the transaction makes it difficult to value the underlying work, for there are no comparable 'goods' available and therefore it is prone to abuse by the related parties to the transaction. The anonymity of the transacting parties, possibility of potentially untraceable transactions and the high mobility of cyber-business make it difficult to adopt and adapt the traditional methods of arriving at an arm's

length price. If a subject matter is developed through collaboration of part makers and assemblers belonging to the same entity, it is difficult to detect, calculate, and allocate each collaborator's contribution. Besides business to business e-commerce allows more parties involved in the production process to take part in product design and standardization.

The OECD and the UN Model Conventions permit aggregation of controlled transactions where the transactions are so closely linked or continuous that they cannot be evaluated adequately on a separate basis. These Model Conventions address the transfer pricing issue between the associated enterprises under Articles 9 and 12.

For the reasons above mentioned, the transfer pricing mechanism has to be developed to be in line with the technological development. It may be mentioned that to date no satisfactory solution or arrangement has been arrived to tackle the problem faced by revenue authority consequent to the e-commerce. The OECD countries have been holding successive discussions to arrive at a workable arrangement.

Exploring Possible Solutions to Transfer Pricing

The most vociferous advocate of open markets, Adam Smith, was of the opinion that an open market should have the least regulations, the government being a mere constable. Unfortunately the history had stated otherwise. The most open markets are also the one's that are also most regulated, the latter being the price for the former. The same applies in all its reason to e-commerce.

Business systems often rely on software products developed by integrated third-party tax calculation vendors to determine local, state, transit, or other taxes that they are required to collect. A niche software industry has developed to provide automated tax calculations and track tax responsibilities of merchants in the United States. These packages are primarily indexed by the Zip Code (postal code) of the shipping address specified by the buyer on the website while the commercial

transaction is carried out. The software can handle situations in which multiple tax authorities impose different tax burdens across a single Zip Code. The software typically is kept current with monthly updates. These systems generally also provide value-added functionality. For example, jurisdictional logic and product or commodity data may be stored along with up-to-date tax rates. This would allow the appropriate tax computation in a particular jurisdiction in which, for example, a clothing purchase transaction below $175 is not taxable but a clothing transaction above that amount is taxable. Where a computed rate needs to be overridden on a transaction basis (*e.g.,* because the purchase is being made by an exempt government agency), a reversing transaction is generated. This reversing transaction is given a date and time stamp and a reason code indicating who made the reversing transaction and when and why it was initiated.

Tax software also can capture data from the seller's accounting system, make calculations, and produce audit trails for the generation of reports and returns. For example, the software can produce ready-to-submit sales tax returns for state and local tax jurisdictions. The system can generate a paper tax return or EDI file for electronic filing programs.

A number of vendors of automated tax compliance products are expanding into the international Internet E-commerce market venue and providing software products with tax calculation, audit, and reporting capabilities. For example, Taxware International has provided software for sales/use, payroll, and property tax calculations for sales of goods in the U.S. tax software market for over two decades. For E-commerce, Taxware has built a comprehensive international tax capability that can integrate with either storefront or back office systems, can be imbedded or interfaced with commerce servers or other seller systems. The following is a simplified illustration of how a third-party tax calculation software such as Taxware would interface with an Internet E-Commerce server. In this example, Taxware's WORLDTAX component functions as a Value Added Tax (VAT) software system to assist merchants in the collection

and reporting of VAT in the European Union. Vendors providing E-commerce software and systems have designed a set of financial services to assist merchants or sellers with the E-commerce process. For example, IBM's Net Trade Finance Services (NTF) calculates VAT based on transaction information input by the merchant. It then directs completed transactions to financial ledgers and creates VAT reports for merchants to use when settling VAT with their local authorities. NTF has been fully operational for many years. Its scope has been expanded for use with Internet E-commerce so that it now also calculates VAT for both physical and electronic deliveries, based on the merchant's classification of the transaction.

Vendors of Internet E-commerce systems also rely on other vendors for plug-in, third-party modules for the provision of tax calculation, as well as for functions such as credit card transaction processing, order processing, inventory, pricing, shipping and international transport documentation, and other modules for integration with EDI systems. For example, IBM's Net.Commerce, Lotus's Domino.Merchant, Microsoft's Site Server Commerce Edition, and Open Market's Open Market Transact system, among others, provide simple interfaces for linking their electronic commerce activities with these third-party vendor applications. Products to calculate customs duty and perform other shipping logistics that will enable international trade are being developed by numerous other vendors. Companies selling on the Internet will be able to purchase third-party application software or even to outsource international logistics and export/import trade compliance.

The proper operation of compliance software systems necessarily depends upon reliable data being available to the merchant. In addition, uncertainty regarding the classification of the transaction for tax purposes may limit the capabilities of such systems in some instances. Another measure that can be provided is to register the server in and with a tax jurisdiction. The website that are offering the commercial transactional services should be given a particular 'code' that would help server differentiate between a commercial website and others.

The server, thus, would record all the commercial transactions carried on the website that carry on commercial activity. The holder of the website has to register with the server. The identity of the licensee or the buyer, who pays with a credit card, can also be ascertained as the card issuer will have the same. This identification of all the parties to a transaction and recording of the same will help greatly reduce the transfer pricing. However, this would not solve the problem relating to collaboration in the development of a product by two companies in different tax jurisdictions. This can be solved by a presumption in the tax statutes that once connection with a tax jurisdiction is established (e.g. presence of server or an office to oversee the website) the holder would be subject to tax on his total world income unless it can be proved that a part of the income was not derived from that jurisdiction. Thus, an entity attempting to siphon profits would then be liable to tax in every jurisdiction. The company to establish that a part of the income accrued elsewhere can avoid this.

WEB BASED TOOLS FOR ELECTRONIC COMMERCE

The basic requirement for a merchant to have a Web presence or have an electronic commerce site, is (i) a connection to the Internet, and (ii) a Web server in the company network. The two main ingredients in a Web server are its hardware and software. In this chapter, we will discuss these requirements of a Web server.

Web Server Hardware

A merchant should think carefully when making a decision on the Web server computer. The decision depends on factors such as:

- Operating system of the network. Unix operating system is found to be more rugged than that of Windows, but Unix is more complex to manage than Windows.
- Hardware requirement of the Web server software. A PC with a midrange CPU, small hard drive, and 32

megabytes of memory will perform poorly when compared with a high-end workstation or a powerful UNIX-based computer.

- Expected traffic or the number of transaction per unit time. Running a large, enterprise-class application server (such as an ERP system) on a personal computer is not feasible.
- Other software running on the same computer. For example, running a Web server and a database server can significantly slow down the performance of a computer.
- Scalability of the hardware — meaning upgrade of components such memory, disk space, disk mirroring, or even connect additional Web servers if necessary.

Setting Up a Web Server

Setting up a Web server doesn't require a lot of money. One can build a small Web server with an inexpensive PC (costing about $1,500) running on Windows 98 or NT. But it is a good idea to start with a server-type computer offered by several leading PC manufacturers.

Benchmarking Web Server Hardware and Software

Benchmarking Web server hardware and software combination can help make informed decisions for a merchant. *Benchmarking* is testing used to compare performance of hardware and software. The results of benchmark tests demonstrate that there are measurable differences in server performance that a web site manager must consider before purchasing or leasing a web server.

A benchmark test considers several factors such as:

- The computer hardware
- Network connection: A Web server on a T3 connection can deliver Web pages to clients much faster than it could on a T1 connection.
- Throughput: It is the number of HTTP requests that a

particular hardware and software combination can process in a unit of time.

- Response Time: It is the amount of time that a server requires to process one request.
- Type of Web page: A server that delivers mostly static Web pages will perform better than the same server that delivers dynamic Web pages. A dynamic page is a Web page whose content is shaped by a program in response to user request (such as a database query), versus a static page, which is just a plain HTML page.

There are companies who offer performance comparison on leading server-type computers and Web servers. There are also several benchmarking programs available in the market that can be used by a merchant to test an e-commerce site.

WebStone is a popular benchmarking software that measures performance on various types of Web pages such as:

- HTML: This is the standard static Web page containing only HTML tags.
- CGI: Common Gateway Interface or CGI protocol causes the Web server to run another program and return the result to the Web server.
- API: Application Programming Interface or API is a set of protocols that uses "multithreading" to handle user requests of the dynamic Web pages. API is more efficient than CGI, as CGI requires an individual program to be brought to the Web server memory when requested by multiple users.

Both CGI and API are protocols that are supported by a Web server software.

Besides testing Web server's performance, it is important to test server software features for efficiency and usability.

Web Server Software Feature Sets

All Web server software provide some basic features which can be classified as:

- Core capabilities
- Site management
- Application Construction, and
- Electronic commerce

Core Capabilities

The most fundamental duty of a Web server is to process and respond to Web client requests that are sent using HTTP protocol. For a static page, the server locates the page and returns it as a formatted HTML document to the client computer. For a dynamic page, the server invokes other programs or database, formats the HTML page, and returns it to the client.

IP-Sharing or Virtual Server: A Web server can work as many virtual Web servers. This means that many businesses can share a Web server's IP address. A virtual server or virtual host is a feature that maintains more than one server on one machine. Thus different groups can have their own domain name, but all domain names refer to the same physical Web server.

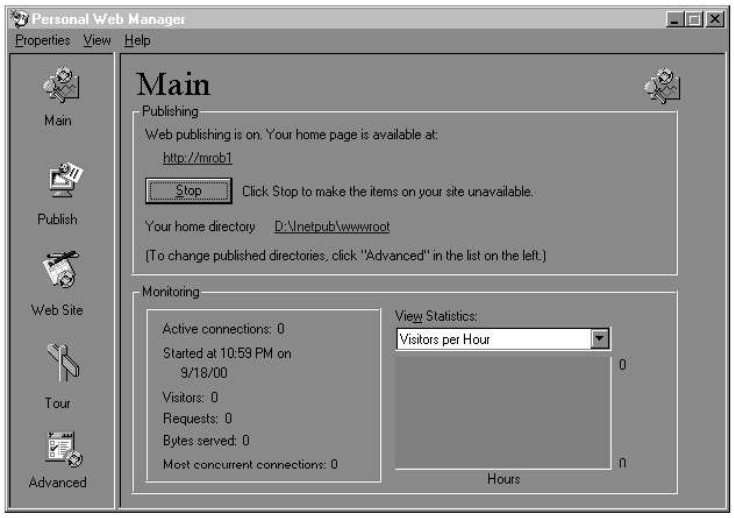
Logical File: A Web server can have a logical file name corresponding to a physical file. The physical file may be in the same computer or in another computer, and also the logical name and the physical name do not have to be same. The Web server translates a logical URL into a physical file address.

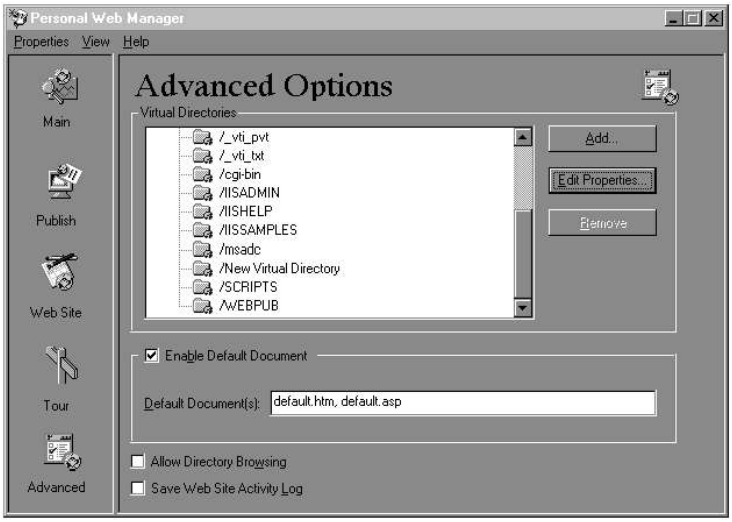
Security: Web servers are located publicly on the Internet or privately on organizational intranet, usually behind firewalls. The public documents are to be viewed by any user, and the folders containing public documents are configured to be viewed by *anonymous* users.

Security and authentication services are set for extranet users, in which case the users are accessing Web files from the public Internet. The files and folders are configured for validation of username and password. Access controls provide or deny access to files based on the username or by URL.

Web servers allow processing digital certificates and private/public key pairs. Web servers also support *Secure Socket Layer (SSL),* which is a protocol developed by Netscape for transmitting

private information securely over the public Internet. Electronic commerce sites use SSL to accept confidential information such as credit card numbers from Web consumers.





FTP: Web servers provide File Transfer Protocol (FTP) services. Thus users can transfer files to and from the server. This is useful when users develop and test Web pages in their

personal computer (even dynamic Web pages using a personal Web server) before moving to the company Web server.

Security is also an issue using FTP services. A user may have to be authenticated with a username and password unless anonymous access is provided for files and folders.

Searching: Search engines and indexing programs are standard components of the Web server. Search engines or search tools search either the existing site or the entire Web for requested documents. An indexing program provides full-text indexing whereby indexes are generated for documents stored on the server.

Site Analysis: Web servers can capture visitor information, including who is visiting the Web site (the visitor's URL), how long the visitor browsed the site, the date and time of each visit, and the pages visited. These data are stored in a *log file*. Log files can yield information that can be used for Internet marketing.

Site Management

A Web server provides tools to manage the services mentioned above, such as management of multiple Web sites, file security, virtual file, and log file analysis. Administration of a Web server can be performed from a remote computer in the network.

Administrators can grant or deny Web access to individual computers, groups of computers, or entire domains. Administrators can stop and restart all Web services without stopping and restarting the computer.

Site management also include authoring tools such as Microsoft Front page 2000, as well as script checking, HTML validation, and identification of orphan pages, broken links, error-prone pages etc.

PAYMENTS THROUGH M-COMMERCE

Using a mobile network device to make a payment is often referred to as a *micro-payment*. Depending upon the mobile

device and available networks in the geographic region, a consumer has the option of making a micropayment in one or all of these modes:

- *Short Message Service (SMS) charges* The consumer keys in the SMS number that is assigned to the merchandise to be purchased and a charge appears on the billing consumer's account where SMS charges are normally listed. For example, some Coca-Cola beverage vending machines accept traditional coin payments and also display the SMS number for the particular machine. The beverage buyers call the SMS number from their own mobile device and, once the vending machine receives the SMS signal, the consumer may select the beverage to be dispensed. The charge for the beverage appears on the consumer's next SMS bill.
- *Direct charge billing to the account linked to the consumer's mobile device* Mobile network devices today are fitted with facilities to transmit data to another computerized device in close proximity without making a telephone call. These data transmission facilities range from inferred (IR) beams, Bluetooth and Wi-Fi transmissions. The owner of the mobile device transacts the purchase sequence as they would do traditionally, that is, select the merchandise to be purchased and take it to the sales counter/ checkout for payment. The only difference is that, instead of payment by cash, EFTPoS (Electronic Funds Transfer Point of Sale) or credit card, the mobile device owner transmits the account details using one of the data transmission facilities noted above.

Similar to the already described Coca-Cola SMS purchases, India's BPL mobile customer may send a message to 2233, which will be displayed on the LCD panel of the vending machine.

The vending machine confirms the customer's mobile number, then asks for the choice of chocolate and, once selected, dispenses the chocolate. Finally, the customer receives an SMS confirming the transaction. The vending transaction cost is

debited from a pre-paid card or added to the monthly bill of a post-paid customer.

- *Using a clearing house service* Intermediaries allow for payment authorities on behalf of the customer to pay for merchandise. One group, the Mobile Payment Services Association, is a coalition between Spain's Telefonica Moviles SA, Germany's T-Mobile AG and Britain's Orange SA and Vodafone Group PLC. The system of making payments through a mobile communications device is often referred to as a micropayment.

Micropayments

M-shopping-enabled technology permits the shopper to make payments in a variety of situations that may be grouped as:

- *Unmanned point of sale equipment*, i.e. food and beverage vending machines, parking meters, public transport ticketing systems (Editor, 2003b).
- *Manned shopping counters*, i.e. fast food and beverage providers.
- *Full-time cellular phone merchant connections*, i.e. SMS and WAP sites that automatically take payments by way of a cellular phone account rather than needing to enter credit card details.

The benefits of micropayment to retailers include:

- Billing the accounts linked to the mobile devices, e.g. the cellular phone does not carry the charges associated with the transfer of credit card funds.
- Reduced need to provide customers with change for vending machines.
- Bill fraud is reduced. When a mobile device is stolen, the communications carrier usually disables network access for that device and so it cannot be used to make further micropayments.
- Extends the frequency of impulse purchases for items of small value.

The benefits of micropayment to the mobile consumer include:

- Reduced dependence upon carrying cash and credit cards.
- Record of purchase appears on the account attached to the micropayment, e.g. cellular phone account.

PROFILING THE M-SHOPPER

The mobile shopping environment is still in its emergent stage of retailer development and shopper adoption. For retailers to tailor their market offering to the needs of the mobile shoppers, we should profile the current and intended adopters of m-shopping. As a contributor to this profiling we have incorporated the wireless shopping research of Fenech (2002, 2003).

Buying behaviour Such individuals are frugal, enjoy shopping and take up new shopping facilities when they become available. In summary they are:

- Buying impulsive;
- Highly desirous of shopping convenience;
- Innovative in shopping;
- Positive in their attitude towards non-store marketing;
- Positive in their attitude towards shopping;
- Price conscious;
- Seekers of variety.

Use of mobile communication technology This individual already uses the functionality of their mobile technology; this is demonstrated by:

- Frequently Sending SMSs.

Shopping and communication environment This shopper is confident in the parties that contribute to the shopping process and desires the convenience of m-shopping. In summary they:

- Desire the convenience of mobile phone shopping;

- Enjoy mobile phone shopping;
- Have a low concern of financial risk from visited Web retailer;
- Have a low concern of privacy risk from ISP;
- Are satisfied with mobile phone carrier.

As surprising as the concept of Web-based e-retailing was in 1996, the concept of mobile shopping far from a phone jack or retailer must also be surprising in the beginning of this new millennium. Fortunately, we have already seen the benefits of e-retailing and this should significantly shorten the adoption rate of m-shopping.

E-COMMERCE PAYMENTS

Where transactions involve the supply of digitised goods over the internet there are issues concerning the characterisation of the income generated– i.e. are these business profits or royalties? The provision of digitised goods such as software or music which can be downloaded would, under traditional rules, generally be the provision of a right to use a product, and in most jurisdictions would give rise to royalties. However, if the same goods were provided in non-digitised form (i.e. sold in a physical form such as a CD-ROM), there would be a supply of goods giving rise to profits.

Withholding tax on royalties

Royalties are subject in the UK (as in many other jurisdictions) to a different tax regime from that applicable to other business profits (arising either from the supply of goods or of services).

Royalty payments may be subject to withholding tax. Where withholding tax applies, the payer is obliged to deduct or withhold an amount equivalent to the tax liability of the payee in respect of the payment. The payee receives the payment net of tax and will be given a tax credit in respect of the amount withheld or deducted. The payer must account for the tax to HM Revenue & Customs.

Relief from withholding tax

In practice, full or partial relief from withholding tax is given by double tax treaties provided relevant claims are made. The obligation (if any) to operate UK withholding tax will apply to the payer of the royalties - that is the customer. Non UK-traders will wish to establish whether withholding tax will be imposed on royalty payments from UK customers. UK traders who are e-trading into other jurisdictions will need to check whether there are any relevant withholding taxes on payment flows from customers' jurisdictions.

Characterisation

This issue of characterisation is important particularly in relation to cross-border transactions as royalties are treated differently from business profits in double tax treaties which follow the Model Convention.

The commentary to Article 12 of the Model Convention gives some guidance on the treatment of digitised products. The decisive question is what is the payment for? Revenues from selling of digitised products on-line will be characterised as business profits, rather than as royalties, even though the purchaser acquires a limited licence in the copyright to download the product.

ELECTRONIC FUND TRANSFER

According to the Electronic Fund Transfer Act an Electronic funds transfer (EFT) is: *a funds transfer initiated through an electronic terminal, telephone, computer (including on-line banking) or magnetic tape for the purpose of ordering, instructing, or authorizing a financial institution to debit or credit a consumer's account.*

EFT are electronic transfer of money from one bank account to another, either within a single financial institution or across multiple institutions, via computer-based systems, without the direct intervention of bank staff.

EFT transactions are known by a number of names across countries and different payment systems. For example, in the

United States, they may be referred to as "electronic checks" or "e-checks". In the United Kingdom, the term "bank transfer" and "bank payment" are used, while in several other European countries "giro transfer" is the common term.

Types

EFTs include, but are not limited to:

- point-of-sale (POS) transfers;
- automated teller machine (ATM) transfers;
- direct deposit payment or withdrawals of funds initiated by the payer;
- direct debit payments for which a business debits the consumer's bank accounts for payment for goods or services;
- transfers initiated by telephone;
- transfers resulting from credit or debit card transactions, whether or not initiated through an electronic terminal.
- wire transfer via an international banking network such as SWIFT;
- electronic bill payment in online banking, which may be delivered by EFT or paper check;
- transactions involving stored value of electronic money, possibly in a private currency;
- instant payment.

INFRASTRUCTURE ISSUES IN EPS

Online merchants and consumers alike expect online buying and selling to be easy, efficient, and safe. Ecommerce transactions trigger complex automated processes that involve downstream players: banks and payment processors to name just two. In addition, technological advances in smartphones and e-wallets, shifting purchase patterns, and demand for cross-border, multi-currency electronic payments have fueled PSP competition to maintain and increase market share. New technologies have already simplified and smoothed business-

to-business and business-to-customer experiences with mobile payments, e-wallets, and contactless cards. As the online payment processing market grows, user demands for additional payment features and options lead growth in multiple directions.

Providers are under pressure to provide peer-to-peer payments beyond traditional banking models, and to facilitate a cashless society that can enable any purchase, even mechanical transactions such as parking meters or vending machines. These demands create technical challenges for merchants, processors, and users up and down the transaction path.

Fraud and chargebacks

Online transactions are "card-not-present" transactions. As e-commerce expands, opportunities for fraudulent misuse of payment networks and data theft grow right alongside. In addition to more obvious fraud-monitoring tools such as the customer account, validation services, and purchase tracking, a certified Level 1 PCI DSS payment processor's risk management staff can sniff out fraud before it occurs.

Chargebacks, in addition to being costly, can damage business reputations; an excessive number of chargebacks can lead to closed merchant accounts, effectively killing the business. While chargebacks do sometimes happen for legitimate reasons, use of customer service practices based on know-your-customer principles, and merchant accessibility, can substantially reduce or eliminate chargebacks.

New technologies such as EMV and fingerprint recognition are also being used by PSPs to reduce fraud and chargebacks. Advanced EMV technology is used to validate that a payment card is genuine and facilitate the authorization of the transaction. When a payment is made in-store, the card is inserted into a compatible card reader, the EMV chip is read, and data is exchanged in a highly secure manner, using encryption.

Of course, when making an online payment, the buyer manually enters card information, so the chip appears to have

no benefit. However, EMV still provides an indirect security benefit for online payments. In the event that card information is stolen online, it's much harder for fraudsters to clone and use a card with an embedded EMV chip.

Consumers are becoming increasingly familiar with biometric identification, such as fingerprint recognition, which is often used to unlock phones. It is now being introduced to increase mobile payment security and prevent fraud.

During the mobile payment process, the buyer simply scans their fingerprint using a compatible mobile device, to prove their identity. This is a powerful tool for fraud prevention, as it ensures the person performing the transaction is truly authorized to do so.

While a password or PIN code can be stolen or guessed, fingerprint data requires the buyer's physical presence.. This technology is already being implemented by Google Play, allowing users of Android smartphones with built-in fingerprint scanners to authenticate Google Play purchases using their fingerprints.

Cross-border transactions

Cross-border payments can be slow, inefficient, and expensive, but they play an important role in global trade. Typically, national banking infrastructures can't handle cross-border payments, resulting in independent and non-uniform development in technologies and software platforms that complicate or stall cross-border transactions. New developments are beginning to shape cross-border payment requirements:

- Emerging transnational systems will decrease reliance on correspondent networks
- Government-led initiatives and mandates will begin to regulate payments and fees
- Payment systems will manage credit risk, liquidity, and costs more effectively
- Multinationals will achieve economies of scale, with a side benefit of consolidating credit risk

- Outsourcing will increase processing efficiency and drive down costs

Card data security

Payment Card Industry Data Security Standards (PCI DSS) certification is required for every merchant or business accepting credit or debit cards, online or off. PCI DSS standards require merchants and processors to meet 12 criteria across six security arenas:

- Build and maintain a secure network and systems
- Protect cardholder data
- Maintain a vulnerability management program
- Implement strong access control measures
- Regularly monitor and test networks
- Maintain an information security policy.

Recent retail, government, and healthcare security breaches underscore what every merchant knows: customer and card data security is top priority. Preventing online payment security issues is a must for anyone doing business online. This can be done by either acquiring PCI DSS Level 1 certification, or using a PSP-hosted payment page.

Multi-currency and payment methods

Global ecommerce means accepting a variety of payment methods and currencies. Electronic payments such as e-wallets, mobile payments, and credit/debit cards help online merchants compete in international markets by allowing their customers to pay in their native currencies. For merchants, multi-currency, cross-border transactions can require new bank accounts, new business entities, and new regulatory hurdles in each national market. Selecting a payment service provider with the necessary infrastructure already in place can provide effective, and immediate, solutions to those problems. A merchant can easily collect payment in one currency and credit the merchant account in its home currency.

Technical integration

Online payment systems run the proprietary gamut across hardware and software platforms. Credit card-affiliated payment processors, while more secure, can be expensive for online retailers. Added to the expense is the lack of interface between processing systems—it may be difficult or impossible for a PSP to link with other systems, resulting in processing and payment delays, lost transactions, and expensive fees.

In true real-time processing, a combination of features, including integrated systems and gateways, addresses liquidity issues and minimizes delays, while preserving online transaction integrity. A payment processor that provides for immediate and individually processed transactions can open client accounts in more than one acquiring bank, thus avoiding the delays often inherent in automated clearinghouse processes.

11

E-Rupee

E-RUPI DIGITAL PAYMENT : WHAT IS IT AND HOW TO USE?

E-RUPI is a cashless medium that will be issued by the Government of India today. This contactless digital payment medium will be launched today by the Prime Minister of the country, Shri Narendra Modi. Now you can make payment through this e-Rupi Digital Payment at any place in the country. Through SMS string or a QR code, this app will be sent to mobile as a payment option across the country. We are going to provide you complete information in our article about how the e-Rupi Digital Payment App works. Digital e-Rupi Benefits and benefits.

e-Rupi Digital Payment

As a digital payment option in India, the Government of India will launch an electronic voucher-based digital payment system on 2nd August 2021. Today the Prime Minister of India, Shri Narendra Modi, will address the public while launching this "e-RUPI". Some of the higher institutions and government agencies of the country like the National Payments Corporation of India (NPCI), Department of Financial Services, Ministry of Health and Family Welfare, and National Health Authority, etc. have jointly developed this app.

This app, being launched in India as e-Rupi Digital Payment, is considered to be very good and reliable. Customers using this

app can securely transfer their money from one account to another in the form of payment. With this app being launched under the name "e-RUPI", you can make digital payments in any part of the country. The main objective of this app is to promote digital payment in the country.

How will e-RUPI work? e-RUPI has been developed as a cashless app. The help of an SMS string or QR code system will be taken to send this app to the mobile of the general public of the country. Beneficiaries can directly download this app on their mobile through SMS string or QR code. You can use this prepaid gift-voucher app without any credit or debit card, mobile app, or internet banking. Digi e-Rupi in India.

Sponsors of e-RUPI services will not need to physically interface with anyone to send this app to every mobile in the country. You can use it as a prepaid gift voucher. Beneficiaries and service providers will be linked through this e-RUPI service. Today this e-RUPI cashless system will be launched by the Prime Minister of India. Digital e-Rupi Kya Hai?

How will these e-Rupi vouchers be issued? This system has been prepared by NPCI on its UPI platform, in which many banks have also been linked. The banks to be incorporated have been made a major part of it as issuing institutions. Through this e-Rupi system, medicines and nutritional assistance will be provided under maternal and child welfare schemes, TB eradication programs so that the help given directly reaches the beneficiary.

In this system, the beneficiary will be identified by his mobile number. The e-Rupi vouchers issued by this system can be used only by the person to whom he would have been allotted e-Rupi vouchers. In a statement issued by the PMO, it was said that Sakar can also use this system in Ayushman Bharat, Pradhan Mantri Jan Arogya Yojana, fertilizer subsidies, etc.

What are the uses of e-RUPI? Many services will be provided by the government through e-RUPI in the country. It can also be used to ensure leak-proof delivery of wellness

services. To be used for leak-proof delivery of fertilizer subsidies, TB eradication programs, Ayushman Bharat, Pradhan Mantri Jan Arogya Yojana, Mother, and Child Welfare Schemes, etc.

The government has also talked about giving the benefit of this digital voucher for the private sector employee welfare and corporate social. This app is not released as a normal payment app. Soon you will be able to get many services through e-RUPI after it is released by the government today. E-RUPI will be spread across the country through SMS string or QR code.

What is the significance of e-RUPI? Developed as a voucher-based payment system, this e-Rupi Digital Payment System is being considered very effective. Being a voucher-based payment system, it is considered quite secure for payment. Due to the specificity of the underlying asset and its purpose, it cannot be considered a virtual currency.

The focus was on developing this central bank's digital currency for a long time by the government. Today this voucher-based payment system will be launched by the Government of India. It is expected that the voucher-based payment system will prove to be quite secure. You will soon be able to use the e-Rupi Digital Payment System. You can write us your questions related to your e-Rupi Digital Payment in the comment box.

E-RUPI: A VOUCHER SYSTEM AHEAD OF DIGITAL CURRENCY

e-RUPI is a cashless and contactless digital payments medium, which will be delivered to mobile phones of beneficiaries in form of an SMS-string or a QR code.

Taking the first step towards having a digital currency in the country, Prime Minister Narendra Modi launched an electronic voucher based digital payment system "e-RUPI" Monday. The platform, which has been developed by the National Payments Corporation of India (NPCI), Department of Financial Services, Ministry of Health and Family Welfare and the National Health Authority, will be a person-specific and purpose-specific payments system.

How will e-RUPI work? e-RUPI is a cashless and contactless digital payments medium, which will be delivered to mobile phones of beneficiaries in form of an SMS-string or a QR code. This will essentially be like a prepaid gift-voucher that will be redeemable at specific accepting centres without any credit or debit card, a mobile app or internet banking. e-RUPI will connect the sponsors of the services with the beneficiaries and service providers in a digital manner without any physical interface.

How will these vouchers be issued? The system has been built by NPCI on its UPI platform, and has onboarded banks that will be the issuing entities. Any corporate or government agency will have to approach the partner banks, which are both private and public-sector lenders, with the details of specific persons and the purpose for which payments have to be made. The beneficiaries will be identified using their mobile number and a voucher allocated by a bank to the service provider in the name of a given person would only be delivered to that person.

What are the use cases of e-RUPI? According to the government, e-RUPI is expected to ensure a leak-proof delivery of welfare services. It can also be used for delivering services under schemes meant for providing drugs and nutritional support under Mother and Child welfare schemes, TB eradication programmes, drugs & diagnostics under schemes like Ayushman Bharat Pradhan Mantri Jan Arogya Yojana, fertiliser subsidies etc. The government also said that even the private sector can leverage these digital vouchers as part of their employee welfare and corporate social responsibility programmes.

What is the significance of e-RUPI and how is it different than a digital currency? The government is already working on developing a central bank digital currency and the launch of e-RUPI could potentially highlight the gaps in digital payments infrastructure that will be necessary for the success of the future digital currency. In effect, e-RUPI is still backed by the existing Indian rupee as the underlying asset and

specificity of its purpose makes it different to a virtual currency and puts it closer to a voucher-based payment system.

The plans for a central bank digital currency (CBDC)

The Reserve Bank of India had recently said that it has been working towards a phased implementation strategy for central bank digital currency or CBDC — digital currencies issued by a central bank that generally take on a digital form of the nation's existing fiat currency such as the rupee. Speaking at a webinar on July 23, RBI deputy governor T Rabi Sankar said that CBDCs "are desirable not just for the benefits they create in payments systems, but also might be necessary to protect the general public in an environment of volatile private VCs. While in the past, RBI governor Shaktikanta Das had flagged concerns over cryptocurrencies, there seems to be a change of mood now in favour of CBDCs on Mint Street. Although CBDCs are conceptually similar to currency notes, the introduction of CBDC would involve changes to the enabling legal framework since the current provisions are primarily synced for currency in paper form.

India have appetite for a digital currency

According to the RBI, there are at least four reasons why digital currencies are expected to do well in India: One, there is increasing penetration of digital payments in the country that exists alongside sustained interest in cash usage, especially for small value transactions.

Two, India's high currency to GDP ratio, according to the RBI, "holds out another benefit of CBDCs". Three, the spread of private virtual currencies such as Bitcoin and Ethereum may be yet another reason why CBDCs become important from the point of view of the central bank. As Christine Lagarde, President of the ECB has mentioned in the BIS Annual Report "… central banks have a duty to safeguard people's trust in our money. Central banks must complement their domestic efforts with close cooperation to guide the exploration of central bank digital currencies to identify reliable principles and encourage

innovation." Four, CBDCs might also cushion the general public in an environment of volatile private VCs.

Global examples of a voucher-based welfare system

In the US, there is the system of education vouchers or school vouchers, which is a certificate of government funding for students selected for state-funded education to create a targeted delivery system. These are essentially subsidies given directly to parents of students for the specific purpose of educating their children. In addition to the US, the school voucher system has been used in several other countries such as Colombia, Chile, Sweden, Hong Kong, etc.

E-RUPI DIGITAL PAYMENT SOLUTION

In the modern era, the advancement of technology is developing by leaps and bounds. The Prime Minister mentioned DBT which aims to transfer payment directly to the people through their Bank Account. The PMO said that with the help of this scheme the country will save up to 1.78 lakh crore so far by plugging pilferages and weeding out fake beneficiaries. With the help of this scheme, people will get direct benefits from their bank accounts. The major benefits to ration money, gas subsidy, and other special security schemes, etc. E-RUPI aims at how people are progressing with the help of technology. A person will get a "revolutionary initiative" in the direction of ensuring a leak-proof delivery of welfare services. e-RUPEE will benefit a lot of customers, hospitals, and Banks.

The PMO said that e-RUPI is not just for government use but for organizations that want to help in any case. The amount given for a specific work will be used in a specific way. If we talk about e-RUPI services, it connects the sponsors of the services with the beneficiaries and service providers in a digital manner without any physical interface. It is safe and secure to keep the beneficiaries confidential. The transaction process is very faster, as the required amount is already stored in the voucher. Even corporates can benefit from e-RUPI. Voucher redemption can be tracked by the issuer. Quick, safe, and

contactless voucher distribution can be done with the help of e-RUPI. Get the E-RUPI mobile app APK file after it's available online.

USES OF E-RUPI DIGITAL PAYMENT PLATFORM

With the help of the e-RUPI platform, the payment of the service provider will be made only after the completion of a transaction. This payment platform will be prepaid in nature which does not require any kind of intermediary to make payment of the service provider. Other than that this platform can also be used for delivering services under schemes that are meant for providing drugs and nutritional support like mother and child welfare scheme, TB eradication program, drug and diagnostic under a scheme like Ayushmann Bharat Pradhan Mantri Jan Arogya Yojana, fertilizer subsidies, etc. The private sector can also leverage these digital vouchers for their employee welfare and corporate social responsibility programs. Leak-proof revolutionary delivery of welfare services will be ensured through this initiative.

Voucher Issuing Procedure

The e-RUPI digital payment system has been developed by the National Payment Corporation of India on its UPI platform. The national payment corporation of India has boarded banks that will be the issuing authority of the voucher. The corporate or government agency is required to approach the partner bank (private and public sector lenders) along with the details of the specific person and purpose for which the payment is required to be made. The identification of beneficiaries will be done by using their mobile number voucher allocated by the bank. This platform will be our revolutionary digital initiative which will improve the standard of living and make the procedure of payment simple.

About National Payment Corporation Of India

National Payment Corporation of India is an organization that is responsible for operating retail payments and settlement

systems in India. This organization has been started by the Reserve Bank of India and the Indian banks' association. This organization works under the provision of payment and settlement systems act 2017 in order to create robust payment and settlement infrastructure in India. National Payment Corporation of India is a non-profit organization that works under the provision of section 8 of the companies act 2013. NPCI is also responsible for maintaining the infrastructure for the banking system in India for physical and electronic payment and settlement systems through the use of technology.

This organization focuses on bringing innovation to the payment system by introducing of technology. The promoter banks of NPCI are State bank of India, Punjab national bank, Bank of Baroda, Canara Bank, Union Bank of India, Bank of India, ICICI bank, HDFC bank, Citibank, and HSBC.

LAUNCHING OF E-RUPI DIGITAL PAYMENT PLATFORM

The e-RUPI digital platform was launched on 2nd August 2021 through video conferencing. In this video conferencing Prime Minister Mr. Narendra Modi has launched e-RUPI. On the occasion of launching this payment platform, the chief executive chairman of the National health authority has also provided highlights of this platform along with the Prime Minister. The first time use of E-RUPI digital payment has been shown in a private vaccination center of Mumbai on the occasion of launching this platform.

Objective Of e-RUPI Digital Payment

The main objective of the e-RUPI digital payment platform is to provide a cashless and contactless payment system so that citizens can make digital payments without any kind of difficulty. With the help of this payment platform, users can make payments in a secure manner. This payment platform uses a QR code or SMS string-based e-voucher which will be delivered to the mobile of the beneficiary. e-RUPI digital payment platform ensures the timely payment of the services without the involvement of an intermediary. Users are not required to

carry any cards or digital payment app or have internet banking access in order to make payments which will make the payment process simple and secure.

Features Of e-RUPI Digital Payment

- The honourable Prime Minister of India Mr Narendra Modi is going to launch a digital payment platform called e-RUPI digital platform on 2 August 2021
- This platform will be cashless and contactless instrument
- Through this system users can make digital payments through QR code or SMS string based e-voucher
- This voucher will deliver to the mobile of the users
- Users can redeem this voucher without any payment app, internet banking or card
- The national payment Corporation of India has developed e Rupi Digital Payment service on its UPI platform.
- The collaborating partners are the Department of financial services, Ministry of health and family welfare and national health authority
- Through this initiative the sponsor of services will be connected with the beneficiaries and service providers. This connection will be held in a digital manner without any kind of physical interface
- Through this platform the payment to the service provider will be made after the completion of transaction
- This payment platform is prepaid in nature
- e-RUPI does not require any kind of service provider to make payment
- This platform can also be used for providing services under schemes which are meant for providing drugs and nutritional support.

Benefits Of e-RUPI

Benefits for Consumers: Payment processes is contactlessOnly have to follow a two-step redemption process

need to have any kind of digital payment app or bank account consumer is not required to share his or her personal details In order to maintain privacy

Benefits for Hospitals: The voucher is prepaid hence the payment process is completely secure voucher can be redeemed in few steps hospitals are not required to handle cash hence hasslefree and contactless payments can be ensured voucher is authorized through a verification code which makes the payment process easy and secure

Benefits for Corporates: The well-being of employees can be enabled by the corporate voucher distribution quick, safe, and contactless issuer can track the voucher redemption leads to cost reduction because the transactions are digital and don't require any physical issuance

Other Services Provided By NPCI

National Payment Corporation of India is responsible for operating retail payment and settlement systems in India. The national payment corporation is offering the following type of services to the citizen of India:-

Unified payment interface (UPI)

Through this feature, the multiple bank accounts of a person can merge into a single mobile application.

Rupee and Payment (RuPay)

It is a domestic card payment network of India that accept at ATMs, POS devices, and e-commerce websites throughout the country. It is a secure network that protects the users against anti-phishing

Bharat Interface For Money (BHIM)

BHIM is an app through which you can make simple, easy, and quick payments and transactions by using your unified payment interface. Instant bank to bank payments can make through BHIM and the user can also collect money using just a mobile number or virtual payment address

National Automated Clearing House (NACH)

Through NACH interbank high-volume electronic transactions which are repetitive and periodic in nature are facilitated. This platform is used by banks, financial institutions, corporate and the government

Immediate Payment Service (IMPS)

Through IMPS 24×7 interbank electronic fund transfer ensure through multiple channels like mobile, internet, ATM, SMS, etc. It is a robust and real-time fund transfer system that transfers the fund instantly within banks across the country. IMPS is totally safe and economical.

National Electronic Toll Collection (NETC)

In order to meet the electronic tolling requirement of the Indian market, the National Payment Corporation of India has developed a national electronic toll collection. Through this platform nationwide toll payment solution offer which includes clearing house service for settlement and dispute management

BHIM Aadhaar

Through BHIM Aadhaar merchants are unable to receive digital payments from the customers. This platform works through Aadhaar authentication. Through this platform, merchants accept payment from customers of banks by authenticating their biometrics

Adhaar Enabled Payment System(AePS)

AePS Is the online interoperable financial inclusion transaction that is done at POS through the business correspondent of the bank by using Aadhaar authentication. You can do six types of transactions through this platform. Customers require to input only bank name, Aadhaar number, and fingerprint captured during enrolment in order to make payment

National Financial Switch(NFS)

It is a network that has 37 members and connects 50,000 ATMs. This platform establishes strong and sustainable

operational models having in-house capabilities. The operational functions and services in national financials switch are at par with other global ATM networks.

Cheque Truncation System(CTS)

It is a process of clearing cheques electronically rather than processing the cheque physically. This process takes place by presenting a bank en-route to the paying bank branch. National Payment Corporation of India is responsible for Managing this platform. This system is also going to save a lot of time.

The Chief Executive Chairman Of National Health Authority

The chief executive chairman of the National health authority has appreciated the e-RUPI initiative which has been launched under the Digital India mission. He has highlighted the fact that this payment platform is as important as BHIM UPI. This platform is a person and purpose-specific instrument which is based on the architecture of UPI. He has also highlighted the purpose-specific nature of this instrument. As of now the government or other institutions are not required to give money for various types of benefits. In place of money, they can issue this voucher and the beneficiary can be able to only use this voucher for the purpose it has been issued. This platform is real-time and paperless. Health, nutrition, education, etc departments will be able to take advantage of this platform. Along with that, it can be used for the national Digital Swasthya mission. This voucher is recognized by the Reserve Bank of India. Through this platform, direct fund transfers can be made to the service provider. This voucher can use only one time.

Highlights Provided By Honorable Prime Minister Narendra Modi

- On the occasion of launching the e-RUPI platform the honorable prime Minister of India has highlighted various benefits of this platform.
- He has highlighted the fact that this initiative is a step towards digital governance.

- With the help of this platform digital transactions can be made easily and this platform will play a major role in making digital payments effective.
- This voucher will help in making transactions in targeted, transparent and leakage free manner.
- The Prime Minister has also highlighted the fact that India is moving ahead with the help of digital technology.
- The standard of living of citizens is improving and technology is playing a major role in the lives of citizens of India.
- He has also expressed his gratitude that this initiative is being launched when the nation is celebrating Amrit mahotsav on 75th independence day.
- This voucher can not only be used by the government but NGO can also provide this voucher in place of cash if they want to help someone in education, health etc.
- This initiative will ensure that money provided to beneficiaries is used for the same purpose.
- In the initial phase of this scheme only health sector benefits will cover.
- The prime Minister has given various examples of using this voucher like in vaccination drives, old age homes, for hospitals etc.
- This voucher is person and purpose specific.
- Only the person for whom this voucher has issued can use it.
- He has also highlighted the importance of technology.
- The banks and payment gateways have played a major role in launching this platform.
- Many private hospitals, corporates, businesses, NGOs and other institutions have shown their interest in e-RUPI platform.

View List Of Live Hospitals On e-RUPI

- First of all go to the official website of national payment Corporation of India

- The home page will open before you
- On the homepage click on what we do Option
- Now you have to click on UPI
- After that you have to click on e-RUPI live partners
- After that you have to click on Live Hospitals on e-RUPI
- A PDF file will appear before you
- In this PDF file you can view list of live hospitals on e-RUPI.

Download e-RUPI Digital Payment Mobile App

- First of all open Google play store or Apple App Store in your mobile phone
- Now in the search box you have to enter e-RUPI Digital payment
- After that you have to click on search
- A list of apps will display before you
- You have to click on the first option
- After that you have to click on install
- e-RUPI digital payment mobile app will download in your device

Procedure To Redeem e-RUPI Voucher

- The beneficiary have to show the e-RUPI QR code or SMS at the service provider outlet
- The salesperson require to scan this QR code or SMS
- Now an OTP will receive through the beneficiary
- The beneficiary have to to share this OTP with the service provider
- Service provider have to enter this OTP into the OTP box
- Now service provider have to click on proceed
- Payment will make to the service provider.

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