

**IFET COLLEGE OF ENGINEERING**  
**(AN AUTONOMOUS INSTITUTION)**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING/**  
**INFORMATION TECHNOLOGY**  
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**19UMBHS601/ DIGITAL TRANSFORMATION IN BUSINESS AND**  
**SERVICES**  
**FUNDAMENTALS**

**UNIT II Strategic Management of Technology and Innovation:**

Technological innovation and business strategy, managing disruptive innovations and technological transitions, The Technology S-Curve and its implications on IS strategies Innovation strategies and their implementation, Online business models – technology mediated platform networks

**2.1 Technological innovation and business strategy**

**2.1.1 Meaning of Technological innovation and business strategy:**

A technological innovation is a new or improved product or process whose technological characteristics are significantly different from before. Implemented technological product innovations are new products (product innovations) or processes in application (process innovations) that have been brought to market.

An innovative strategy guides decisions on how resources are to be used to meet a business's objectives for innovation, deliver value and build competitive advantage. Strategies should include: an analysis of a business's competitive and technological environment, its external challenges and opportunities.

**2.1.2 Importance of Technological innovation and business strategy:**

**I. Importance on the basis of National:**

**✓ Economic growth:**

Technological innovation is considered as a major source of economic growth. Economic growth refers to the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP. There's generally two ways to increase the output of the economy:

- Increase the number of inputs that go to the productive process
- Come up with new ways to get more output from the same number of inputs

**✓ Provides future of jobs:**

Technological advancement and increased productivity mean major changes for careers today as well. The world economy could more than double in size by 2050 due to continued technology-driven product improvements.

Increased well-being

In general, innovation and economic growth increases well-being because living standards rise. According to the Brookings Institution, average life satisfaction is higher in countries with greater GDP per capita. Another research also shows that there's a link between innovation and subjective wellbeing.

**✓ Reduced sickness, poverty and hunger:**

As already mentioned, developing countries depend on innovation as new digital technologies and innovative solutions create huge opportunities to fight sickness, poverty and

hunger in the poorest regions of the world. Developed countries also rely on innovation to be able to solve their own problems related to these themes.

**✓ Communication and educational accessibility:**

There is already known fact that a huge technological revolution during the past decades and continue to do so in the future in terms of educational sector by bringing new thoughts and ideas in promoting education in India.

**✓ Environmental sustainability:**

Sustainability and environmental issues, such as climate change, are challenges that require a lot of work and innovative solutions now and in the future. Earth suffers as consumerism spreads and puts consumption at the heart of modern economy. Although consumerism has a positive impact on innovation as a source of economic growth, the rising consumption of innovative products is often considered as one of the reasons for environmental deterioration.

**I. Importance on the basis of Organization (Micro perspective):**

**✓ Competitive advantage:**

Competitive advantage means the necessary advancements in capabilities that provide an edge in comparison to competitors of the industry. What these are exactly, depends on the strategy business model and the industry the strategy operates in.

**✓ Maximize ROI:**

Increased competitive advantage and continuous innovation often has a direct impact on performance and profitability.

**✓ Increased productivity:**

Economic growth is driven by innovation and technological improvements, which reduce the costs of production and enable higher output. In this from the perspective of an organization, different automation solutions decrease manual, repetitive work and release time for more important, value-creating tasks.

**✓ Positive impact on company culture:**

Innovation also has a positive impact on company culture as it increases the ability to acquire, create and make the best use of competencies, skills and knowledge.

**2.1.3 Types of Technological innovation and business strategy:**

**✓ Incremental Innovation (Existing Technology, Existing Market):**

One of the most common forms of innovation that we can observe. It uses existing technologies within an existing market. The goal is to improve an existing offering by adding new features, changes in the design, etc.

Example: The best Example for incremental innovation can be seen in the Smartphone market where the most innovation is only updating the hardware, improving the design, or adding some additional features/cameras/sensors, etc.

**✓ Disruptive Innovation (New Technology, Existing Market):**

Disruptive innovation is mostly associated with applying new technologies, processes, or disruptive business models to existing industries. Sometimes new technologies and business models seem, especially in the beginning, inferior to the existing solutions but after some iterations, they surpass the existing models and take over the market due to efficiency and/or efficacy advantages.

Examples: Amazon used Internet-Technologies to disrupt the existing industry for book-shops. They had the existing market for books but changed the way it was sold, delivered and experienced due to the use of disruptive technologies. Another example was the iPhone, where existing technologies in the market (Phones with buttons, keypads, etc.) were replaced with touch-interface-centred devices combined with intuitive user interfaces.

**✓ Architectural Innovation (Existing Technology, New Market)**

Architectural innovation is something we see with tech giants like Amazon, Google, and many more at the moment. They take their domain expertise, technology, and skills and apply

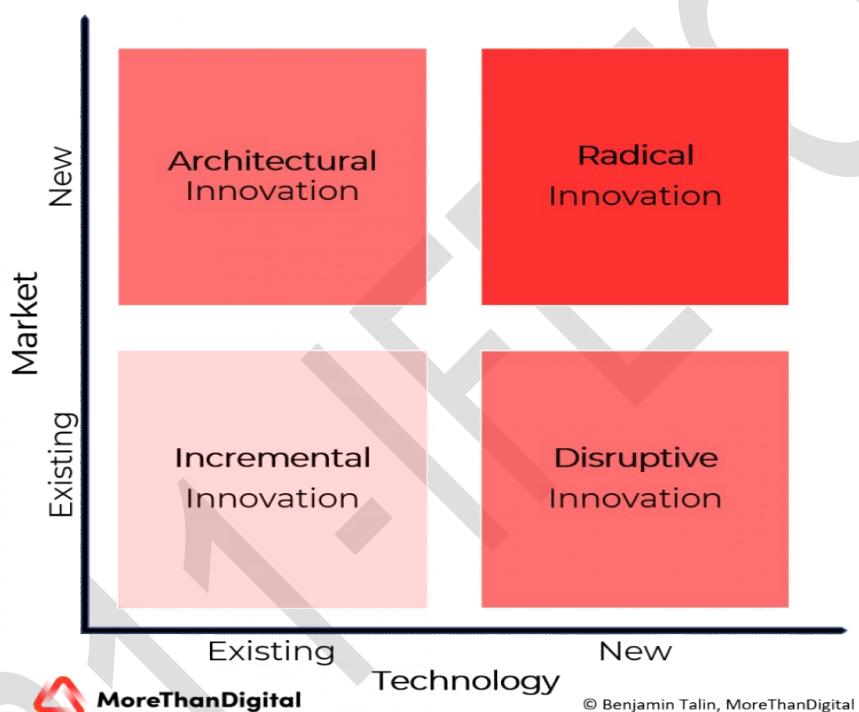
them to a different market. This way they can open up new markets and expand their customer base.

Examples: Especially digital ecosystem orchestrators like Amazon and Alibaba use this innovation strategy to enter new markets. They use existing expertise in building apps, platforms, and their existing customer base to offer new services and products for different markets. A recent example for this: Amazon recently entered the medical care field.

✓ **Radical Innovation (New Technology, New Market):**

Even it is the stereotypical way most people see innovation; it is the rarest form of them all. Radical innovation involves the creation of technologies, services, and business models that open up entirely new markets.

Example: The best example of radical innovation was the invention of the airplane. This radical new technology opened up a new form of travel, invented an industry, and a whole new market.



**Figure Number 2.1.3: Types of Technological innovation and business strategy**

#### 2.1.4 Different Fields of Innovation:

Innovation can be in different forms and outcomes. When we talk about innovation, most people think of new products while there is a wide array of different innovation outcomes possible. Here we list the most common

✓ **Product & Product Performance Innovation**

Either a new product is developed or the performance of an existing product is improved. This kind of innovation is very common in the business world.

✓ **Technology Innovation**

New technologies can be also the basis for many other innovations. The best example was the Internet, which was itself an innovation but also lead to other innovations in various fields.

✓ **Business Model Innovation**

Many of the most successful companies in the world managed to innovate their business model. Using different channels, technologies and new markets can lead to new possible business models which can create, deliver and capture customer value. Digital ecosystems are a well-known example of innovation using several technologies and creating a whole new type of business.

✓ **Organizational Innovation**

Managing and sharing resources in a new way can also be an innovation. This way it's possible to use resources and assets in a completely new way.

✓ **Process Innovation**

Innovation in the processes can improve the efficiency or effectiveness of existing methods. Possible process innovations involve production, delivery, or customer interaction.

✓ **Marketing / Sales – New Channel Innovation**

New methods to capture and hold attention from customers. Either through the use of innovative marketing/sales concepts or the use of new channels for customer acquisition/sales.

✓ **Network Innovation**

By connecting different groups and stakeholders it might be possible to create extra value. This type of innovation is very common due to the use of ICT services.

✓ **Customer Engagement / Retention**

Innovative concepts that try to increase the engagement of customers and keep the retention up. The goal is to have innovative models to keep the customers “locked-in” or engaged.

## 2.2 Managing disruptive innovations and technological transitions

### 2.2.1 Meaning of disruptive innovations:

Disruptive innovation is mostly associated with applying new technologies, processes, or disruptive business models to existing industries. Sometimes new technologies and business models seem, especially in the beginning, inferior to the existing solutions but after some iterations, they surpass the existing models and take over the market due to efficiency and/or efficacy advantages. In simple words launching new technology under the existing market.

An example of disruptive innovation is the introduction of digital music downloads, which have, by far, replaced compact discs (CDs). Clayton Christensen popularized the idea of disruptive innovation in the book *The Innovator's Solution*, which was a follow up to his *Innovators Dilemma* published in 1997. Google is also one of these examples which has a history of developing disruptive innovations in the tech space. The last few years have seen Google pushing their Chromebook computers heavily, achieving the dominant market share in the education sector, and seeing exponential growth overall.

### 2.2.2 Four Key Elements of the Theory of Disruptive Innovation:

✓ **Incumbents are improving along a trajectory of innovation**

In every market there is a distinctly different trajectory of improvement that innovating companies provide as they introduce new and improved products. An incumbent business's improvement trajectory results from what they call “sustaining innovation” the year-by-year improvements that all good companies grind out from these innovative ideas.

✓ **The pace of sustaining innovation overshoots customer needs**

Thus, a company whose products are squarely positioned on mainstream customer's current needs will probably overshoot what those customers are able to utilize in the future. In simple innovations develop based on the requirement of the customers.

✓ **Incumbents have the capability to respond but fail to exploit it**

Under this most of the authors claim that incumbent companies frequently possess the capabilities needed to succeed but managers or heads of the institutions fail to employ them effectively to combat potential disruptors due to lack of skilled employees, financial position.

✓ **Incumbent's flounder as a result of the disruption**

Companies with these disruptive technologies, will always improve their products' performance and in so doing eventually take over the older markets. Once it takes the market the disruptors are on a path that will ultimately crush the incumbents.

### 2.2.3 Merits and De-merits of Disruptive Innovation:

#### Merits of Disruptive Innovation:

- ✓ **Innovative benefits**

One of the key features of disruptive technology is its ability to offer consumers new and notable benefits. When this type of technology enters the marketplace, it changes the entire industry. The internet disrupted previous ways of gathering information, such as libraries, newspapers and even social interactions.

- ✓ **Start-up opportunities**

Disruptive technology provides opportunities for start-up companies to gain a significant foothold in existing industries. Those who begin offering the new technology early can establish themselves as thought leaders in a fresh market.

- ✓ **Room for business growth**

When an established business willingly embraces disruptive technology, it enjoys prime opportunities for growth either within its current industry or within a new industry that's been created by the technology.

#### Disadvantages of disruptive technology:

While disruptive technologies are largely beneficial once they're well established, they can create some challenges in their early stages including:

- ✓ **Unrefined inventions**

New technology is typically untested and unrefined during its early stages and development can continue for years. During this time, businesses offering the technology may struggle to market an innovative product. The earliest users of disruptive technology may find themselves working with clunky prototypes that don't yet offer the sleek refinement that's presented in later stages of development.

- ✓ **Early performance problems**

Nearly all innovations go through a period of problem-solving. Modern consumers are accustomed to experiencing this with a newly developed app or piece of software. Updates and patches are necessary to overcome the glitches and other challenges that the technology might present. The same process applies to any disruptive technology and can make early adoption more challenging.

- ✓ **Unproven applications**

It can take time for a disruptive technology to find its place in the marketplace. The potential applications for the innovation are at first unproven. Users may doubt whether they can use the product to replace its predecessors. For example, when small kitchen appliances were first made available, cooks may have doubted whether electric mixers could deliver the same quality as their own skilled hands.

### 2.2.4 Types of Disruptive Innovation:

- ✓ **Low-End Disruption**

Low-end disruption is when a company uses a low-cost business model to enter at the bottom of an existing market and claim a segment because there's no profitability incentive to fight for the bottom of the market, a low-end disruption causes incumbent companies to focus their efforts on more profitable areas.

An example of a low-end disruption is the rise of retail medical clinics in the healthcare space. Large medical centres handle everything from a sinus infection to open-heart surgery and employ specialists to care for various injuries and ailments. Typically, the more serious the injury or illness, the more expensive the cost to the patient.

- ✓ **New-Market Disruption**

The other type of disruptive innovation is new-market disruption, which is when a company creates a new segment in an existing market with a low-cost version of a product.

The factor that sets new-market disruption apart from low-end disruption is its focus on an audience that doesn't yet exist in the market. Offering a more cost-effective, simple, or accessible product effectively creates a new segment.

An example of a new-market disruption is the transistor radio. Starting in the 1920s, the radio market was dominated by large, expensive stereo systems that families purchased for their homes. The consoles were heavy, designed to be placed in the living room, and provided excellent sound quality. The incumbent companies had no economic incentive to go after the new market segment created by transistor radios, which were much cheaper and had a lower profit margin than radio consoles. Instead of competing with Texas Instruments, the incumbents let the company own the new market segment.

### **The Disruptive Innovation Model:**

In business theory, disruptive innovation is innovation that creates a new market and value network or enters at the bottom of an existing market and eventually displaces established market-leading firms, products, and alliances. The concept was developed by the American academic Clayton Christensen and his collaborators beginning in 1995 and has been called the most influential business idea of the early 21st century. Lingfei Wu, Dashun Wang, and James A. Evans generalized this term to identify disruptive science and technological advances from more than 65 million papers, patents and software products that span the period 1954–2014. Their work was featured as the cover of the February 2019 issue of nature and was selected as the Altmetric 100 most-discussed work in 2019. Not all innovations are disruptive, even if they are revolutionary. For example, the first automobiles in the late 19th century were not a disruptive innovation, because early automobiles were expensive luxury items that did not disrupt the market for horse-drawn vehicles. The market for transportation essentially remained intact until the debut of the lower-priced Ford Model T in 1908.

The mass-produced automobile was a disruptive innovation, because it changed the transportation market, whereas the first thirty years of automobiles did not. Disruptive innovations tend to be produced by outsiders and entrepreneurs in start-ups, rather than existing market-leading companies. The business environment of market leaders does not allow them to pursue disruptive innovations when they first arise, because they are not profitable enough at first and because their development can take scarce resources away from sustaining innovations (which are needed to compete against current competition). Small teams are more likely to create disruptive innovations than large teams.

A disruptive process can take longer to develop than by the conventional approach and the risk associated to it is higher than the other more incremental, architectural or evolutionary forms of innovations, but once it is deployed in the market, it achieves a much faster penetration and higher degree of impact on the established markets. For example, the automobile was high technology with respect to the horse carriage; however, it evolved into technology and finally into appropriate technology with a stable, unchanging TSN. The main high-technology advance in the offing is some form of electric car—whether the energy source is the sun, hydrogen, water, air pressure, or traditional charging outlet. Electric cars preceded the gasoline automobile by many decades and are now returning to replace the traditional gasoline automobile.

- Disruption is a process, not a product or service, that occurs from the nascent to the mainstream
- Originate in low-end (fewer demanding customers) or new market (where none existed) footholds
- New firms don't catch on with mainstream customers until quality catches up with their standards
- Success is not a requirement and some business can be disruptive but fail
- New firm's business model differs significantly from incumbent

### **2.2.5 Protection of Disruptive Innovation:**

There are many ways in which the strategy can protect the strategy innovation. We focus here on the 2 major protection methods which are either “legal protection” or being the market leader due to a “first-mover advantage”.

#### **1. Legal Protection**

Depending on the type of innovation, it might be useful to patent the strategy invention to monetize it and protect it from others. There also needs to be an understanding of the cost of patent protection. While the initial cost might not be as high, it can be that the legal costs to enforce possible patent infringements can skyrocket and make it harder for smaller companies to get their right. It is also important to understand that not everything can be protected and patented. While products, processes, and technologies are usually easier to be protected/patented, it's harder/impossible to protect software or business models.

#### **2. First-Mover Advantage**

Especially software companies make use of the first-mover advantage. A company that has a new process, new business model, or new product tries to get as much market share as possible while the competition is still developing its offering. This head start gives the first-mover the advantage of incrementally improving the product. This way it's possible to grab a market share and offer a better product/service faster than others.

### **2.2.6 Theory of Disruptive Innovation:**

Disruptive innovation, a term of art coined by Clayton Christensen, describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors.

Christensen also noted that products considered as disruptive innovations tend to skip stages in the traditional product design and development process to quickly gain market traction and competitive advantage. He argued that disruptive innovations can hurt successful, well-managed companies that are responsive to their customers and have excellent research and development.

These companies tend to ignore the markets most susceptible to disruptive innovations, because the markets have very tight profit margins and are too small to provide a good growth rate to an established (sizable) firm. Thus, disruptive technology provides an example of an instance when the common business-world advice to "focus on the customer" (or "stay close to the customer", or "listen to the customer") can be strategically counterproductive. While Christensen argued that disruptive innovations can hurt successful, well-managed companies, O'Ryan countered that "constructive" integration of existing, new, and forward-thinking innovation could improve the economic benefits of these same well-managed companies, once decision-making management understood the systemic benefits as a whole.

#### **Low-end disruption**

"Low-end disruption" occurs when the rate at which products improve exceeds the rate at which customers can adopt the new performance. Therefore, at some point the performance of the product overshoots the needs of certain customer segments. At this point, a disruptive technology may enter the market and provide a product that has lower performance than the incumbent but that exceeds the requirements of certain segments, thereby gaining a foothold in the market.

#### **New market disruption**

"New market disruption" occurs when a product fits a new or emerging market segment that is not being served by existing incumbents in the industry. Some scholars note that the creation of a new market is a defining feature of disruptive innovation, particularly in the way it tends to improve products or services differently in comparison to normal market drivers. It initially caters to niche market and proceeds on defining the industry over time once it is able

to penetrate the market or induce consumers to defect from the existing market into the new market it created.

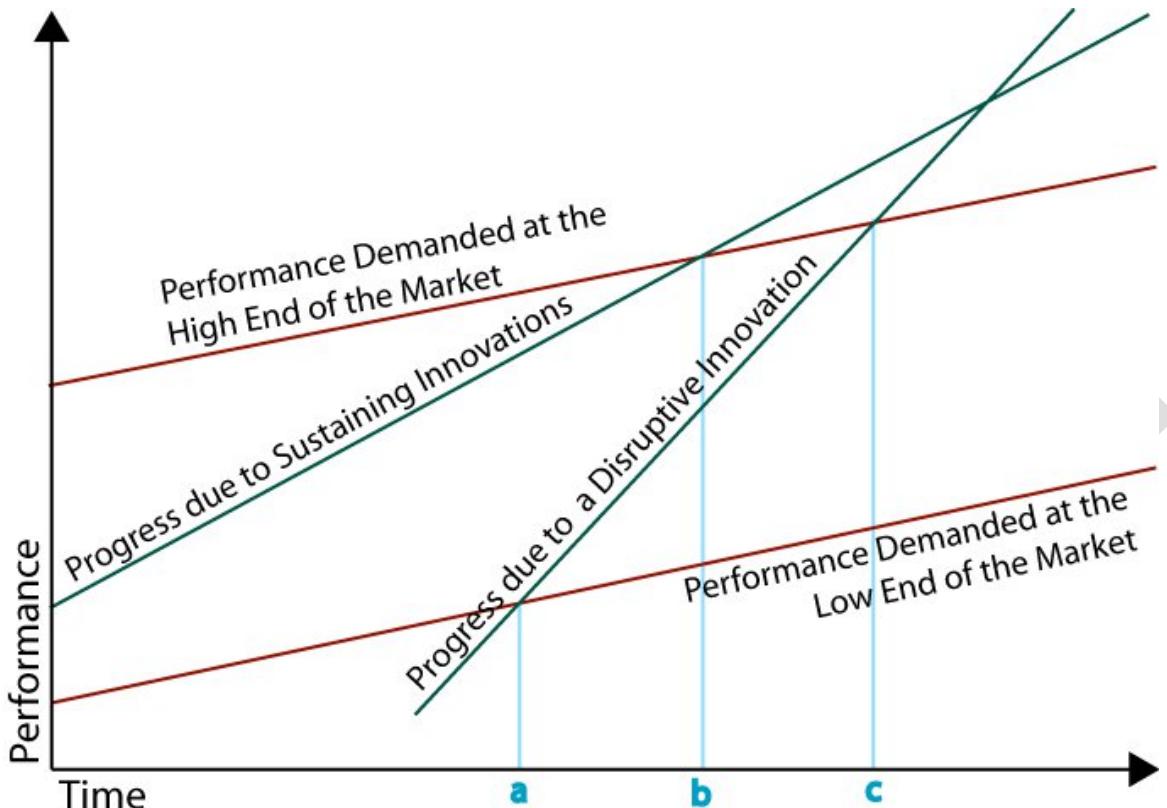


Figure Number 2.2.6: The Disruptive Innovation Theory



Figure Number 2.2.6.1: Graphical example for the Disruptive Innovation Theory

### 2.2.7 Meaning of technological transitions:

Technological innovations have occurred throughout history and rapidly increased over the modern age. New technologies are developed and co-exist with the old before supplanting

them. Transport offers several examples; from sailing to steam ships to automobiles replacing horse-based transportation. Technological transitions (TT) describe how these technological innovations occur and are incorporated into society. For a technology to have use, it must be linked to social structures human agency and organizations to fulfil a specific need.

Hughes refers to the 'seamless web' where physical artifacts, organizations, scientific communities, and social practices combined. A technological system includes technical and non-technical aspects, and it is a major shift in the socio-technical configurations (involving at least one new technology) when a technological transition occurs.

The multi-level perspective (MLP) is an analytical tool that attempts to deal with this complexity and resistance to change. Focussing on the dynamics of wider transitionary developments as opposed to discrete technological innovations, the MLP concerns itself with socio-technical system transformations, particularly with transitions towards sustainability and resilience. The socio-technical regime is dynamically stable in the sense that innovation still transpires albeit incrementally and along a predictable trajectory. Work on technological transitions draws on a number of fields including history of science, technology studies, and evolutionary economics. The focus of evolutionary economics is on economic change, but as a driver of this technological change has been considered in the literature.

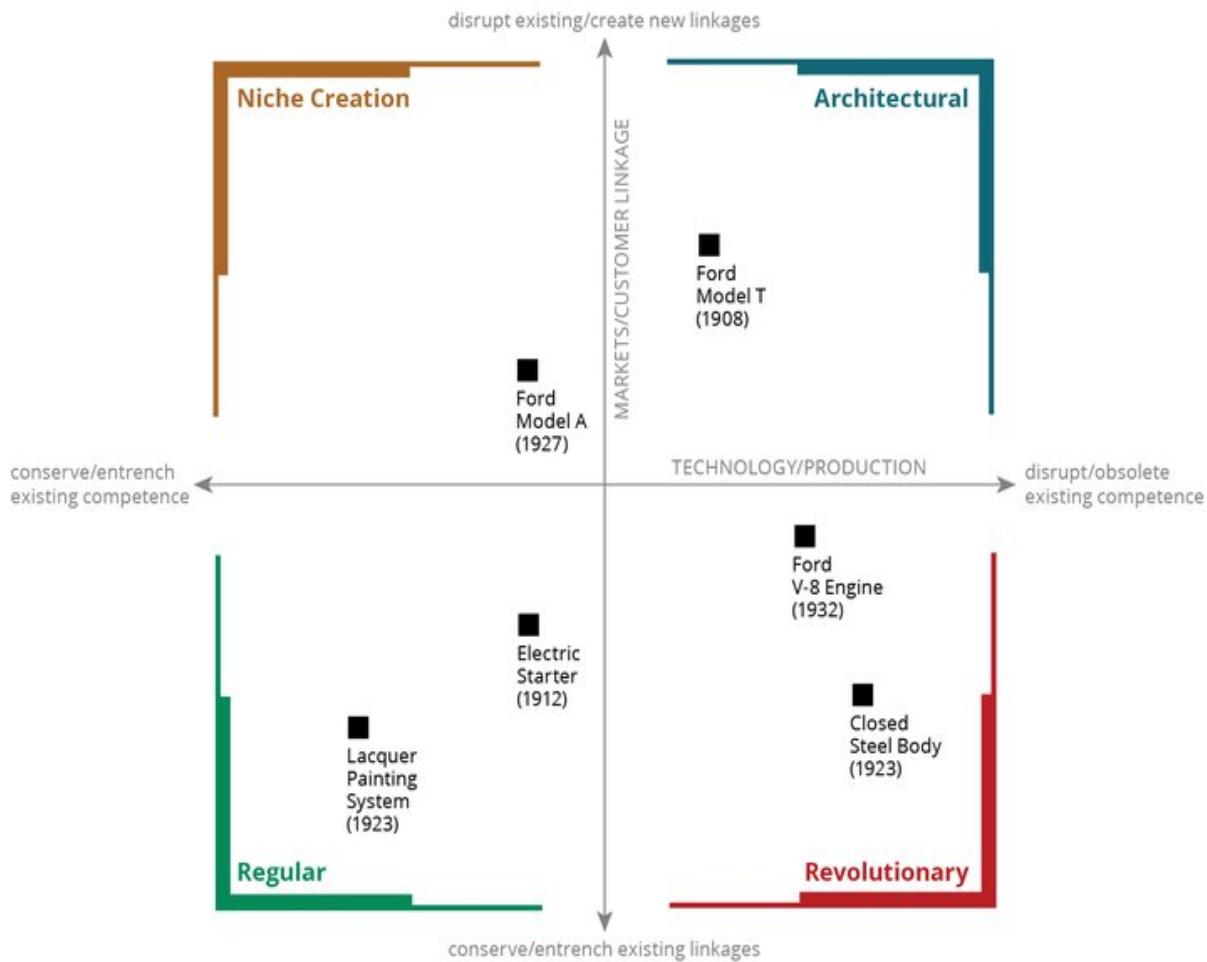
### **2.2.8 Characteristics of technological transitions:**

- ✓ **Transitions are co-evolutionary and multi-dimensional:** Technological developments occur intertwined with societal needs, wants and uses. A technology is adopted and diffused based on this interplay between innovation and societal requirements. Co-evolution has different aspects. As well as the co-evolution of technology and society, aspects between science, technology, users and culture have been considered.
- ✓ **Multi actors involved:** Scientific and engineering communities are central to the development of a technology, but a wide range of actors are involved in a transition. This can include organisations, policy-makers, government, NGOs, special interest groups and others.
- ✓ **Transitions occur at multiple levels:** As shown in theory, transitions occur through the interplay of processes at different levels.
- ✓ **Transitions are a long-term process:** Complete system-change takes time and can be decades in the making. Case studies show them to be between 40 and 90 years.
- ✓ **Transitions are radical:** A true transition to occur the technology has to be a radical innovation.
- ✓ **Change is Non-linear:** The rate of change will vary over time. For example, the pace of change may be slow at the gestation period (at the niche level) but much more rapid when a breakthrough is occurring.

### **2.2.9 Types or methods of technological transitions:**

#### **Four Models of Technology Transition to Bridge the Gap Between Digital Natives and Digital Immigrants**

- **Architectural technologies** drastically change how something is produced and how it is discussed or promoted in the marketplace.
- **Revolutionary technologies** drastically change how something is produced, but don't radically change how it's discussed.
- **Niche technologies** don't radically change how something is produced, but do drastically change how it's discussed.
- **Evolutionary technologies** don't radically change either how something is produced or how it's discussed



**Figure Number 2.2.9: Types or methods of technological transitions**

Practice-based technologies tend to be evolutionary or revolutionary. The title comes from the observation that architectural technologies destroy both marketing and production infrastructure and therefore require a much longer adoption cycle unless there is an urgent, dramatic need for the architectural technology in question.

When thinking about these four types of technologies in the context of digital immigrants and digital natives, it is important to remember that each cohort has differing perceptions of what constitutes a change in the means of production.

The other difference lies in communication and marketing channels. In particular, the use of various social media channels is likely to be a baseline communication and/or marketing approach for digital natives, whereas digital immigrants don't typically engage as much in social media.

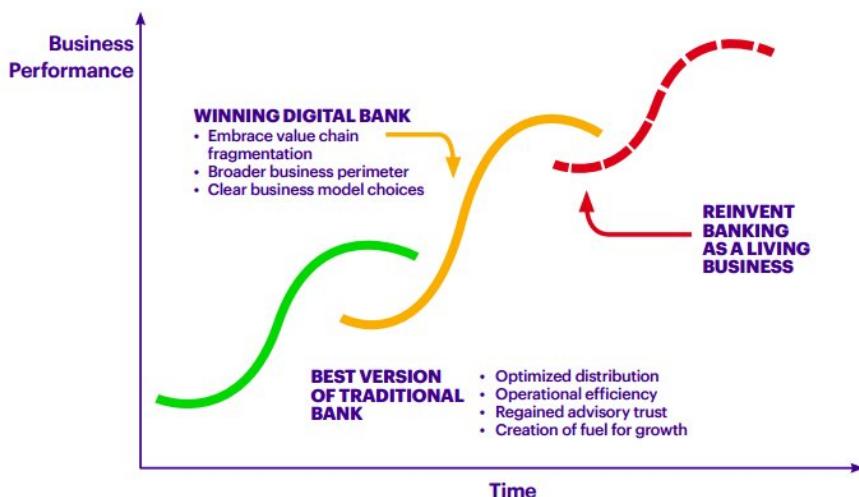
### 2.3 The Technology S-Curve and its implications on IS strategies Innovation strategies and their implementation:

#### 2.3.1 Meaning of the Technology S-Curve:

The S-curve shows the innovation from its slow early beginnings as the technology or process is developed, to an acceleration phase (a steeper line) as it matures and, finally, to its stabilisation over time (the flattening curve), with corresponding increases in performance of the item or organisation using it. The S-Curve Pattern of Innovation highlights the fact that as an industry, product, or business model evolves over time, the profits generated by it gradually rise until the maturity stage. These new products are often upgraded or related versions of products approaching the maturity stages of their S-Curves.

### 2.3.2 Conceptual frame work of the Technology S-Curve:

There are many theories of change, but one that is particularly relevant to innovation is centred on the S-curve. It is a way of depicting incremental, disruptive and radical innovation.



**Figure Number: 2.3.2 S- curve showing incremental and radical innovation**

In Figure mentioned above, the vertical axis shows the performance of the item under consideration – this is sometimes equated to competitive advantage for business organisations. The horizontal axis shows effort – this could be time, resource investment or similar, which is associated with the innovation and its development. The S-curve shows the innovation from its slow early beginnings as the technology or process is developed, to an acceleration phase (a steeper line) as it matures and, finally, to its stabilisation over time (the flattening curve), with corresponding increases in performance of the item or organisation using it. Over time, the technology reaches its technological limit of usefulness or competitive advantage. At any point, there may be a step change in the technology – a radical innovation – resulting in a new S-curve.

Disruptive innovation can involve some elements from the old technology ‘transferring’ across – hence the S-curve overlaps. In radical innovation, the ‘gap’ or discontinuity shown in Figure 5 conveys the sense of a break from one technology to the other, newer, radical technology. Thus, a radical technology fulfils the same need, but is based on a different knowledge and practice base. An example might be photographic film being largely replaced by digital storage media in digital cameras. Paradigm paralysis is when an organisation resists the shift to the new idea, process or product. One example is the Kodak photographic company, traditionally a hugely innovative company responsible for the invention of the digital camera, but which continued to prioritise its commitment to film and printing of images despite the digital revolution in camera and media technologies. This paradigm paralysis (continuing to support film), which is described in an article titled ‘The moment it all went wrong for Kodak’ in The Independent newspaper (Usborne, 2012), contributed to the bankruptcy and demise of the company in 2012. The S-curve can also be used to depict the diffusion of innovations in a culture over time. First described by Everett Rogers in the early 1960s, diffusion is the process by which an innovation is communicated and taken up over time. Rogers’ work is important because it emphasises that the innovation itself is not the only determinant of its ‘success’. There must also be communication channels, time and a social system in place to enable the innovation to be used and adopted more and more widely.

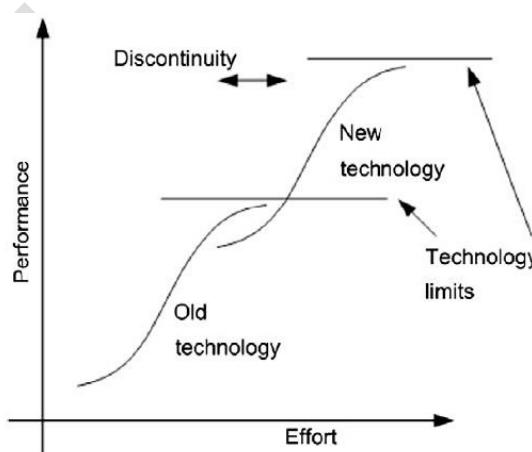
Rogers also identifies the different categories of adopters: innovators, early adopters, majority (further subdivided into early and late) and laggards (Rogers, 1962). Returning to the example of the solar panels, those households having solar panels by 2015 in the UK would probably still be classed as innovators or early adopters. The social system, comprising policy, legal, finance, information and many other factors, is still not (and may never be) fully in place for solar panels to be installed by the majority of householders. While there are criticisms of S-curves and Rogers' diffusion theory, they provide a useful way of understanding how innovation may or may not progress. However, the strategy may be wondering why all this is important for environmental management.

### 2.3.3 The Technology S-Curve's implications on IS strategies Innovation strategies and their implementation:

Therefore, two model families that are closely related to the concept of the S curve are identified below: (1) diffusion models (2) life cycle models

#### 1. Diffusion models:

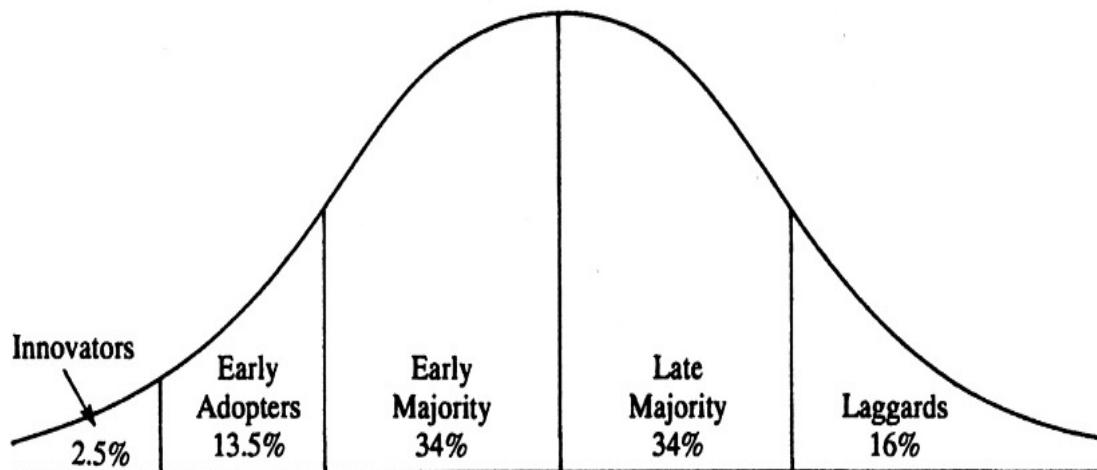
Diffusion models attempt to analyse the process by which an innovation is diffused throughout a determined social system (Rogers, 1993). Most of their search regarding diffusion processes has been carried out by scholars from the field of industrial economy and marketing. Therefore, in these models, variables that are related to the structure of the industrial market in which the innovation is diffused and other characteristics of the overall economic environment play a relevant role. The first studies that were carried out in the 1960s and 1970s were concerned primarily with predicting the diffusion speed of the innovations. In general, the models that were proposed were quite rigid and incorporated very restrictive hypotheses: innovations with constant technology performances over time, constant market potentials, etc. This function is very simple: the speed to which the total number of firms that adopt a new technology increase, depends on the number of firms that have already assimilated it and the potential number of firms that have not yet incorporated it. Intuitively, this same idea can be expressed in epidemiological terms of the speed with which a contagious disease is spread is directly proportional to the number of people infected to date and the size of the city that is potentially exposed to the disease'. Mansfield, after a series of manipulations and approximations, transformed the function into a usable expression. The form of this function will depend solely on the parameter that represents the rate of imitation which, in accordance with the adopted hypotheses, is a lineal function of: (1) the profitability of the installation; (2) the investment volume required for its installation; and (3) the contingent variable with an expected null value that obtains the effect of other non-specified variables:



**Figure Number: 2.3.3- Diffusion models**

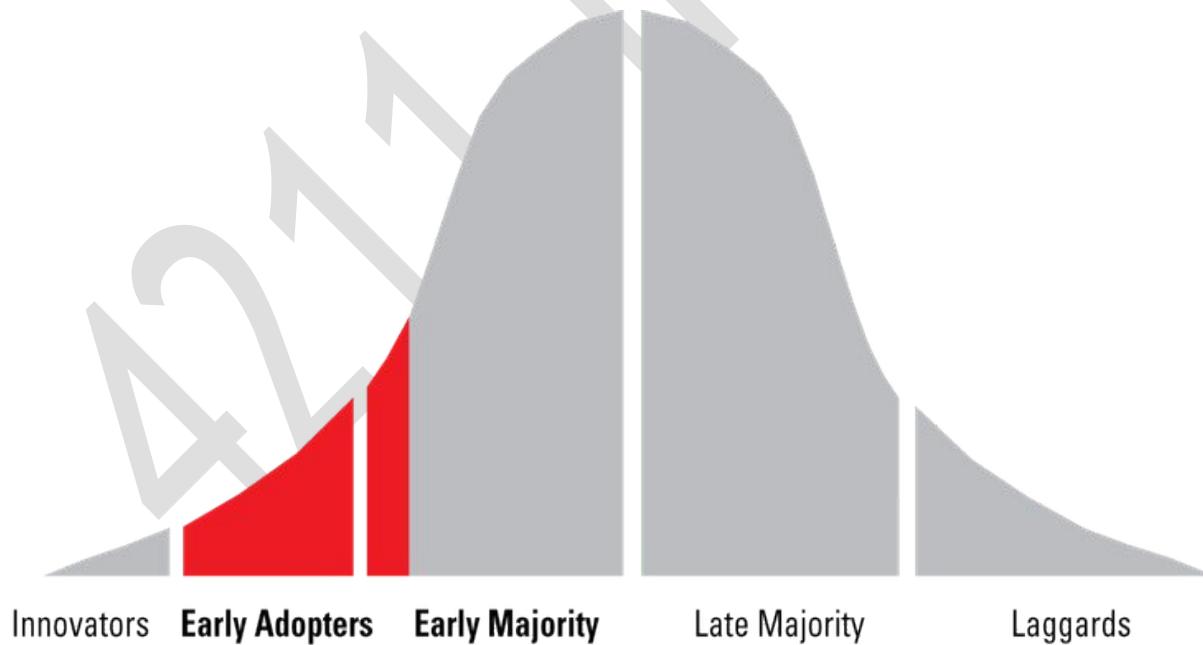
## 2. Life cycle models:

In different works in the field of management, the term life cycle has been used to describe some generic models. These models represent the evolution of industrial sectors, products, technologies, etc. The most widespread among them, initially formulated by Levitt (1965), is the one that refers to the life cycle of a product and describes the evolution of the volume of sales over time.



**Figure Number: 2.3.3- Life cycle models**

In terms of the S curve, innovators occupy 2.5%, early adopters 13.5%, early majority 34%, late majority 34%, and laggards 16%. The four stages of technology life cycle are as follows:  
**Innovation stage:** This stage represents the birth of a new product, material or process resulting from R&D activities.



**Figure Number: 2.3.3- Life cycle models**

**The model contains five basic categories:**

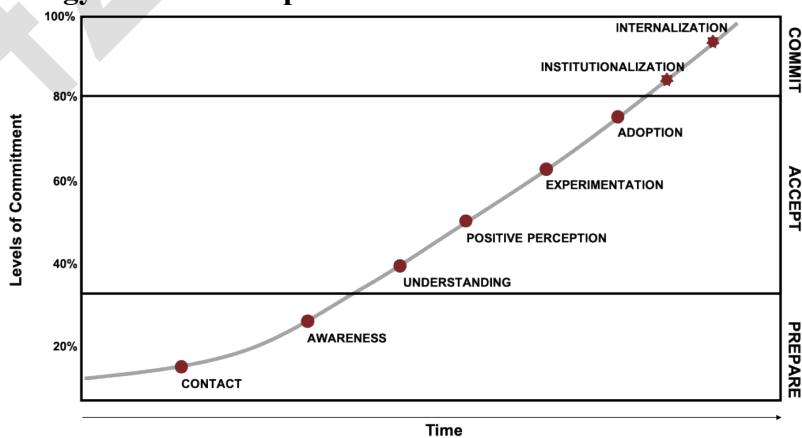
- **Innovators** require little prodding to try a new technology and generally require little support for making it work. They are often serially enthusiastic about multiple technologies of a particular type, always looking for the next big thing.

- **Early adopters** look for strategic advantage from new technologies but are not adopting a new technology for its own sake. They are willing to accept some risks associated with adoption, but only if they can see how the technology fits into the larger picture of their market or their mission. They don't require a fully baked solution, but they may need some support (usually consulting). They are often called visionaries.
- **The early majority** are pragmatic about using new technologies. If a new technology is cooked enough and is visibly useful to support their mission, they will consider adopting it, but they want to be fairly certain of the return on investment they can expect. Even if the technology isn't fully proven in their context, it should be proven in at least one context they consider relevant. They are often called pragmatists.
- **The late majority** only make a shift to a new technology when it has been proved and is well-supported. They want training, checklists, and tools to be tuned to their context and role. The less they have to change their practices to accommodate the technology, the better. They are often called Main Street.
- **Laggards** will avoid adopting a new technology, often at great cost to themselves. They will continue to see problems in the technology long after it has been adopted by the mainstream and will sometimes make serious shifts in their job or other situation to avoid a technology they don't want to adopt.

Between the early adopter and early majority populations, Moore added the concept of the "chasm," which represents the significant difference in how to communicate about a technology with early adopters versus how to talk with early majority adopters. Technologies that seem to stall in their adoption journey are often victims of the chasm. If the technologists do not change their communication and marketing strategy for the early majority, their technology will often fail at being adopted across a wide population. Although it may be tempting to classify digital natives as early adopters and digital immigrants as early majority, it's often not that clear-cut. Some digital immigrants are early adopters of certain types of technologies that they can easily envision supporting their organizational or individual goals. In other situations, a digital native may not see the cost/benefit of a new technology if the current technology it replaces meets their organizational or individual needs. Individuals will not always be in the same category for every technology.

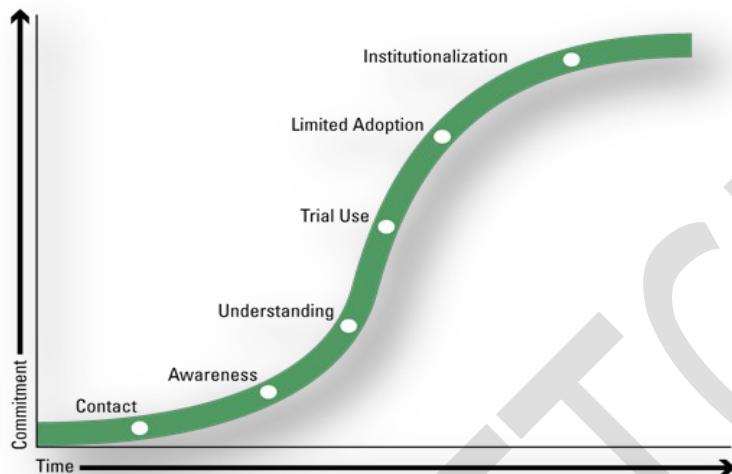
In this model, digital natives are less likely to be laggards in information technology settings, as long as those settings are related to the technology environments, they are familiar with already. For example, digital natives typically pick up smartphone-based apps more readily than digital immigrants. As with the larger population, not all digital natives will consistently fall into the category of innovators or early adopters, so it's still worth investigating the population that the strategy dealing with in any particular instance.

#### 2.3.4 The Technology S-Curve's implementation:



**Figure Number: 2.3.4- The Technology S-Curve's implementation**

Once we know who the adopters are and the size of the adoption, the next model that helps us move forward is Adoption Commitment Curve model introduced by Daryl R. Conner and Robert W. Patterson. This model is based on research on how individuals learn new things, a key element in adopting most technologies.



**Figure Number: 2.3.4- Graphical presentation of Technology S-Curve's implementation**  
**The stages for the Commitment Curve are:**

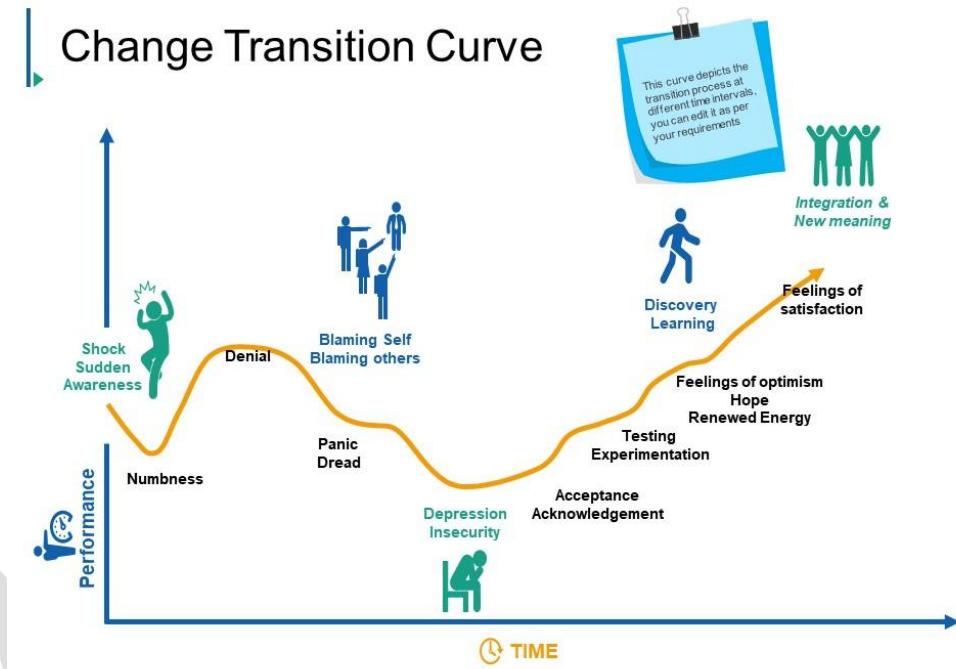
- ✓ **Contact:** The name of the technology and its general purpose is to create contacts. In the contact stage, we probably can't expand the acronym associated with the technology, but we have a vague idea of who is promoting it and why.
- ✓ **Awareness:** learning more about the general attributes of the technology and who might be candidates for adopting it. We can tell someone what the acronym means and provide a high-level description of it, but can't yet articulate how the technology would work in our particular environment. (From the viewpoint of designing mechanisms to transition a group from one stage to another, contact and awareness are often treated together, because they use similar mechanisms.)
- ✓ **Understanding:** It is not only to understand what the technology is but also understand how we could apply it in our own environment. We haven't yet tried it, but, if pressed, we know how we would do it. If we can't get to this stage, we are not likely to get very far with actual adoption.
- ✓ **Trial use:** The company try using the technology for our mission or operational goals. The inflection in the curve increases as we move into this stage, because the shift into trial use takes a large amount of energy and support.
- ✓ **Adoption or limited adoption:** This is the stage at which we have proved to ourselves that the technology works (trial use has provided us with technical feasibility pilots), and we are now performing adoption feasibility pilots--rolling out the technology, along with appropriate support, to the intended populations for adoption. The reason this is sometimes called limited adoption is that the technology hasn't made it into the organization's policy or infrastructure yet, and it could be displaced if something better came along or something disastrous occurred when using it.
- ✓ **Institutionalization:** This is the stage when the new technology becomes the new status quo within the organization. The accompanying policy and infrastructure support is in place, making it difficult to back out of the technology. Generally

speaking, we would resist abandoning the technology because it now supports our work.

- ✓ **Internalization:** This is the stage (not shown in the graphic) at which we have become so invested in the technology that we would seriously sabotage any attempts to remove it, and might even leave the organization if the technology were removed. In terms of technology adoption, most organizations are not seeking internalization, because they know that most technologies will have to be replaced in the future, and a technology that is internalized is very difficult to displace. The main reason for understanding this stage is to be able to recognize the symptoms that an organization has internalized the technology we are trying to replace.

Generally speaking, *communication* mechanisms help people move from contact through awareness to understanding. Although communication mechanisms are also used for later stages, the character of support changes to *implementation* support mechanisms for trial use through adoption and institutionalization.

This model can be very helpful to diagnose anomalies in an adoption setting. Organizations often try to move too quickly to trial use, without helping employees understand what this technology means to them and their work. Conversely, organizations also ignore providing the implementation support their constituents need, focusing instead on the conceptual benefits of the technology.



**Figure Number: 2.3.4- Graphical presentation of Transition Curve**

## 2.4 Online business models – technology mediated platform networks:

### 2.4.1 Meaning of Online business models:

An e-business model is simply the approach a company takes to become a profitable business on the Internet. There are many buzzwords that define aspects of electronic business, and there are subgroups as well, such as content providers, auction sites and pure-play Internet retailers in the business-to-consumer space.

Internet business models are categorized as business-to-consumer, business-to-business, and more recently, consumer-to-consumer. Business-to-consumer and business-to-business

models typically sell goods and services or provide information designed to help visitors make purchase decisions.

The term business model refers to a company's plan for making a profit. It identifies the products or services the business plans to sell, its identified target market, and any anticipated expenses. Business models are important for both new and established businesses. They help new, developing companies attract investment, recruit talent, and motivate management and staff. Established businesses should regularly update their business plans or they'll fail to anticipate trends and challenges ahead. Business plans help investors evaluate companies that interest them.

#### **2.4.2 Four Traditional Types of Ecommerce/ Online Business Models:**

##### **✓ B2C – Business to consumer:**

B2C businesses sell to their end-user. The B2C model is the most common business model, so there are many unique approaches under this umbrella. Anything the strategy buy in an online store as a consumer think wardrobe, household supplies, entertainment is done as part of a B2C transaction. The decision-making process for a B2C purchase is much shorter than a business-to- business (B2B) purchase, especially for items that have a lower value. Think about it: it's much easier for the strategy to decide on a new pair of tennis shoes than for the strategy company to vet and purchase a new email service provider or food caterer. Because of this shorter sales cycle, B2C businesses typically spend less marketing dollars to make a sale, but also have a lower average order value and less recurring orders than their B2B counterparts and B2C doesn't only include products, but services as well. B2C innovators have leveraged technology like mobile apps, native advertising and remarketing to market directly to their customers and make their lives easier in the process. For example, using an app like Lawn Guru allows consumers to easily connect with local lawn mowing services, garden and patio specialists, or snow removal experts. Additionally, home service businesses can use House call Pro's plumbing software app to track employee routes, text customers, and process credit card payments on the go, benefitting both the consumer and business alike.

##### **✓ B2B – Business to business:**

In a B2B business model, a business sells its product or service to another business. Sometimes the buyer is the end user, but often the buyer resells to the consumer. B2B transactions generally have a longer sales cycle, but higher order value and more recurring purchases. Recent B2B innovators have made a place for themselves by replacing catalogues and order sheets with ecommerce storefronts and improved targeting in niche markets. In 2020, close to half of B2B buyers are millennials nearly double the amount from 2012. As the strategy generations enter the age of making business transactions, B2B selling in the online space is becoming more important.

##### **✓ C2B – Consumer to business:**

C2B businesses allow individuals to sell goods and services to companies. In this ecommerce model, a site might allow customers to post the work they want to be completed and have businesses bid for the opportunity. Affiliate marketing services would also be considered C2B. Elance (now Upwork) was an early innovator in this model by helping businesses hire freelancers. The C2B ecommerce model's competitive edge is in pricing for goods and services. This approach gives consumers the power to name their price or have businesses directly compete to meet their needs. Recent innovators have creatively used this model to connect companies to social media influencers to market their products.

##### **✓ C2C – Consumer to consumer.**

A C2C business also called an online marketplace connects consumers to exchange goods and services and typically make their money by charging transaction or listing fees. Online businesses like Craigslist and eBay pioneered this model in the early days of the internet.

C2C businesses benefit from self-propelled growth by motivated buyers and sellers, but face a key challenge in quality control and technology maintenance.

#### **2.4.3 Five Value Delivery Methods for Ecommerce/ Online Innovation:**

##### **✓ D2C – Direct to consumer**

By cutting out the middleman, a new generation of consumer brands have built loyal followings with rapid growth. Online retailers like Warby Parker and Casper set the standard for vertical disruption, but brands like Glossier are showing us how D2C can continue to be an area for innovation and growth.

##### **✓ White label and private label**

To “white label” is to apply the strategy name and brand to a generic product purchased from a distributor. In private labelling, a retailer hires a manufacturer to create a unique product for them to sell exclusively. With private labelling and white labelling, the strategy can stay lean on the strategy investments in design and production and look for an edge in technology and marketing.

##### **✓ Wholesaling**

In a wholesaling approach, a retailer offers its product in bulk at a discount. Wholesaling is traditionally a B2B practice, but many retailers have offered it to budget-conscious consumers in a B2C context.

##### **✓ Drop shipping**

One of the fastest growing methods of ecommerce is drop shipping. Typically, drop shippers’ market and sell items fulfilled by a third-party supplier, like AliExpress or Print-full. Drop shippers act as a middle man by connecting buyers to manufacturers. Easy-to-use tools allow BigCommerce users to integrate inventory from suppliers around the world for their storefronts.

##### **✓ Subscription service**

As early as the 1600s, publishing companies in England used a subscription model to deliver books monthly to their loyal customers. With ecommerce, businesses are going beyond periodicals and fruit of the month clubs. Today, virtually every industry has seen the arrival of subscription services to bring convenience and savings to customers.

#### **2.4.4 Information product sales can be broken into two categories:**

**✓ Downloadable Material:** The most common downloadable material is an e-book. They range in price anywhere from \$3.99 to \$49.00 and up (\$3.99 is a common price for an e-book on Amazon while an e-book sold directly on the strategy website that covers a very specialized topic could sell for a much higher price point). Other downloadable material can include audio (MP3), video (MP4) and worksheets. The higher priced courses often include a combination of pdf and audio/video files. Because these products are delivered digitally and there are no costs involved the strategy get very high-profit margins on these types of products.

**✓ Membership Sites:** These range from online access to newspapers/magazine to full-blown training sites with video, audio, and interactive forums all behind a membership gateway. These often bill monthly or annual membership fees. Sometimes they are set to automatically deliver a set amount of content to each new member - like course lessons - over a set period of time. The goal of this “drip” method is to avoid overwhelming new subscribers with too much content and to keep them paying for a longer period of time. Having a membership site where members are charged monthly is a good way to get stable, recurring revenue into the strategy online business.

#### 2.4.5 Five primary online business models:

There is often a bit of subjectivity to each model and some overlap, but in general, we break online business models down into each of the five categories described below.

✓ **Software as a Service (SaaS):**

Revenue is generated from the sale of software on a subscription basis, which can be accessed by the customer as long as the subscription remains active.

✓ **E-Commerce:**

Revenue is generated from the sale of physical and / or digital products directly to customers via the internet. For example, eCommerce businesses selling generic products with a heavy reliance on Facebook advertising do not typically sell for as high multiples as other eCommerce businesses that have diverse traffic sources and unique products. This is because Facebook dependent eCommerce businesses have low barriers to entry and can be replicated easily at a fraction of the cost of acquiring an existing business. Additionally, these businesses are highly dependent on Facebook's algorithm, which changes frequently. Of course, Facebook eCommerce businesses have proven to be sellable, but buyers will adjust their valuations according to the increased risk and volatility. The eCommerce business model has many variations and sub-categories. We'll explore each below, but remember, these are all just variations of the eCommerce model! The strategy can view our selection of Ecommerce businesses for sale here.

- Digital eCommerce
- Drop shipping
- 3PL
- 3rd Party Marketplaces
- Subscription eCommerce

✓ **Digital eCommerce:** The first important distinction to make is the difference between eCommerce businesses which sell physical products (e.g. sporting goods, furniture, auto parts, vitamins & supplements, etc.) vs those which sell digital products (themes & plugins, audio guides, software, etc.). As an example, a business selling custom guitars online is quite different from a business selling WordPress themes and plugins. Though both would be classified as eCommerce, we would further classify the latter as a digital eCommerce business.

✓ **Drop shipping:** An important subcategory of eCommerce is the drop shipping model. Drop shipping is the practice of outsourcing the fulfilment and shipping of a product to a third-party provider, so that the company itself never orders inventory. Instead, it simply places the order for the customer in real time, and the drop shipping partner handles the rest. An order will be placed by a customer on the business's website, and the order details will then be communicated to a drop shipping partner who will fulfil and ship the order to the customer on behalf of the business owner.

✓ **3PL:** Third Party Logistics, or more simply 3PL, which is similar to and often confused with drop shipping, is the practice of outsourcing one or more elements of the warehousing, fulfilment and shipping process to a third-party provider. The primary difference between 3PL and drop shipping is that, with 3PL the company continues ordering its own inventory.

✓ **3rd Party Marketplace:** Another important classification of eCommerce businesses is the point of sale. Some operators sell products through dedicated websites, while others prefer selling through third-party marketplaces like Amazon, eBay or Etsy. As the sale and acquisition of businesses with a third-party marketplace becomes more common, the acquisitions industry has had to evolve and adjust.

✓ **Content:**

Revenue is generated by monetizing visitors, usually through advertising and affiliate sales. Content businesses include blogs, forums, directories, online communities, YouTube businesses and other online destinations where the primary offering to visitors is consumable content, typically offered for free, and revenue is generated by monetizing visitors through advertising or affiliate sales. The strategy can read our guides on the Google AdSense and the Amazon Associates business model for more info on this type of business. The content itself can be in the form of written content such as articles, guides, reviews, listicles, how to, social media posts, forum activity, and online reviews. It can also be other digital media such as videos, images, music, audio files, podcasts, infographics, eBooks, memes, animated gifs, etc.

Content based websites can be monetized in various ways, but the most common way is through advertising, and we can further categorize and classify content businesses based on the type(s) of advertising relationships they maintain.

- **Direct Ad Sales** – Direct advertising typically involves the business owner selling advertising space directly to an advertiser.
- **Advertising Network** – Ad Networks or ad exchanges are platforms where advertisers can purchase or bid on advertising space from publishers (i.e. website owners, etc.)
- **Affiliate Sales** – Affiliate marketing involves promoting and advertising other people's products, and generating a commission for resulting transactions.
- **Lead Generation** – Lead generation is the practice of one business generating leads for another, usually by capturing contact details through user expression of interest forms, and then selling these contact details to a third-party.

➤ **Services:**

Revenue is generated from the sale of services directly to customers via the internet. This online business model is most popularly associated with internet marketing and web design and development services such as SEO, content writing, logo design, and more. However, the services model also expands to include other traditional and non-traditional service-based businesses which are primarily generating revenue online. In the web acquisitions industry, there is often somewhat of a stigma associated with a certain class of generic internet marketing style service-based businesses, and the services category in general tends to have the lowest average valuation of the five major online business models.

➤ **Transactional/ Marketplaces:**

Revenue is generated by facilitating a transaction between two or more users on an online platform in exchange for a commission. The transactional business model, also known as the marketplace model, is an online business model whereby users engage in transactions, and revenue is generated by charging these users a fee or "commission" on each successful transaction.

This model was first introduced in the late 90's by tech giants like eBay and Amazon, and fuelled by the rise in the gig economy, has since been utilized by many companies to disrupt a wide array industry. The success of an online marketplace often depends on its ability to create network effects. Once network effects have been achieved these businesses have a low failure rate and their valuations typically soar.

Buyers of transactional marketplaces should investigate user growth rates, cost of customer acquisition and lifetime customer value as they develop their valuations and perform initial due diligence.

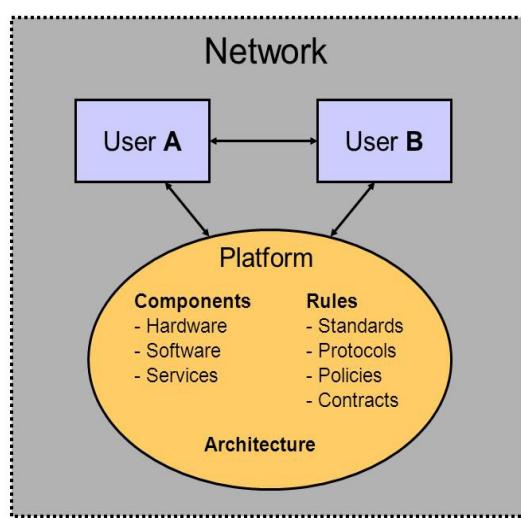
#### **2.4.6 Technology mediated platform networks:**

The conditions for a networked market to be served by one single Winner-Take-All platform are:

**Multi-homing cost are high-** which means users cannot use many same platforms, example: it is pretty hard to use all iOS, Android, and Windows Phone at once. On the other hand, when multi-homing cost are low, a user can own and use several platforms easily and cheaply, for example a rider can use service from Grab, Lift, and Uber at the same time to search for the cheapest fare.

**The network effects are strong and positive** so that the Winner can keep amassing more users, like the case of Airbnb, Facebook.

**The demand from users for different features are relatively low.**



9

**Figure Number: 2.4.6- Technology mediated platform networks**

✓ **Multi homing cost essential:**

Multi-homing cost is the cost of using more than one platform at the same time for the same purpose. In a sector where multi-homing cost is high, there is higher chance that one platform will be the WTA because after homing, users are less likely to use competitor platforms. As I noticed, multi-homing cost is proportional to switching cost. High multi-homing cost deters the switching process, which causes the switching cost even higher. In a low multi-homing cost market such as P2P shared driving, the switching cost is basically zero. Drivers can easily switch back and forth between Uber, Grab Taxi, and Lift by just one tap to open the mobile app. Riders can also multi-home to several platforms and choose the ride that cost less to them.

✓ **Switching cost only as a barrier:**

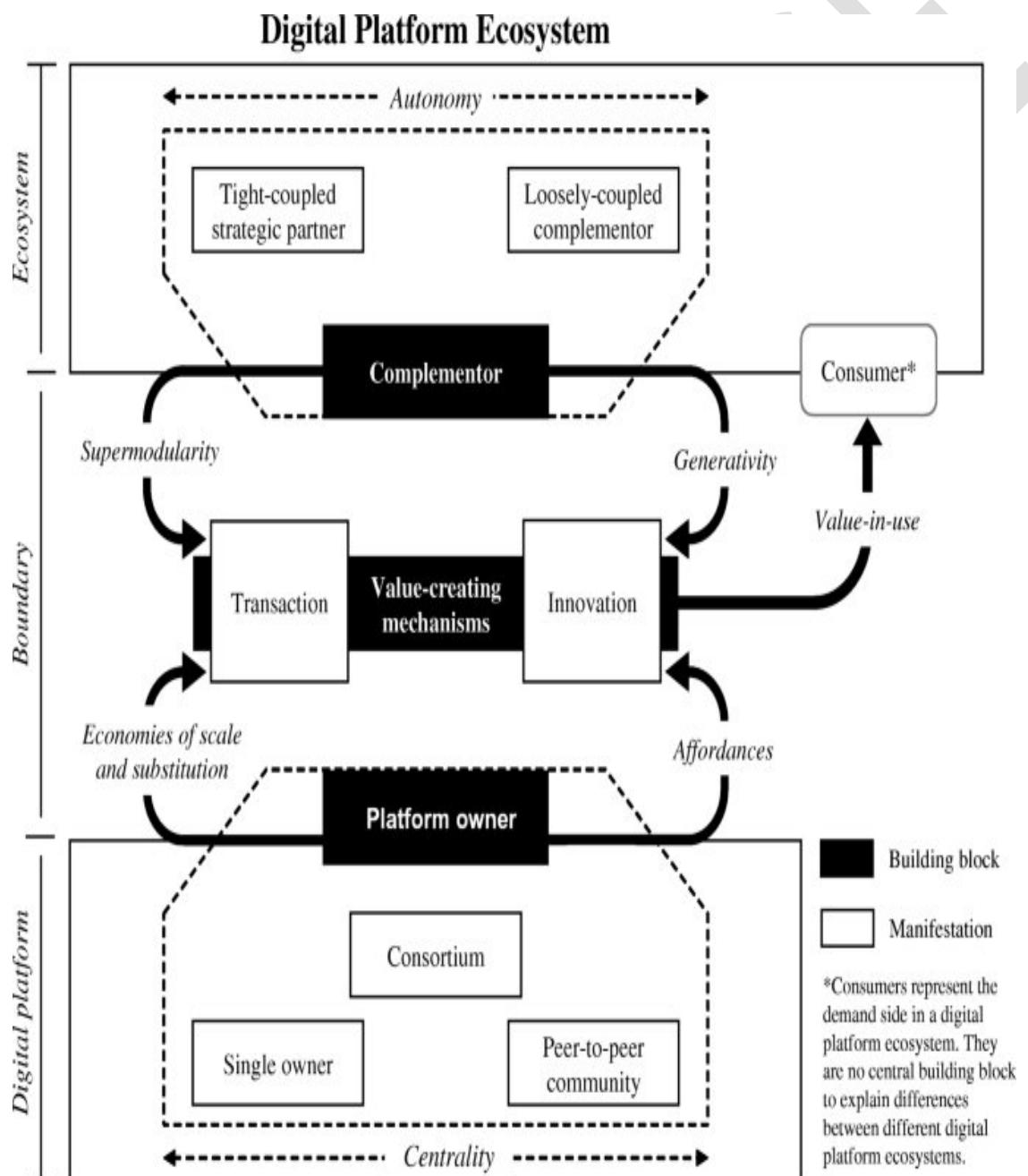
Switch cost is the cost of changing from one platform to another, or from one product/service to another, that the users will incur. This cost is not limited to only monetary cost, but instead it can be friction (mental) cost of new learning curve or mental frustration. Switching cost also includes hidden cost of time for exiting the old platform, setting up for the new platform, or migrating data from the old to the new platform if needed. The higher switching cost is, the less likely that users will change platform providers. For example, changing to a totally new blogging platform requires users to migrate old blog posts and to start attracting readers again.

✓ **Fund Racing Strategy:**

Racing to acquire users faster than competitor is common in platform competition. For example, in P2P shared driving, Uber, Grab Taxi, and Lift all try to subsidize both drivers and riders by discounting heavily to acquire more users and increase positive network effect. However, in a low switching cost market along with poor network effect, racing by discount

is very inefficient because customers not only can switch to whom offers the highest discount, but also do not care much about how large the customer base is. For example, in the Dot.com era, there were multiple pet supply platforms competed to be the WTA and tried to “get big fast”. Unfortunately, customers preferred discount price and did not care whether their friends/neighbours get pet foods from other platforms. They could easily multi-home to several platforms and buy from the heaviest-discounted pet supplier. Although the pet companies spent huge amount of money in advertisement, free delivery, and price discount, they still failed right when the Dot.com burst. The cost of acquiring new customer was certainly one cause to the failure.

#### 2.4.6 Technology mediated platform networks Ecosystem:



**Figure Number: 2.4.6 Technology mediated platform networks Ecosystem**

Platform-mediated networks encompass users whose interactions are subject to network effects, along with intermediaries who provide a platform that facilitates user's interactions. For our report we made an analysis on platform mediated networks and chose to compare Helping and Work Hard Anywhere (WHA). Below a short summary is written, where we describe the business models of each platform and will then shortly discuss their differences.

## **2.5 Sample Case study for reference:**

### **2.5.1 Case study on strategy implementation of Virgin Group**

Richard Branson, entrepreneurial owner and founder of Britain's untraditional Virgin Group, has fused two dissimilar lines of work – show business and commerce – into a single, extremely profitable enterprise. Virgin Group comprises more than 100 companies in 15 countries. It includes Virgin Atlantic, a 12-plane long distance carrier, the Virgin Retail Group outlets that sell CDs, videos and games; Virgin Communications including a small publishing company a commercial AM radio station, and a television station; Virgin Interactive Communication a computer games software publisher, and the Voyager Group a collection of diverse assets ranging from a hotel chain to a model agency. Branson's business strategy places him at the forefront as the company's most effective marketing tool. He has become the world's greatest underdog commented a London analyst. He is great actor. In addition, his strategy also involves making the most of publicity. If you have got an airline, Branson asserted, you've got to keep it in the public eye somehow. This he accomplishes through a variety of methods including headline grabbing adventures such as crossing the Atlantic Ocean by speedboat and balloon. Such exploits have served to define Virgin's organizational culture. In addition, morale is boosted by the success of Virgin Atlantic which had humble beginning as an upstart airline and was vulnerable to allegedly unfair competitive tactics by rival British Airways (BA). Being around through the gulf war, the recession and BA's dirty tricks campaign has been particularly satisfying. The airline now holds 22 percent of the transatlantic market. This is less than BA's share, but more than American or United holds. And Virgin is still expanding. The structure Branson relies on entails his heavy involvement. He believes in taking a hands-on approach particularly with airlines. At times, he even greets Virgin passengers at airports and asks them how they enjoyed their flights. Any time that he goes out to meet passengers he is always scribbling things he commented. With the airline in an industry plagued by intense competition and price survival remains a constant goal. Branson is therefore cautious. There are a lot of big airlines in America that have gone belly-up. As airlines get bigger, they sometimes get more vulnerable. Branson is determined not to let happen to his airline. In recent years, Branson appears to have mellowed with regard to his ambitions. Before he wanted to build the biggest entertainment empire in the world. Now, the man who has everything, doesn't need more. There is also an element of social crusading in him that needs to be assuaged. Branson has now found at least a degree of contentment, He is now complacent that he has enough money to have three meals a day, to feed his children, clothe them, take holidays and build up and continue to run his companies. He has no more ambitions to build the biggest company in the world. Branson remain conservative in his lifestyle. He attributes this to his respect for employees. As a businessman he thinks it's very important to set an example for his staff in the way you behave. You don't drive flashy cars and you choose a wife who isn't into diamond rings and expensive, glitzy clothes. In this he implied leads to a staff with similar values. In line with this, as Virgin has grown, Branson has broken operations down into smaller companies of between 50 and 100 people. He believes that each company should occupy separate offices and that employees should be able to take ownership of their company. A culture that emphasizes individual responsibility in this way enables drastic changes to take place quickly and easily. The systems within the company are also very supportive of empowerment. For example, through

the strong communication system, budgeting is explained to employees, with daily graphs that display performance by area in comparison to area budgets. The hiring system also relies on the empowerment of employees. At one point four junior employees were made responsible for hiring their own replacements when they were promoted. Virgin offices are extremely informal. With 15-foot ceilings, working fire places and lavish gardens the building is more like a home than a place of business. Antiques are scattered around, along with plush sofas, intimate family pictures, various plaques and models of Virgin airplanes. And employees dress casually in line with the surroundings. The elements of Virgin's strategy thus clinch the company's success. Under Branson's creative leadership exciting twists promise to lay ahead.

**Questions:**

- 1) Provide the SWOT Analysis for the above-mentioned case.
- 2) Did really the strategy implement was effective and successful?
- 3) If you are the Manager of this organization, what will be your reaction towards this strategy implementation?