Stakeholders Theory and Its effects on Organization's Technological Change

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ABSTRACT

This paper intends to investigate the effectiveness of the Stakeholders Theory in the organizational process of Technological change. It focuses on the importance of involving every stakeholder in the decision-making process. This focal point will be interpreted through integrating the Systems Theory with the organization's adaptive stage. It also shows how the Board of Directors (hereinafter, BODs)[1]and the executives manage this change and apply leadership skills when dealing with each stakeholder. This research deploys the stakeholders theory specifically focusing on shareholders, investors, management, employees and customers. The anticipated findings indicate that the application of governance theories and specially stakeholders theory is highly impactful. This paper intends to compare the typical outcomes based on literature with outcomes based on real life applications of organizational technological change. It shall be interpreted through a selection of change management models, CVC[2] analysis and technological change models. Moreover, measurements of the outcomes for each stakeholder's participation will be presented through (e.g. employees performance, ROI[3], etc.).

Keywords: Organizations, Organizational change, Stakeholders Theory, Stakeholders, Technology.

[1]**Board of Directors**: is a recognized group of people who jointly oversee the activities of an organization, which can be either a for-profit business, nonprofit organization, or a government agency.(Wikipedia, 2018)

[2]**Customer Value Chain**: an original methodological tool that enables design teams in the product definition phase to comprehensively identify pertinent stakeholders, their relationships with each other, and their role in the product's life cycle. (Donaldson, Ishii, Sheppard, 2006)

[3]**Return on Investment:** is a performance measure used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments. (Investopedia, n.d.)

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SECTION I

INTRODUCTION

1.1 The Organization's Technological Change

The organizational change is a process that occurs when an organization's contingency factor shifts (e.g. Size, Technology, Strategies and goals etc.) (Quttainah, 2017).The consequence of the former and the latter could be a single effect or combined that could cause an internal or external imbalance in organizations. Such influence may result in major losses of income, market share, resources, if not dealt with immediately. Executive managements are therefore developing alternative strategies to mitigate such hurdles. Technological change is an increase in the efficiency of a product or a process that results in an increase in output, without an increase in input. Someone invents or improves a product or process, which is then used to get a bigger reward for the same amount of work.(Winston, n.d.). This paper concentrates on only three examples of technological change as processes and products : Change in the information system, Change in the operations technology (equipment's, machines, etc.) and products/services technological innovation.

When the industrial revolution emerged, alongside with new machines and tools, It caused a tremendous reversal in the traditional pattern and means of production. Since then, technological revolutions are almost a daily event, with the factors of organization, technology, and people, organizations around the globe had grown larger, more powerful and more developed. Adopting new technologies became a critical way for businesses to survive and grow. All of these new technological arrivals demand change. It demands the creation of new business models and complicated supply chains. Businesses had to find new ways to decrease the inputs and increase the outputs. They started to aim for operational excellence; efficiency for higher profitability. Keeping up with the rapidly changing customers' demands is not an easy task, which forces businesses to respond to these changes as fast.

Processes and products move through technological change in three stages, Invention; the creation of a new product or a process. Innovation; the application of the invention for the first time. Diffusion; how fast the others begin to adopt the innovation (Winston, n.d.). These stages will be explained thoroughly in Section III.

1.2 Change Management

For organizations to remain competitive they must be able to quickly respond to rapid changes, that is why the core competency of the most successful organizations is their ability to manage change. The way they manage it is what keeps the organization growing consistently in the market. the secret of success is to adapt the internal factors of the organization with the changes, and only a strong and knowledgeable management can achieve that.

Change management is the formal process for organizational change, including a systematic approach and application of knowledge. Change management means defining and adopting corporate strategies, structures, procedures, and technologies to deal with change stemming from internal and external conditions. (Society for HRM, 2007)

To initiate change, the upper management must have a clear vision. Whether change is caused by external (political, economic, social, technological, or legal) or internal factors (policies, guidelines, systems, processes or the structure), having a vision will clarify the direction and goals of the change. In addition, the vision will support in motivating the stakeholders who are ought to take action in this direction. After the vision comes the strategic plan that will lead to achieving the vision. without a strategy and a vision to start the change with, change won't succeed. Because no one then will know why was the change initiated and how are they going to make it work until the end.

Change management is therefore an effective tool in ensuring that organizations maintain their relevance in terms of market share, revenue generation, industry leadership and optimization of resources (Pearce and Robinson, 2002).

1.2.1 Leadership Role in Managing Change

As mentioned before, The secret to successful change is a strong management that integrates both internal and external factors, to achieve organizational balance and attain growth, competitiveness and innovation. But since our focus is on technological change, which is a very special type of change that does not only require management skills, but also requires leadership skills. Managers with clear promising visions, passion and integrity, to lead the organization through the disarray to a thriving future.

Leadership is social influence. It means leaving a mark. It is initiating and guiding, and the result is change (Manning., & Curtis. 2015). A Leader is always after innovation and after development of not only the organization as a structure or a system but also the people within it, both teams and individuals, he or she believes that caring for and investing in their people's development, will grant the organization the greatest competency; having powerful human resources on hand. Leaders tend to focus on long-term plans for growth in knowledge, expertise, competency to do the right thing rather than focus on short-term plans for profits and unhealthy rapid expansion, which results in exerting control over every aspect of the organization and limiting chances of actual development, this reduces the value of an organization and its purpose.

Every change comes with certain challenges, hence the need to have change leaders in order to ensure that such organizations continue to raise the bar on ethical leadership and corporate behavior, as these values are an integral part of change process (Bolo, 2014).

A more detailed explanation of how leaders lead the organization through change will be interpreted in Section III.

SECTION II

LITERATURE REVIEW

2.1 Introduction

This Section explains the resolution process relating to managing organizational change as well as the organization's stakeholders, through involving each stakeholder in the decisions and matters of both its benefit and the organizations', and holding them responsible as participants of change management. It seeks to identify what impact theories will have on different organizations if applied. It also seeks to understand the effect of change on the entire operations of an organization.

2.2 Theoretical Foundation

Today, Technological innovations, are a universal issue and a solution at the same time, especially after the arrival of innovative tools and applications that caused an emergence of new markets and dissolution of others. companies all over the world across industries started mergers and acquisitions with other companies that have technological knowledge, to survive and compete. and therefore technological change and its effect on organizations has been the interest of researches and studies. Researches and case studies have been investigating on whether technological innovations creates wealth or reduces it, for example, for some shareholders, the best solution for technological change is through successful synergies, while some others believe that in-sourcing technologies for the competency and knowledge is worth both the money and the risk, these two types of shareholders think for the long-term growth. yet there are other shareholders who thinks that investing in technology is risky and requires huge investments which will reduce their returns. these shareholders generally prefer short-term returns.

The theoretical foundation of this study highlights two theories that have been used to explain the process of organizational change under the effect of technological factors. These theories also show the importance of the stakeholders participation in change management, it examines how different the adaptation is from a technological change to another (e.g. Information system, operation technology, products and services innovation) and how each stakeholder reacts with these different changes and what kind of solutions can be implemented when dealing with them to achieve a positive performance of all stakeholders combined.

2.2.1 Stakeholders Theory

Every stakeholder within the organization and its ecosystem[4] is important and has to be involved in all the decisions concerning matters of survival, success and growth. and that every stakeholder should be held responsible and accountable for any performance-relevant act.

Managers should acknowledge the validity of diverse stakeholder interests and should attempt to respond to them within a mutually supportive framework, because that is a moral requirement for the legitimacy of the management function (Donaldson & Preston, 1995).

The Stakeholders Theory addresses morals and values in managing an organization. It argues that a firm should create value for all stakeholders, not just shareholders. It is also an important element of (CSR) Corporate Social Responsibility (Freeman, 1984). This theory combines three factors that help in achieving sustainable change, which are management, ethics, and stakeholders. Management uses CSR to give all the stakeholders advantages which will enhance their performance and therefore, be reciprocated in the outcomes of the organizational change.

CSR is a business approach that contributes to sustainable development by delivering economic, social, and environmental benefits for all stakeholders. Executive managements implement businesses through improving their CSR activities that by which companies are able to encourage and improve the socioeconomic development. Whatever the definition is, the purpose of CSR is to drive change towards sustainability (Quttainah, 2017).

How the management manages stakeholders, applies CSR on them to enhance their performance in the organization's process of technological change, in addition to the outcomes of such application shall be discussed in Section III.

2.2.2 The Systems Theory

[4] Ecosystem: Organizational ecosystem is a system formed by the interaction of a community of organizations and their environment.(Daft, 2010)

Organizations are an open system with a purpose (Daft, 2010). which means that organizations are exposed to the threats of change in the external environment or to the opportunities it carries, whichever perspective the management thinks of the change from. and since the organization seeks to provide value to its stakeholders, it should react in a calculated, structured and a fast way. This is when the management does the screening of the environment, developing a strategic plan that integrates all change elements with the organization's functions and operations to reach its goals. The integration process goes over every level and every process of the organization, and the final result should be the goal that serves the organization's purpose (e.g. a product or a service that serves the changing demands and needs proposed by change, which also provides an added value to the customers.)

The Systems Theory emphasizes the external links that are part of every organization. Thus, organizations described as 'open systems' are part of a much larger network rather than as independent self-standing entities. Identification of both the stakeholders and the interconnections between them is a critical step in this approach. From a systems perspective, problems can only be solved with the support of the all the members, or stakeholders, in the network. Systems theory emphasizes the development of collective strategies that optimize the network (Freeman & McVea, 2001).

The purpose of this theory in our analysis is the relevance of it to the stakeholders theory and the optimization it will add to the analysis. It supports all processes of change by dividing it in six subsystems, to explain how every organization goes through continuous change and how crucial every stage is, a never-ending line of imbalance to balance, misfits to fits and so on. These subsystems are :

A. The Management Subsystem

It is when the management draws a strategic plan to reach their goals, establish the vision, mission, strategy, structure, and culture that will be administered through all levels of the organization.

B. The Adaptive Subsystem

This is when the management monitors the changes in the environment and makes sure that their services and products are suitable for the changing nature of the environment, That is to sustain competitiveness and survival.

If this function does not exist, the organization becomes a closed system, which is vulnerable to rejection by society and ultimately, unless it is completely self-sustaining, to death (Clawson, 2008).

This subsystem is the umbrella of all the analysis in this paper; ethical management of the change, Technological in our case, under the adaptive stage starting from monitoring the environment to creating an adaptive organizational forms with the involvement of the stakeholders. This stage will be the start of our analysis to know whether the application of stakeholders theory will grant great outcomes, in Section III.

C. The Boundary Spanning-In Subsystem

It is to control what comes into the organization. This includes money, people, supplies, and information. It provides a screen that keeps some things out and lets some things in. It is concerned not only with what to bring in, but how to do so in the most efficient manner and largest volume possible (Clawson, 2008).

D. The Production Subsystem

It is the process of turning inputs into outputs. (e.g. in a manufacturing company it happens in a factory, turning supplies into finished products).

E. The Boundary Spanning-Out Subsystem

It is when the managements coordinate to market for the products or services, to start out placing the employees who aren't meeting the required standards, and to start influencing the environment through public relations.

F. The Maintenance Subsystem

It is the function of maintaining the balance the organization had reached, by making sure all other subsystems are working efficiently in coordination together.

SECTION III

RESEARCH METHODOLOGIES & ANALYSIS

This section starts by defining and explaining the three types of technological change chosen for this paper; Change in Information technology, In operations technology, and in Innovating products/services, in accordance to the systems theory. Then it explains how to deal with each of the stakeholders when involved in this change, under the stakeholders theory, and displays the overall outcome their participation will bring to both them and the organization.

3.1 Introduction : The Adaptive Stage of Technological Change

Developing new strategies or operational initiatives is the most important way companies renew themselves, by helping to preserve their competitive advantage and stimulating platforms for long-term success. Preparing the company for a change by making any level of the organization better able to deal with it may be as important as the details of the project (LaClair & Rao, 2002).

Technological change is like any other type of organizational change, it goes through the hierarchy on all levels of management and affects all the stakeholders. Some organizations have fixed and formal rules that employees work by, but in order to initiate and integrate new technology, the management needs to know the attitudes of its stakeholders towards the present technology used and the new technology initiated, specially the employees. If their attitude is negative, there will be many conflicts to overcome, but if their attitudes turn positive that shows a signal of a learning organization that can adapt to changes in the environment, and aims for competitiveness. This is where managers can determine the first step in this adaptive stage; to identify the organization's culture[5], the values and ways of doing things that has been accepted by most of the people within the organization, helps the managers determine how adaptive the culture is, this could be the creation cause of many competitive advantages in the future.

In a learning organization, the culture encourages openness, equality, continuous improvement, and change. People in the organization are aware of the whole system,

[5] Organizational Culture : the underlying set of key values, beliefs, understandings, and norms shared by employees (Daft, 2010).

how everything fits together, and how the various parts of the organization interact with one another and with the environment. (Daft, 2010)

This is a vital step to ensure that the goals and strategies set to be achieved, can actually happen and are accepted by the organization's people.

The second step in initiating technological change is to conduct a feasibility study[6], That is to measure whether this projected change is valid, and will ensure effectiveness in the business processes. Operational excellence on the other hand is a meticulous matter that needs to be measured by all managers of all departments to determine how efficient was the work done using the new technology (e.g. employees productivity, time and waste reduction).

A feasibility study is a combination of various components, which the organization needs to consider before initiating the technological change, and they're also very crucial factors in convincing stakeholders such as shareholders and investors to invest money in it.

a) Market Feasibility

Describes the industry, the current and future market potential, competition, sales estimations and prospective buyers (Investopedia,2015).

b) Organizational Feasibility

Ensures that the organization is capable of adapting with new technology, internally and externally. If implemented, will human resources to be recruited be readily educated and trained to use this technology or not.

c) Financial Feasibility

Is the organization financially capable of affording the expenses of the change? How will they get financed and etc., In addition to the cost and benefit analysis.

d) Technical Feasibility

[6] Feasibility Study : an analysis of how successfully a project can be completed, accounting for factors that affect it such as economic, technological, legal and scheduling factors. (Investopedia, 2015)

It ensures that the reasons for initiating this technology in addition to its requirements, are rational. It also ensures whether the organization is capable of managing such requirements, and if this change is worth the effort.

The third step is starting the initiative. After convincing the stakeholders, apply the change using different methods and strategies. It is very important to study the outcomes of each change regarding technology, and what kind of measurements are required by the stakeholders or from the stakeholders to ensure the success of this project.

3.1.1 Change in The Organization Information System

Organizations that aim for having a core competency, usually result in enhancing or changing their information system. An Information System (IS) is a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making (Laudon, 2015). In the case of changing or adding an information system in the organization (e.g. TPS, MIS, DDS, ESS, E-commerce)[7], whether to a certain level of management or department, systems used by each are different, which is why specific questions must be asked; Will this application create a competitive advantage or a core competency to our organization? Will it help us survive the competition ? To answer these questions, some managers use Porter's Competitive Forces Model[8] or Benchmarking. Other questions to be asked such as, Will it Achieve our objectives, help in decision making, reduce waste, co-create business value, increase profits ? these have different measurements to the overall

- [7] TPS : Transaction Processing Systems, a computerized system that performs and records the daily routine transactions necessary to conduct business, for operational management level. (Laudon, 2015)
- MIS : Management Information System, Provides middle managers with reports on the organization's current performance (Laudon, 2015).
- DSS : Decision-support systems, focus on problems that are unique and rapidly changing, for which the procedure for arriving at a solution may not be fully predefined in advance.
- ESS : Executive Support systems, helps senior management make decisions, address non-routine decisions requiring judgment, evaluation, and insight because there's no agreed-on procedures for arriving at solutions. (Laudon, 2015)
- E-Commerce : Electronic commerce 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. (Investopedia, 2017)

[8] Porter's Competitive Forces Model : Provides a general view of the firm, its competitors, and the firm's environment. (Laudon, 2015)

performance. It is a very detailed and complex measurements that won't be included in this report, but will be displayed in general.

The first thing managers should do before changing the system is aligning the information system and the technologies used to run it, with the business objectives and generic strategies, that is to serve the organizational change in accordance. Then they should start thinking about the Inputs, How will they start it? Depending on the organization's position in the market, its financial ability, their goals and decision making process, They will either go for synergies (e.g. acquiring a business that manages IS), or collaborate with one (e.g. Outsourcing), or In-source the IS by constructing it as a whole, which requires an amount of knowledge, not to mention that all of these choices require great investments; financial, human resource and knowledge-wise.

After the Inputs comes the process of installing the system. Here, managers will decide on one of the various IS installation strategies :

a) Direct Cut-off Strategy

The management (responsible for managing the IS; MIS) decide on a date by which the old system as a whole will be replaced by a new one. It doesn't take into consideration the employees attitudes, leaders who care for their employees rarely go for this strategy.

b) Parallel Approach Strategy

The IS management keeps the old system running, and at the same time runs the new one. This way they give employees the chance to be introduced to the new system and start comparing it with the old one, in addition to getting their feedback for future adjustments. If the majority starts using the new system and agrees on it. The old one will be removed.

c) Phase-Out Strategy

IS management withdraws a part of the old system and replaces it with a part of the new one, gradually until the whole system is changed. It is risky, systems can't be restored and conflicts between the old and new parts will occur.

d) Pilot Strategy

This strategy is used in case of an organization that has diverse divisions, each has different objective and a way of processing things (e.g. University's colleges). The strategy changes the system of one division with a new one and gradually, does it to the rest in case of success.

The strategy chosen between them determines the type of management running the business. Only strong management that applies governance and has great leadership skills will know the suitable strategy for their organization and its people. The outputs stage is in measuring the Return on IT Investments, The rate of return, The Net operating income, Growth and operational performance of the managements and departments, the employees productivity also counts.

Return on IT Investment (ROI)[9] Formula :

ROI = Net Profit / Total Investment * 100

Refer to Appendix 1 & 2 for the IS effectiveness evaluation methodologies.

3.1.2 Change In the Organization's Operations Technology

Operations are considered the heart of every business in the world and the growth hormone of its supply chain, it is where the product or the service are processed from inputs into outputs. It is not limited to this process only, but it's much more complicated and needs more than knowledge to practice it. That is why most decisions made by the upper management aren't usually realistic to the operational managers who supervise the day-to-day activities. As we discussed before, the culture determines how the communication and decision making process is handled, and the most successful organizations are the ones that involve their operation managers in the future plans. Operation is not only about the making procedures, It is about forecasting demands,

[9] ROI : **Return on investment** is the ratio of a profit or loss made in a fiscal year expressed in terms of an investment. It is expressed in terms of a percentage of increase or decrease in the value of the investment during the year in question. (Study.com, 2018)

allocating resources, controlling the quality of the production and the process, managing inventories, distribution, and etc. which means any minimal enhancement in one of these procedure's technology will reduce the cost of money, time and increase the production with a great value added to the organization, If planned and implemented effectively. When we come to discussing the stakeholders, we will discuss a one certain way most of the upper managers tend to use to enhance the performance of the organization, to quicken the adaptive stage of the change, and to ethically involve managers as stakeholders in order to create balance.

To change or add a technology in an operations process, First the organization's objectives and strategies should be conveyed clearly from the upper management to the operational management through a clear organizational structure. Second, the area of change must be clarified, studied and budgeted well; Since information technology that we explained above is an inseparable element of the operations, the change might be in IS technology used in operations, or it might be in the machines used by the workers, or any tool used in production or in operating the production facility. and last, the operation workers must be introduced and trained to use these systems and equipments to ensure great quality production. these steps are general, while in real life it is more difficult and precise.

As long as the business keeps growing, change and enhancements in the operations becomes a mandatory process, to cover the demands and survive competition in the environment. If the operation managers forecasts great demands due to marketing efforts or launching new products, It will require more machines, more labor, more operating and storing spaces, more distribution means, and more time (taking into consideration different cases and different capacities). there might be many options in front of the managers, but the most efficient one relies on an effective solution that reduces waste of resources. It might be a developed machine, or a new system of greater capacity or more space. this requires investments and great budgeting for a long-term result. That is why many managers in learning organizations create cross-functional teams made of different functional departments to find a solution, the HR manager will train or recruit the best HR, the finance and accounting managers will help in budgeting and conduct the cost benefit analysis to better make a decision, the marketing department will help in designing the product and allocating distribution areas and etc.

When they all have the same goal and are all enlightened by the limitations and what's available, they will find the best solution.

To decide whether to in-source or out-source an equipment, managers should think beyond financial perspective, because it might be cheaper to outsource, but the main rule of successful businesses is to know the worth of your product and its process, If it's critical to your company's survival and success then keep this in your mind: "Never out-source your core competency" it is rule number one in the book. If it's not a competency then consider other factors like comparing the quality or the knowledge of your business with the suppliers.

From a financial perspective, usually operation managers compare the total costs of making and buying a certain quantity of equipment, machine, or any item whether as a direct manufacturing cost or an indirect manufacturing cost, using these formulas :

Outsourcing costs formula :

$$TC_{Buy} = FC_{Buy} + (VC_{Buy} \times Q)$$

Where

TC_{Buy} = total annual costs of buying the item from a supplier.

FC_{Buy} = fixed annual costs associated with buying the item from the supplier.

VC_{Buy} = variable costs per unit associated with buying the item from the supplier.

Q = quantity of units bought.

Similarly we calculate the total cost of making the item in-house as :

$$TC_{Make} = FC_{Make} + (VC_{Make} \times Q)$$

Where

TC_{Make} = total annual costs of making the item in-house.

FC_{Make} = fixed annual costs associated with making the item in-house.

VC_{Make} = variable costs per unit associated with making the item from in-house.

Q = quantity of units made in-house.

after calculating both costs, the solution with the lowest cost is the one to be chosen. After that the manager should calculate the indifference point by which it would be indifferent to whether he/she bought the item or produced it in-house.

The formulas are as follows :

$$Indifference\ Point = Q^* = \frac{FC_{Buy} - FC_{Make}}{VC_{Make} - VC_{Buy}}$$

OR

$$FC_{Buy} + (VC_{Buy} \times Q) = FC_{Make} + (VC_{Make} \times Q)$$

Formulas Resource : Reid, R. D., & Sanders, N. R. (2013). *Operations management: An integrated approach* (5th ed.).

These are methods to decide on one of the two solutions. Other measurements to evaluate the effectiveness of the operation technology installed :

Figure 1 : Criteria of the system evaluation. Source : Antosz K, Stadnicka D. Evaluation measures of machine operation effectiveness in large enterprises: study results.

No.	Criterion	Characteristics	Exemplary indicators
1.	Informational and operational	Related to the organisation and course of maintenance processes, as well as those concerning the achievement of goals or certain needs, and the impact of the control system on its operation.	Indicator of technological advancement Indicator of machine average age Indicator of repair service rate Indicator of repair requirements accomplishment Indicator of maintenance staff employment Indicator of timeliness of executing major, medium, current repairs and overhauls, Indicator of maintainability
2.	Economic	Related to plus (benefits) and minus (inputs) value effects as well as to profitableness of investment and finance activities in a system.	Indicator of profitability Fixed and variable costs of machines maintenance Indicator of the costs of major and medium repairs, and current maintenance Spare parts maintenance costs
3.	Technical and maintenance	Related to the system elements operability, particularly to technical means, and expressing the impact of technology on their operation; related to the operation of the elements and means for the system continuity, they also express the influence on the system capability to remain in an up state in the specified time.	Indicator of performance Indicator of machine idle time Indicator of machines damage and failures Indicator of technical availability Indicator of machine use Indicator of a shift system
4.	Safety	Related to the risk of losses (human – loss of life or damage to health, ecological, material), which commonly relate fault states of the system elements to the probability of loss caused by them; the extent of the potential losses.	A number of accidents at machine operation and use A number of hazards arisen during machine operation and use

Refer to Appendix 3 for further details.

3.1.3 Organization's Innovation in Products/Services

When organizations start to change and develop for survival and success, they aim at modifying their strategy, focus on how the organization is affected by the environment and on how relationships in the ecosystem can improve the change and development process. It might include changes both in the structure and in the process to support the changes in strategy. The top management becomes more focused on solving the company's problems in strategy and structure. To keep up with different changes that must occur to the organization, the management can't focus on everything in one time, they narrow their scope to one or two organizational forms and do great in them (e.g. service, product, system, operations, etc.).

To focus on technological innovation, many organizations tend to trade other aspects off, like innovating a certain product and spending a lot of money on it while neglecting other services or the operations and other areas of the business than needs development. they tend to invest in research and development for a single or two products that are the most profiting. (If it's not profiting, it shouldn't be given any thought) regardless of the opportunities these neglected forms might give if attended to.

To start initiating innovations, the management looks at all the resources that are within their hold and what they need to acquire to start inventing and commercializing their product or service. If they have the financial ability, or a resource of finance (e.g. investors, shareholders, creditor, etc.), they will conduct an acquisition on a certain supplier and expand their supply chain (vertical integration), that is if they have the money, in other cases they will subcontract and outsource some materials or components (if their product is not a core competency). But if they have the resources and lack the knowledge, they'll start collaborating with other organizations in joint ventures. Many decisions to take and many calculation to make.

The change process in products and services requires many gradual steps, either do them all or focus on one thing. For survival, managers go for fast and quick solutions with the least costs to avoid losing their investors and shareholders. Projects that promise earlier returns are preferable to those that promise later returns, other than that the change process will be slowed down. In order to prove whether the innovation is worth the investment or not, Accounting and finance managers calculate the Net

Present Value (NPV)[10] of the project, not because it only determines if the project is acceptable or not, but it also takes into consideration the time value of money.

If the NPV is positive, then the project is acceptable because its return is greater than the required rate of return. If the NPV is zero, then the project is acceptable because its return is equal to the required rate of return. If the NPV is negative, then the project is not acceptable because its return is less than the required rate of return (Garrison, 2014).

The calculation is as follows:

$$NPV = PV\ (Inflows) - PV\ (Outflows)$$

OR

$$NPV = \frac{R_t}{(1+i)^t}$$

Where

t = the time of cash flow.

i = the discount rate, i.e. the rate of return that could be earned per unit of time on an investment with similar risk.

R_t = the net cash flow i.e. cash inflow – cash outflow, at time t. For educational purposes, R_0 is commonly placed to the left of the sum to emphasize its role as (minus) the investment.

The result of this formula is multiplied with the Annual Net cash in-flows and reduced by Initial Cash outlay the present value but in cases where the cash flows are not equal in amount, then the previous formula will be used to determine the present value of each cash flow separately. Any cash flow within 12 months will not be discounted for NPV purpose, nevertheless the usual initial investments during the first year R_0 are summed up a negative cash flow.

[10] NPV : Net present value, is the difference between the present value of cash inflows and cash outflows. (Garrison, 2014)

Given the (period, cash flow) pairs (t, R_t) where N is the total number of periods, the net present value NPV is given by:

$$NPV\ (i,N) = \sum_{t=0}^{N} \frac{R_t}{(1+i)^t}$$

Many computer-based spreadsheet programs have built-in formula for PV and NPV.

Resource : Wikipedia contributors. Net present value. In Wikipedia, The Free Encyclopedia.

The discount rate calculation :

$$Discount\ rate\ (Rate\ of\ return) = \frac{Amount\ recieved - Amount\ invested}{Amount\ invested}$$

Resource : Brigham, E. F., & Houston, J. F. (2009). Fundamentals of financial management (12th ed.).

These calculation will result in the numbers the financers and manager want presented to them, to make the rational decision.

3.2 Stakeholder Approach : Acceptance of Technology Initiative

As discussed before in section II, The stakeholders theory proposes creating value for all stakeholders in an organization, it is not just for the benefit of the financial performance, but it is an ethical business act that adds value to the organization for the long term. It is recognized it as an important element of Corporate Social Responsibility (CSR), improving the CSR activities for the sake of organizational development is what managements are applying nowadays to achieve sustainability in their business practice. It also promotes the corporate citizenship of how the organization is perceived by internal stakeholders.

Stakeholder approach suggests that managers must formulate and implement processes which satisfy all and only those groups who have a stake in the business. The central task in this process is to manage and integrate the relationships and interests of shareholders, employees, customers, suppliers, communities and other groups in a way that ensures the long-term success of the firm. A stakeholder approach emphasizes

active management of the business environment, relationships and the promotion of shared interests (Freeman, 2018).

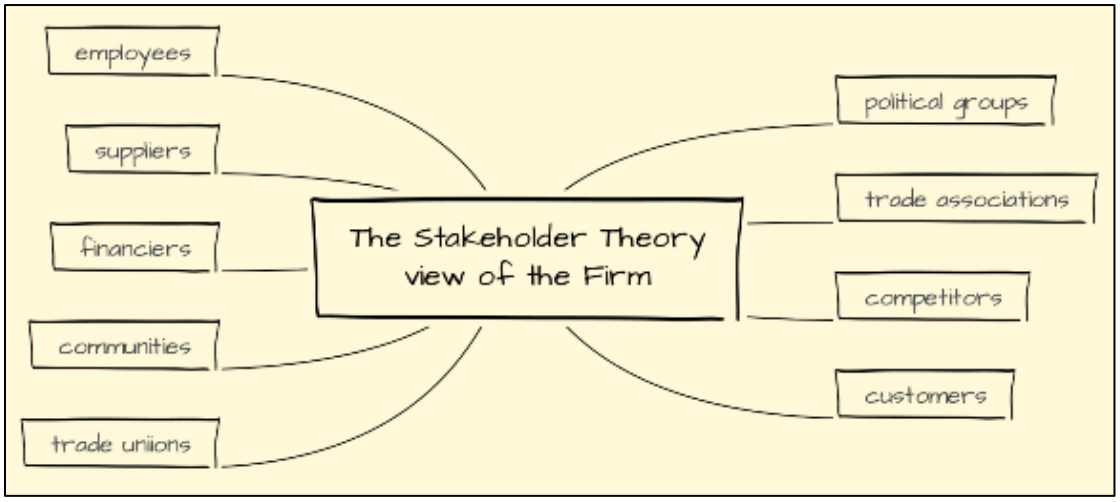

Figure 2 : stakeholder Map. *resource: Strategic Management: A Stakeholder Approach.*

A stakeholder approach encourages management to develop strategies by looking out from the firm and identifying, and investing in, all the relationships that will ensure long-term success. From this perspective it becomes clear that there is a critical role for values and 'values-based-management' within business strategy. Diverse collections of stakeholders can only cooperate over the long run if, despite their differences, they share a set of core values. Thus, for a stakeholder approach to be successful it must incorporate values as a key element of the strategic management process (Freeman, 2018).

For example 3M's core values include " a respect for individual initiative and personal growth"; Merck's core values include "profits, but profit from work that benefits humanity"; Hewlett-Packard's core values include " respect and opportunity for HP people" and "affordable quality for HP customers" and "profit and growth as a means to make all else possible"; Marriott's core values include "people are #1 treat them well, expect a lot, and the rest will follow'; and Walt Disney's core values include "to bring happiness to millions, and to celebrate, nurture and promulgate wholesome American values." This was Freeman's way to simply identify the organizations that apply the collaborative stakeholder relationship, in order to start studying the outcome of their strategy application.

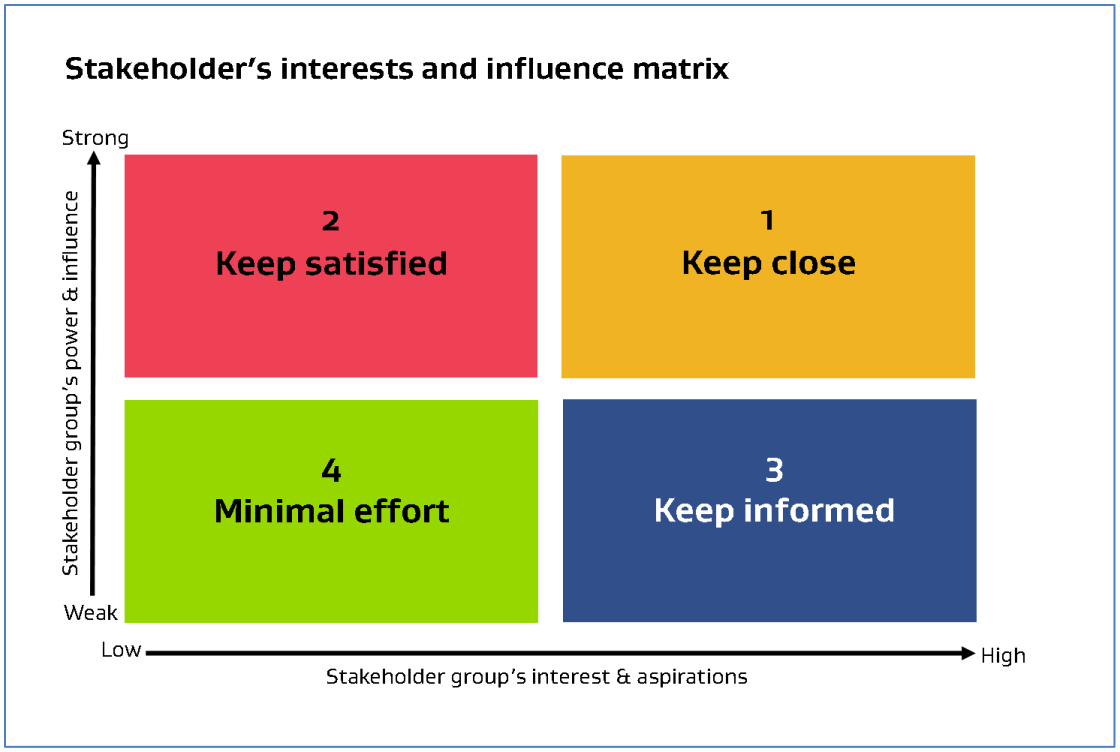

Figure 3 : Stakeholder Framework. Resource : Set up governance and project structure, from https://www.procurement.govt.nz/procurement/guide-to-procurement/plan-your-procurement/set-up-governance-and-project-structure/

Kotter (1996) suggests that for change to be successful, 75 percent of a company's management needs to "buy into" the change. In other words, we have to work hard and spend significant time and energy building urgency; Help others see the need for change and the importance of acting immediately, before moving onto the next steps.

The hypothesis this paper intends to prove, is that by adopting the stakeholders theory and involving the stakeholders in the change process, the organization will be able to apply technological change effectively, and through ethical and sustainable standards.

The following discusses how the management gains the stakeholders acceptance of technological change (as the change process was previously explained), and therefore, create the collaborative stakeholder relationship.

3.2.1 Shareholders & Investors

Shareholders[11] and investors[12] are considered a financial resource to the organization they own shares in, both require evidences of return such investments would bring, and that is since technological change of all types consumes a great amount of investments, and technology in general is not an industry of high certainty; it is continuously changing which means investments have to keep coming. Unlike the investors, shareholders have the right (among many) to decide on how their investments should be divided and distributed, that is one of the reasons why many businesses care to please shareholders above other stakeholders.

Smart shareholders and investors study the industry, the market, and the financial performances of companies they aim to invest in over a period of 5 years after their technological change, to ensure that the management is trustworthy of handling this change process. The numbers, financial ratios and rates investors and shareholders care to see and understand are the NPV, ROI, rate of return (ROR), growth rate, market capitalization, liquidity ratios, asset management ratios, debt management ratios, profitability ratios, earning per share, revenues, and net income. **Refer to Appendix 4 for definitions and descriptive formulas.**

This is not the only way to gain a shareholder's acceptance and obligation to the benefit of the organization, but the upper management needs to apply corporate governance and take actions to prevent conflicts between shareholders that have different desires and goals. this is why we previously insisted on aligning all stakeholders with the organization goals and strategy.

Example

Etsy[13] has been operating as an e-commerce marketplace for years, recently they have innovated different technologies to help their sellers across the globe to operate effectively, They developed seller service tools that helps them in categorizing, pricing, promoting, shipping, and getting payments. they also developed apps for their sellers

[11] Shareholders : commonly referred to as a stockholder, is any person, company, or institution that owns at least one share of a company's stock. (Investopedia, 2018)
[12] Investors : is any person who commits capital with the expectation of financial returns. (Investopedia, 2018)
[13] Etsy : Is an e-commerce marketplace that sellers and buyers around the world can sell and buy handmade, and vintage products. (etsy.com, 2018)

"Sell on Etsy" App, an "Etsy credit card reader" for sellers to use on their mobile phones. This resulted in :

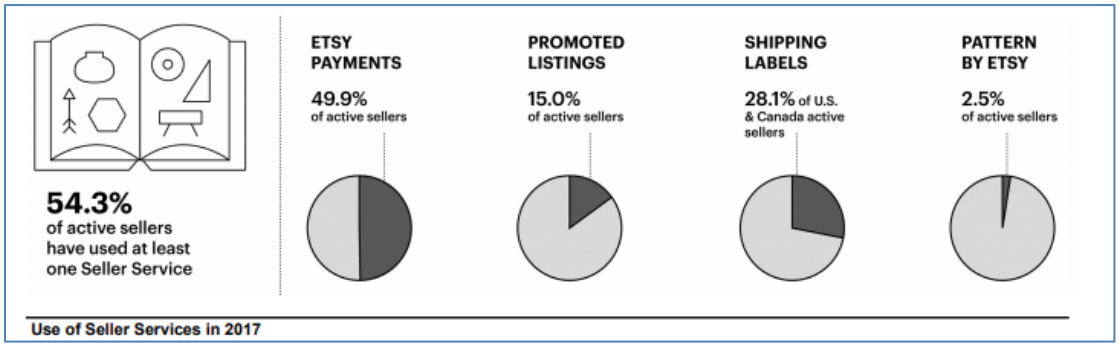

Figure 4 : Use of seller services in 2017. *Resource : Etsy's annual report 2017.*

They also developed translation machines in their offices to support their workforce diversity, these machines can translate over 10 languages, significantly increasing the inventory available to non-English speaking Etsy buyers and giving Etsy sellers access to a truly global audience. They also translate conversations and reviews and are applying machine translation to translate Promoted Listings. They are also leveraging their machine learning technology to advance their search capabilities and enable shoppers to more easily browse, filter for and buy that perfect item. In Addition to their partnership with Google, "Google Cloud Partnership" to support their sellers in their operations.

This had a great impact on their financial performance, *"For the year ended December 31, 2017 approximately 66% of our visits and approximately 51% of our GMS were generated on a mobile device. This is up compared with 2016, during which 64% of our visits and 48% of our GMS were generated on a mobile device. We are focused on increasing conversion rates in general; however, we are particularly focused on mobile web, which accounted for 46% of our overall visits in 2017 up from 45% in 2016, and continued to be the largest driver of both overall visits growth and mobile GMS growth. Mobile web conversion rate is about half the conversion rate on desktop and the conversion rate on mobile Buy on Etsy app is about 1.2x the desktop conversion rate. Therefore, if mobile web visits continue to grow as a percentage of overall visits, it could be a headwind to future conversion rate gains."* (Etsy's annual report, 2017)

Figure 5 : Track record of growth. *Resource : Etsy's annual report 2017.*

Etsy's Market Capitalization is $3.52 Billion with a share price of $29.50 (2018) . The following table sets forth the high and low intra-day sales price per share of Etsy's common stock as reported by Nasdaq for the periods indicated. Shows the reaction and acceptance of investors of the technological applications and developments in Etsy :

	2017		2016	
	High	Low	High	Low
First Quarter	$ 13.61	$ 9.41	$ 9.40	$ 6.04
Second Quarter	15.46	9.90	10.10	7.60
Third Quarter	17.90	13.58	15.70	9.08
Fourth Quarter	21.86	15.27	16.05	10.84

Figure 6 : high and low intra-day sales price per share of Etsy's common stock as reported by Nasdaq. *Resource : Etsy's annual report 2017.*

Refer to Appendix 5, It displays a performance graph that shows the returns for Etsy through the period 2015-2017. Links to view their Investors relations, and to view the annual report 2017.

3.2.2 Management & Employees

Since all the previous point discussed are under the adaptive stage of the organization (systems theory). the previous point about the shareholders and investors summed the part where the organization realizes factors of technological change and starts looking for inputs to process it. This point, is where the process starts, the management and the employees are the core of it, they operate it and are highly affected by it, and they also manage this change until balance is reached.

Management

From a systems theory perspective, Corporate governance is the explicit and exclusive responsibility of the Board of Directors in all types of organizations. governance does not come in different types; it is a single system, the responsibility of a single entity, the Board (Bourne, 2012). which means that the board is responsible for applying the stakeholders approach e.i. stakeholders theory, they might be accountable by the shareholders but they should care for other stakeholders who take the responsibility of the organization and its changes on their backs. This system relies on sub-systems to be effective :

The Governance System, is responsible for setting strategy and ensuring resources are used effectively. To achieve this, it is heavily reliant on the organization's management system and additionally, the Board may have some involvement in the management processes (e.g. approving very large projects). The *Management System*, manages the entire organization from within, and supports the governance framework. Executive management are responsible for creating an organization capable of achieving the objectives defined by the governance system and also capable of providing assurances to the governance system that resources of all types are being effectively and ethically used. Middle and front line managers are responsible for implementing the work.

The Project Delivery System is a sub-set of the overall management system, this specialized area of management is responsible for all aspects of the 'management of project management'. And naturally, a core component of the Project Delivery System are the individual *Project Management Systems,* each system responsible for creating

the project or program was initiated and deliver it, to the management to make effective use of, and generate value. (Bourne, 2012).[14]

Now the board and the executives are the ones responsible for the technology initiative, and most importantly, aligning the interests of all managements and subsystems with the renewed goals and strategies. This will give them the push to start influencing their departments e.i. employees, and work effectively with high motivation.

We have discussed before the importance of leadership and its role in the change process, specially the adaptive stage. Only successful leaders can make the best practices while implementing their decisions. Leaders in the management subsystem and the governance subsystem had found a way, that is commonly used now, to align goals and strategies of managements with the organization's, an initiative to start involving them as valuable members of the organization and giving them the responsibility, in addition to the feeling of involvement that results in high motivation. In short, apply stakeholders theory, quicken the adaptive subsystem of the systems theory, and achieve sustainability through CSR.

Budgeting. A crucial matter, especially when it comes to technology, because it is about distributing resources on the departments. resources are power, wherever you put your resources, that part will become your competency (e.g. Volvo's investments are centered on cars safety, Volvo cars are the safest). In many organizations, the upper management does the budgeting and transfer their own vision along with goals that usually seem unrealistic to the managements, specially the operations management who are knowledgeable of the day-to-day activities including the requirements of acquiring and operating different technological changes them.

That is why there is what's called, a master budget, An essential management tool that communicates management's plans throughout the organization, allocates resources, and coordinates activities (Garrison, 2014). This budget allows all managements to participate and share the same objectives, decide their budgets, and make comparative budgets of the present situation and future outcomes.

[14] Specialist sub-systems such as a Project Control Board (PCB) operate within this overall structure to fulfill specific purposes. (Bourne, 2012)

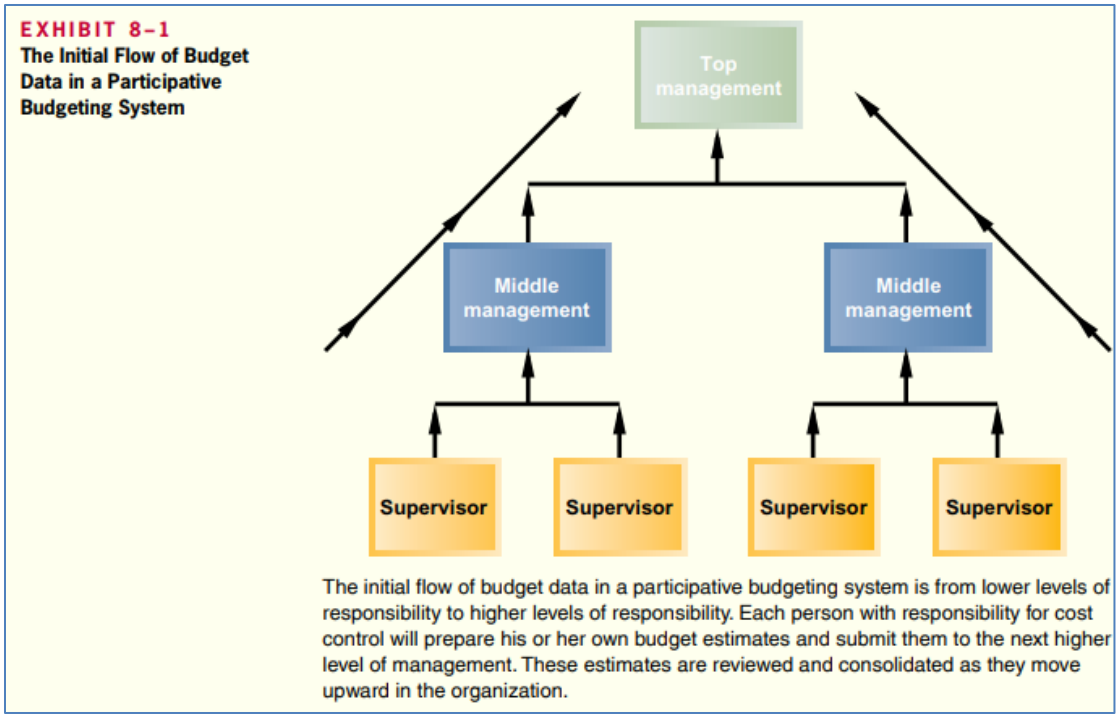

Figure 7 : The initial flow of budget data in a participative budgeting system. *Resource : Managerial Accounting (2nd Ed.), Ray Garrison, 2014.*

The self-imposed budget, or the participative budget is a budget that is prepared with the full cooperation and participation of managers at all levels (Garrison, 2014). This way the managers will feel like they're part of the team, their accuracy of judgments are valued. Under technological change, they know what's needed, they can set their own goals to reach and budget for it, the requirement of developing a technology or innovating, the amount of investments spent on it, This creates commitment.

The issue with this method is that it lacks sufficient strategic direction and lower level managements may be tempted to build slack into their budgets to escape not meeting targets. That is why leaders are needed, a budgeting system is not applied unless studied, the leadership in the upper management creates a budgeting committee, that is responsible for initiating the budgeting system, monitor the budgets and reviews the master budget, they also account problems. They apply the concept "Responsibility accounting" for governance purposes, to monitor, direct, and control. Every manager is responsible for the budget he/she makes and the items under his/her control extent. Budgets are personalized for their makers, every mistake in it, the manager is accountable for it. Leaders do not take this method as a punishment tool, but as a tool to make the manager feel responsible, and responsibility means involvement. This is a

basic common way to integrate goals and strategies that helps in processing crucial changes e.i. technological change.

Employees

When it comes to making big changes in an organization, adopting a new information system, renew operations technology, and develop innovations. Executives know that the wild card in the pack is their employees capacity to adapt to a new system, a new technology. Not all organizations can afford to wait for the strategic human resourcing to bring the required recruits. If the employees misunderstand or resist the technological change, success or failure depends as much on how the change is made as on the project itself. referring to the previously suggested strategies under change in the information system. Fortunately, when companies attempt to change, a little improvement goes a long way, That is why investing in employees in the first place, saves organizations future conflicts.

To determine the role of people and process issues, department managers are usually asked for a progress reports on employees, and that help the HR management realize the issues and create solutions for them. The workplace environment and the culture of the organization determines whether it would be easy or not for everyone to share the psychological and sociological effects of change. A culture built on socializing and sharing will adapt faster than closed environments. This will set the HR manager to the next step of helping them embrace the technological changes of systems and operations, training, group sessions, brainstorming sessions, and mentoring are very effective. It is also an opportunity for the management to integrate their CSR activities with the environment, this creates a positive atmosphere and enhances productivity.

Not to forget, an effective vision drawn by the upper management should be imaginable, desirable, feasible, flexible and communicable and also communicate for understanding and buy in by making sure as many people as possible understand and accept the vision and strategy (Kotter,1996). Change in the vision may get lost in a clutter of communication. In addition, enable action by removing as many barriers as possible so that those who want to make the vision a reality can do. Create short-term wins; create some viable and unambiguous successes as soon as possible and do not let up; press harder and faster after the first success, be relentless with initiating the change until the vision is a reality (Kotter, 1996). Never declare victory too soon. Finally create

a new culture; hold onto the new ways of behavior until they become strong enough to replace the old traditions.

The other tool used to explain change in an organization is the Kubler-Ross change model. It helps people to understand different reactions to significant organizational change. At any beginning stage of a given change, most people would react with shock and denial due to lack of information or fear of the unknown. However, when the process is followed and change is successful, individuals accept that change is inevitable and begin to work with the changes rather than against them; this brings in acceptance and integration in the entire organization as people start thinking of new and exciting opportunities, relief that the change has been survived and so forth (Dean, 2009).

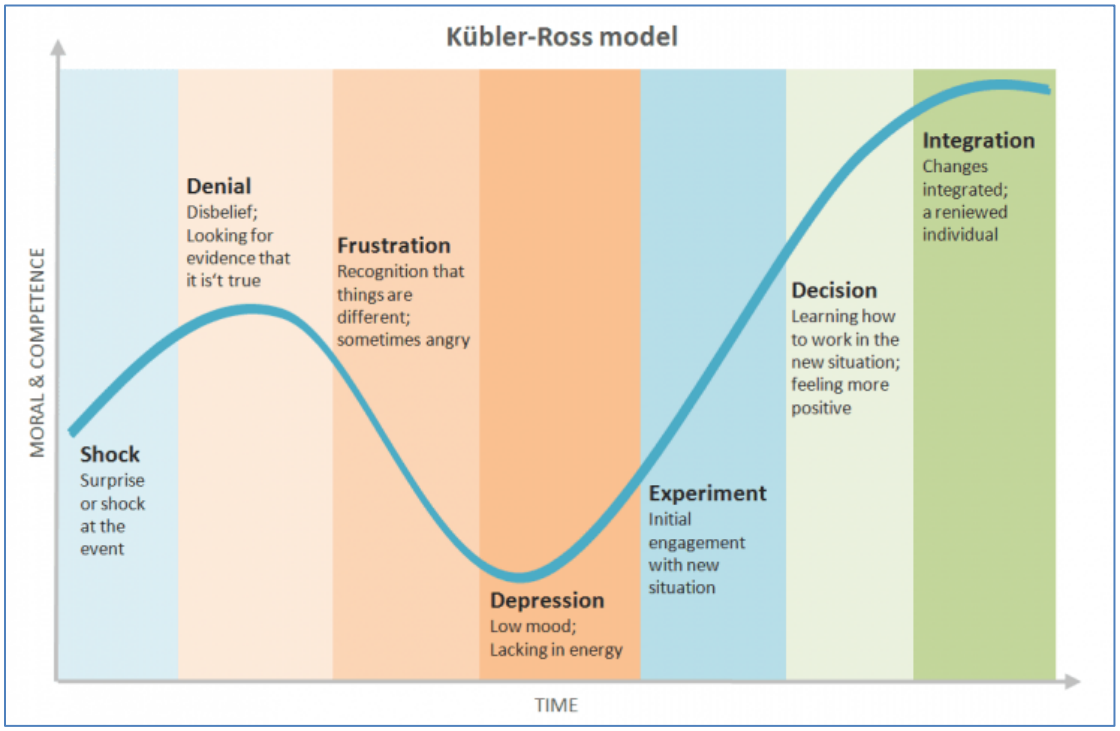

Figure 8 : Kubler-Ross Change Curve. *Source : Understanding the Kubler-Ross Change Curve. (2016, March 12). Retrieved May 25, 2018, from* https://www.cleverism.com/understanding-kubler-ross-change-curve/

3.2.3 Customers

Customers are the first to taste the fruit of the change, before the create revenues for the organization for the managers and shareholders to enjoy. They are also the thermometer that measures the degree of success for their change. Will the customer realize it? will their attitude turn our positive or negative? It is essential to know the value of your customer, this will enable you to serve them will through the transition, specially technology wise since people nowadays are into the trend and have meticulous opinions regarding innovations and service systems.

Customer satisfaction is a strategic weapon that results in increased market shares and profits , begins with the commitment of top management, involves the entire organization, can be quantified, measured, and tracked. It also has fundamental organizational structure implications (Anton, 2003).

Traditional organizations tend to measure customer satisfaction by revenues, revenue volumes, and account receivables, which is not sufficient. Executives need to have a way to calculate the value of a customer. Companies generally start with technology i.e. innovation and service systems without understanding the factors that make a them successful. To reap a sizeable ROI for a products and services, a company has to understand the financial correlations among customer satisfaction, customer retention, customer lifetime value, and a company's profitability (Anton, 2003). If customers are satisfied, they are retained. The longer the customer is retained, the more value they provide via profits. As long as managers understand that, they will be able to get their customers acceptance to the change they initiated.

We call the financial connection of all three aspects : satisfaction, retention, and customer lifetime value, the Customer Value Chain (CVC), which is illustrated in figure 9. The CVC is what enables technology to gain revenue share (Anton, 2003).

The customer value chain can be examined by looking at :

- customer revenue
- customer profitability
- customer loyalty
- customer growth

The value of a customer is realized from the revenue stream that each customer brings to a company. Many companies measure revenue per customer in order to calculate sales commissions. Order and billing systems store customer revenue information from which customer revenue reports can be generated.

The primary form of return on a technology system comes from allowing a company to better engineer the customer's experience to increase the frequency of "great" experiences, thus leading the company to be the preferred company of choice for a long time. Also important is that employees of the company are trained to interact and manage changes well to ensure customer satisfaction (Anton, 2003).

Analyzing profit means that you need to know costs. Current accounting systems don't do a great job of measuring actual costs. Accounting systems can measure historic costs and suggest an average direct and indirect cost for a product. In addition, they can allocate a portion of corporate overhead, sales and marketing costs to a product or customer.

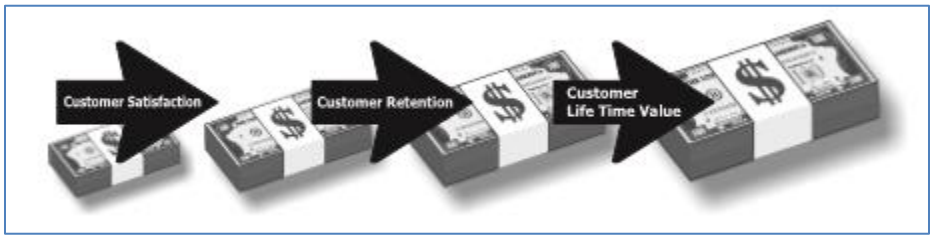

Figure 9 : Customer Value Chain. Resource : D. L. (2003). Integrating People with Process and Technology. *"Gaining Employee Acceptance of Technology Initiatives"*

The following is a method to calculate customer :

One Customer's Value

The following is a method to calculate customer by (Anton, 2003).

For the sake of illustration we will demonstrate a customer lifetime value calculation, assuming for one customer that:

1. the stream of revenues from the customer is level across time at $25 per month or $300 per year = R. 2. the interest rate (opportunity cost) is the bank rate paid on the money for which no other specific use is made and is assumed to be 9% = i. 3. the time

a typical customer stays with a company is 3 years = N. 4. the formula for the calculation is then:

CLV=R

$$\frac{1}{\frac{1-(1+i)^N}{1}}$$

where

R = annual revenue received from a loyal customer. i = the relevant interest rate or opportunity cost of money per period. N = the number of periods in which a customer makes purchases. In our example, the lifetime value profitability of our typical customer is $759.39. Calculating the value of a saved customer is identical to calculating the lifetime value profitability. Why? Because a customer saved can be expected to stay another lifetime— everything else being equal.

A good reason for a company to purchase a technological solution is to have a process and the technology that will provide data on the customers. But to apply stakeholder theory, the company needs to involve them in the process. Many organization had already made the customer part of their operations. The transparency was the key to customers hearts, whatever we are going through, our customers need to know of. questionnaires, customer service, recommendations, and voting. all of these are ways used by organizations to initiate participation and involve customers as part of the organization. this way they pave the way for changes to come, customer will expect and anticipate. This increases the customer value.

SECTION IV

CONCLUSION

From the discussion and analysis above, supported by the theoretical foundation. We conclude, that it is crucial to any organization to involve its stakeholders in the adaptive stage of change. they may vary in power and in benefits as well, but they are equally essential in the decision making process of technological change. Technology is very critical and it is hard to make a decision regarding it, specially the funding area, It is hard to find investors that like taking risks, and can't proceed with the funds without the participation of the knowledge and perspective of the internal stakeholders.

As we had realized through this paper, Customers can tell exactly what you need to do, the employees have the potential to operate the solution, the managers are there to guide them and manage the process, while the board monitors and controls the overall performance of the organization, then comes the shareholder, investors to fund this project because of the attractive historical financial reports (in case of adaptive organization). the competitors will start strategic alliances with the organization, the government will support the vision of achieving sustainability and therefore will provide the organization with the needed resources (e.g. Strategic HR) . and finally, the society will give the organization the legitimacy.

The perfect circle happens only for effective application of governance theories, and continuously monitoring the environment for new changes, not to forget readiness for future challenges.

The stakeholders effect on the technological change, if applied effectively and ethically, will enhance and quicken the technological change since it is a sensitive and uncertain industry. Stakeholders participation will add more value to organizational form of the company. they are an inseparable part of any organizations.

APPENDICIES

- **Appendix 1**

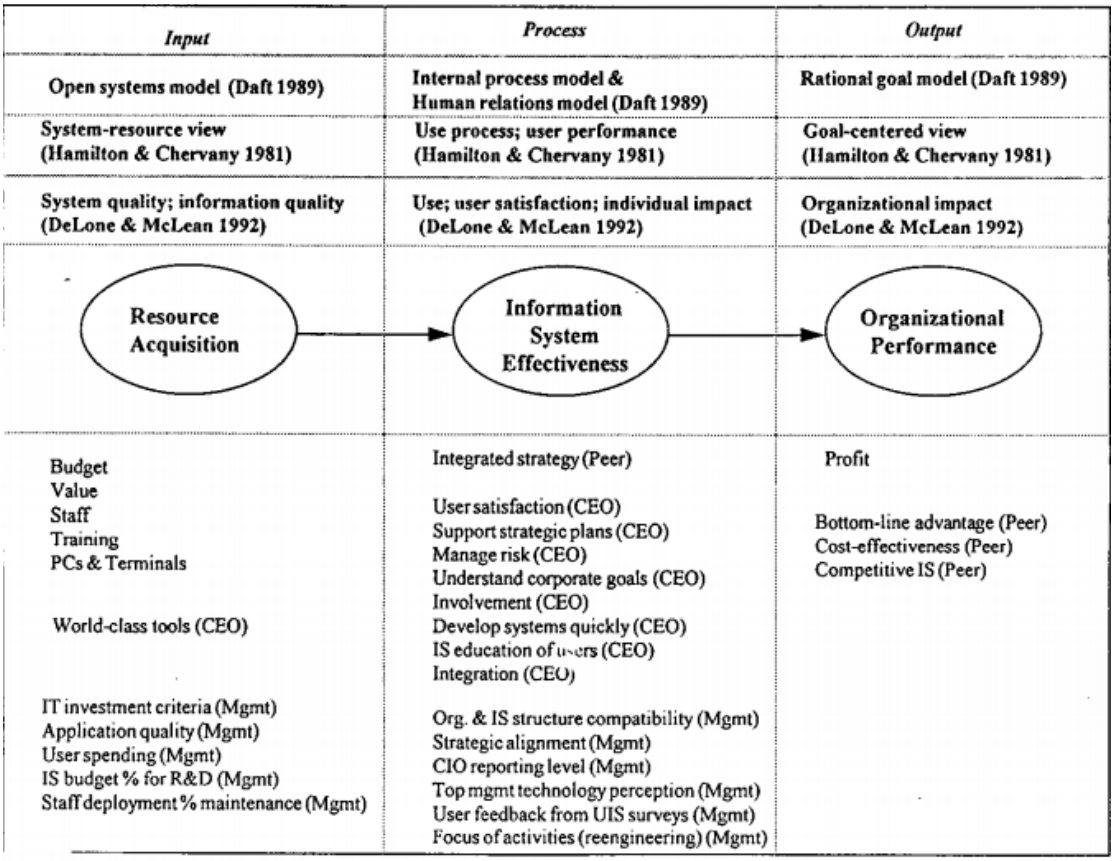

Figure 3. Mapping *Computerworld* Measures to a Theoretical Framework

Resource : Scott, Judy; Konsynski, Benn; Blanning, Robert; and King, David, "The Measurement of Information Systems Effectiveness: Evaluating a Measuring Instrument" (1994). ICIS 1994 Proceedings. 66. http://aisel.aisnet.org/icis1994/66

- **Appendix 2**

Methodology for IT performance evaluation, Considering corporate governance.

Resource : S. B., I. R., & S. D. (2014). Journal of Information Systems and Technology Management. *PERFORMANCE MEASUREMENT OF INFORMATION TECHNOLOGY GOVERNANCE IN BRAZILIAN FINANCIAL INSTITUTIONS*, *11*(1), 1-18. doi:10.4301/2531 http://www.scielo.br/pdf/jistm/v11n2/1807-1775-jistem-11-2-0397.pdf

- **Appendix 3**

Methodologies and formulas for evaluating operations effectiveness in detail.

K. A., & D. S. (2015). Evaluation measures of machine operation effectiveness in large enterprises. *Study Results*, 1-11. Retrieved May 23, 2018, from http://www.ein.org.pl/sites/default/files/2015-01-15.pdf

- **Appendix 4**

Key Financial Definitions

Market Capitalization	it is the market value of a company's outstanding shares. Calculation: the stock price multiplied by the total number of shares outstanding. The higher the better.
Liquidity Ratios	It measure a company's ability to pay off its short-term debt obligations.
Current Ratio	It is a liquidity ratio that measures a company's ability to pay short-term and long-term obligations. it indicates a very strong, safe liquidity position. Calculation: dividing current assets by current liabilities.
Quick Ratio	It is a measure of how well a company can meet its short-term financial liabilities. Calculation: Deducting inventories from current assets and then dividing the remainder by current liabilities.
Asset Management Ratios	It measures how effectively the firm is managing its assets.
Inventory Turnover Ratio	It is a key measure for evaluating just how efficient management is at managing company inventory and generating sales from it. Calculation: Dividing sales on inventories.
Total Assets Turnover Ratio	It measures a company's ability to generate sales from its assets by comparing net sales with average total assets. Calculation: Dividing sales over total assets.
Debt Management Ratios	It measures how much of a company's operations comes from debt instead of other financing, It measures the company's risk and likelihood of a default.
Debt Ratios	It indicates the percentage of a company's assets that are provided by debt. Calculation: Dividing total debt over total assets.

Profitability Ratios	It is used to assess a business's ability to generate earnings compared to its expenses and other relevant costs incurred during a specific period of time.
Profit Margin	It measures net income per dollar of sales. Calculation: Dividing net income by sales.
Return on Assets (ROA)	It illustrates how well management is employing the company's total assets to make a profit. Calculation: Dividing net income by total assets.
Return on Equity (ROE)	It is a measure of profitability that calculates how many dollars of profit a company generates with each dollar of shareholders' equity. Calculation: Dividing net income over common equity.
Market Value Ratios	They are used to evaluate the current share price of a publicly-held company's stock.
Earnings per share (EPS)	Is the portion of a company's profit allocated to each outstanding share of common stock. It indicates the company's profitability. Calculation: Subtract the net income of dividends on preferred stock and dividing it over average outstanding shares.
Volume	It is the amount of a security that were traded during a given period of time.
Revenue	It is the income that a business has from its normal business activities. Calculation: multiplying the number of a product sold by the sales amount.
Net Income	It is a company's total earnings. Calculation: taking revenues and subtracting the costs of doing business.
Growth Rate	It is the percentage change of a specific variable within a specific time period, given a certain context. Calculation: Subtract the present value of the past value and divide the result over the present value.

Resource : Brigham, E. F., & Houston, J. F. (2009). Fundamentals of financial management (12th ed.)

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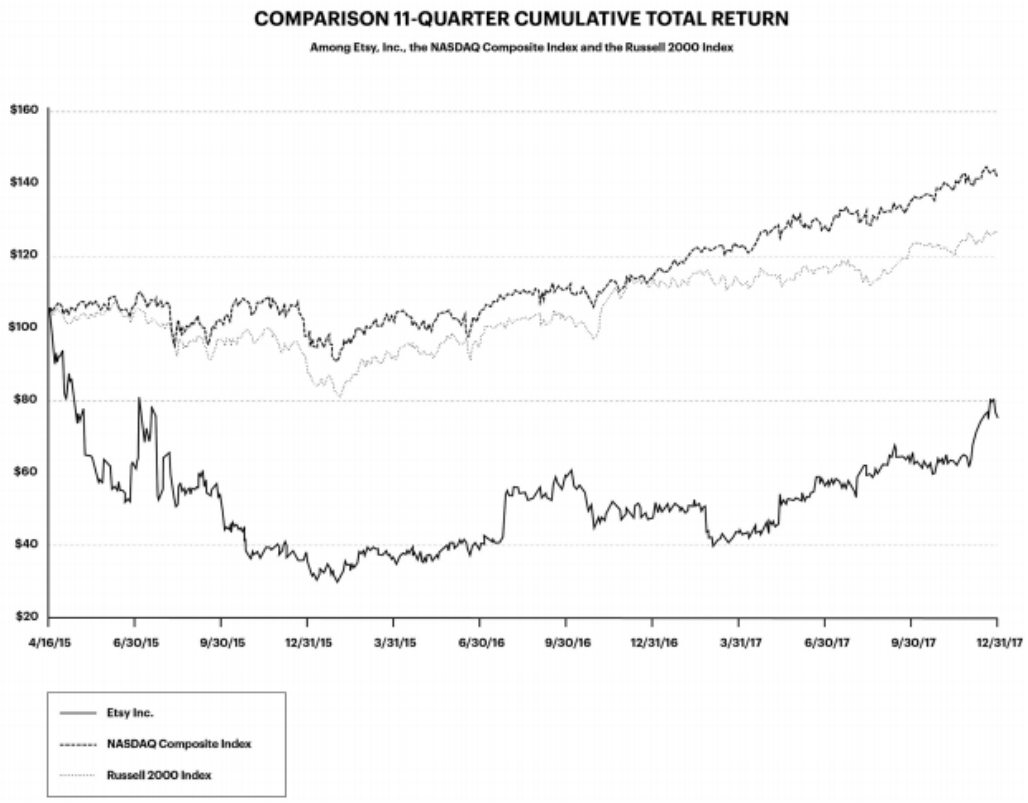
- **Appendix 5**

Performance Graph

The following graph shows a comparison from April 16, 2015 (the date our common stock commenced trading on Nasdaq) through December 31, 2017, of the cumulative total returns for our common stock, the Nasdaq Composite Index and the Russell 2000 Index. The graph assumes $100 was invested at the market close on April 16, 2015 in the common stock of Etsy, Inc. Such returns are based on historical results and are not intended to suggest future performance. The Nasdaq Composite Index and Russell 2000 Index assume reinvestment of any dividends.



This performance graph shall not be deemed "filed" with the SEC for purposes of Section 18 of the Exchange Act, or incorporated by reference into any of our other filings under the Securities Act or the Exchange Act.

Figure 7 : performance graph that shows the returns for Etsy through the period 2015-2017. *Resource : Etsy's Annual report 2017.*

Etsy's Investors relation and stock price information (Updated daily) :

https://investors.etsy.com/stock-price

Etsy's Annual Reports :

https://investors.etsy.com/annual-report-and-proxy-materials

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