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How Effective Leadership can Facilitate Change in Organizations through Improvement and Innovation

By Moo Jun Hao & Dr. Rashad Yazdanifard

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Abstract- This research intends to explain effective leadership and how it can bring positive change that helps the organization to improve and be innovative in the current business environment. Effective leadership and change management will be discussed in this article and also how leadership affects other factors, for instance trust, culture and clear vision, in the organization as it facilitates the change. Leadership is one of the main factors in bringing positive change to the organization; if there is no leadership in the organization they will not be able to change in the direction they desire and could experience negative change instead.

Keywords: *leadership, change management, improvement, innovation.*

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How Effective Leadership can Facilitate Change in Organizations through Improvement and Innovation

Moo Jun Hao ^a & Dr. Rashad Yazdanifard ^σ

Abstract- This research intends to explain effective leadership and how it can bring positive change that helps the organization to improve and be innovative in the current business environment. Effective leadership and change management will be discussed in this article and also how leadership affects other factors, for instance trust, culture and clear vision, in the organization as it facilitates the change. Leadership is one of the main factors in bringing positive change to the organization; if there is no leadership in the organization they will not be able to change in the direction they desire and could experience negative change instead.

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I. INTRODUCTION

The rapid growth of the economic environment as well as the emergence of the internet made it easier to communicate with countries around the world. This in turn changed the business environment in every country, causing a competitiveness in the market that increases with each passing year (Friedman, 2007). In order to keep their business afloat, business owners discovered they had to offer better quality products at a lower cost, employ strategies that were uniquely suited for the organization to adapt according to current business trends and also flexibility in facing the rapid change of the business environment.

Effective leadership is one of most essential parts of the overall method for an organization to sustain their business in the face of problems caused by the rapid growth of the economic environment. (Cabeza-Erikson, Edwards, and Van Brabant, 2008) Leaders are the one who control and take charge of the operation of an organization and good leaders are able to set optimistic goals and objectives while steering the operation of the company towards those goals through effective strategies. Other than that, good leaders can also influence their employees and motivate them by strengthening a positive organization culture and through generous employee benefits, for instance health care insurance, worker compensation, leave benefit and others.

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Intelligent leaders also have the responsibility to use their skills and knowledge to effectively and efficiently guide their business forward in the face of an uncertain future and also to decrease the feelings of insecurity in their employees caused by that uncertainty. A leader has the power to influence the success of the organization, due to his full power to control the direction of the organization, as well as through the influence they exert on their employees that motivates them to bring the company to greater heights.

II. EFFECTIVE LEADERSHIP

Leadership is a kind of power where one person has the ability to influence or change the values, beliefs, behaviour and attitudes of another person (Ganta, and Manukonda, 2014). A person with strong leadership ability will be a good example or role model to their employees, because the leader who is able to effectively achieve some good result or achievement gains the trust and admiration of their employees, and inadvertently changes their values, beliefs, behaviour and attitudes, for mimicry is the sincerest form of flattery (Grint, 2007). This statement is also supported by Northhouse (2009), who states that leaders who possess strong leadership have the strength to influence others to achieve the goals and objectives of the organization.

Other than that, there is also another way to define a leader that has strong leadership. A characteristic of effective leaders is that they give a clear direction to their employees, and also lead their employees to commit to their jobs and to work as a group to achieve the organization's goals and objectives (Wasim, and Imran, 2010). This also tells us that good leaders usually have a clear vision for the company and therefore can easily identify the problems and obstacles that currently stand between them and the aims of the organization. In this way they are able to effectively and efficiently bring about the necessary reforms that will bring the company into the future while keeping abreast with contemporary changes in the business world.

According to Jackson and Parry (2008), leadership is a process where leaders use their skills and knowledge to lead and bring a group of employees in the desired direction that is relevant to their

organization's goals and objectives. Additionally, an effective leader that has strong leadership skills should also be in possession of certain characteristics, such as, passion, consistency, trust and vision; for only leaders who own these characteristics are able to build trust in employees.

Leadership and management are two different aspects, management is more like the traditional way of managing business, which the owner of the business has complete control of the organization, and will single-handedly establish a direction and direct their employees to do their work in accordance to the owner's instruction and plan. On the other hand, leadership is when the leader guides their employees towards the organizational goals, all the while trying to communicate and motivate their employees in order to make sure their employees are in the right position to use their talents and commit to their jobs. Leadership strategies also will change according to the current trends when necessary, unlike management that merely follows its old, traditional rules. (Graetz et al., 2010)

III. CHANGE MANAGEMENT

Change has always been an issue for organization, just as it has always been a common characteristic of human life. Change is definitely hard for humans to accept as it is something that pull people out of their comfort zones, which forces them to change their habits and makes them highly uncomfortable (Lorenzoni, Nicholson, and Whitmarsh, 2007). For example, a worker usually starts work at 9 a.m.; if his supervisor suddenly requests the worker to begin work at 7 a.m., the worker will be late to work because force of habit keeps him waking up late. The same thing applies to the organization, if an employee's normally does their work following the sequence of A to Z, suddenly changing the sequence of work from Z to A, can be quite difficult for all the employees to get use to in a short period of time.

Change management in an organization can be defined as an approach to deal with change in two different areas - the organization and the individual, with individuals and the overall organization adapting to change at their own pace and style (Rouse, 2014). Change management allows the organization to catch an opportunity to gain a competitive advantage, if the organization effectively and efficiently implements and adapts to the change of the market (Du Plessis, 2007). There are three stages in change management, which are adapting to change, controlling the change and lastly effecting the change. The first stage, adapting to change, is determining the individual readiness to adapt to the changes and their willingness to commit to the change. The second stage involves controlling the change and implementing it in daily life. Lastly, effecting the change, is to sustain the change and to get used to it in life. (Hritz, 2008)

The time taken for the process of change management in an organization is hard to determine, due to the difference in individual employees' ability to adapt, as some might rapidly embrace change, while others might take a longer time to engage in the change. Just like some employees will be happy with the change, and some might not. The leader should communicate and work together with the group of employees to sustain the long term process changes (Wuestman and Casey, 2015).

IV. CHANGE FACTOR LEAD BY LEADERSHIP

In terms of leadership, it is defined as the ability to influence a group of employees' values, beliefs, attitudes and behavior. (Ganta, and Manukonda, 2014). A leader with strong leadership skills can easily motivate and influence the employees of the organization and apply effective changes to the organization. According to Atkinson, if there is no effective leadership in an organization no changes will be made, because there are no leaders that motivate and lead the organization's employees as well as provide a clear direction for the organization (Atkinson, 2015).

a) *Trust*

Trust is an essential issue in leadership for leaders, as gaining the trust of group members or employees could help to improve the overall performance and commitment of the group members or employees (Lee et al., 2010). If the employees or the group members trust in their leaders, it reflects that they are good, effective leaders. Only when the employees trust in their leader will change be brought about, because people will only follow a person that they trust to lead them to the correct path; not a leader that only talks but without action to back up their words (Stacey, Paul and Alice, 2011). If the employees trust their leader, this relationship will bind them together and improve the overall performance and commitment of the employees; if it happens conversely, the performance and commitment of the employees will go downhill and could cause a high employee turnover rate in the organization.

b) *Organizational Culture*

Leadership can shape a good culture. A culture is shaped within the trust between the employees and the leaders of an organization, or it can be defined as cultures need trust to be able to form. Employees and leaders in the organization need to trust each other in order to shape a positive organizational culture. Leaders with strong leadership skills are able to shape a positive culture in the organization (Ionescu, 2014), due to them being able to inspire trust from their employees. A positive organizational culture not only improves performance, but also influences the behavior and attitude of the employees in the organization for the better. In addition, it motivates employees and gives

them a sense of belonging to the organization, which inspires loyalty and commitment to the company (Schein, 2010). A good organizational culture not only improves the performance and reduces the turnover rate of the organization, it also facilitates the solution of internal issues in the organization. When a good organizational culture is established, that does not discriminate based on races, religious and etc, it provides a pleasant environment to work in, thereby reducing internal conflict and encouraging discussion and cooperation in order to work through any inter-employee issues that crop up. In addition, good organizational culture encourages a sense of healthy competition, motivating employees in the organization to be more innovative. Therefore, a strong organizational culture can change the overall performance of the organization.

c) *Learning*

An effective leader can encourage employees in the organization to learn through certain types of motivators, such as rewards or position (Azzam, 2014). Continuously learning is one of the ways to improve the overall performance of the organization. It is not only the employees that need to improve but even all segments of the leadership levels of an organization, if only to set a good example to the bottom line to motivate them to learn. Leaders should join leadership training programs in order to strengthen their skills and knowledge, making them more effective in their strategies and execution (Freifeld, 2013). The same goes for employees, as sending employees for further training will improve their ability to do their job as well as help to facilitate the effective implementation of the desired changes. This helps the organization to increase the productivity and performance of the employees (Abou-Moghli, 2015). Since learning does not have an end, leaders need continuous improvement of their leadership skills and knowledge to be competitive in the business market nowadays (Park, et al., 2014). If an organization or leader stops improving and as a result find that their skills and knowledge are insufficient, their company will surely find itself deteriorating. The organization, Nokia, is a very good example, Nokia was once one of the best cell phone brands in the world, but Nokia did not continuously improve their skills and make changes in order to adapt to the new trends and needs of the market, and Nokia dropped from the one of the best to a brand that not many people pay attention to (Lee, 2013).

d) *Teamwork, Communication and Leading*

Besides strengthening their leadership skills, leaders also need to encourage the employees of the organization to be innovative and cooperative. Teamwork and communication are the best way to create innovative ideas in order to produce the best outcome for the organization (Maxwell, 2009). To

achieve the kind of teamwork and rapport that is necessary for the birth of innovative ideas, leaders need to cultivate a positive culture where the employees trust each other, are allowed to do their own jobs without too much interference and have the freedom to establish a dialogue with one another (Malloch and Melnyk, 2013).

Leaders that wish to facilitate effective change in the organization should encourage employees to collaborate and communicate with each other, for this is how people are able to create and discover new ways to think (Gilley, Dixon and Gilley, 2008), which produces a greater outcome for the organization and also encourages them to learn from different people the ways to improve themselves. Even high ranking management can learn from the strong points of their employees, which they might find themselves lacking. Communication helps people to get to know each other, and also could help to create more new ideas by sharing opinions with each other. It is also one of the best ways to gain each other's trust and bond the whole employees in the organization together.

Lastly, leadership not only influence the employees in the organization, but also provides a clear direction to the employees according to the organization's vision and mission. Effective leaders set strategies to help the employees to achieve the company's target and objectives. Leader also play a role in monitoring the direction of the employees to make sure the employees are on the right path to achieve the goals according to the strategies. This is only possible with effective leadership that inspires employee trust, as employees are unwilling to follow someone who has little to no idea of what they are doing and who wastes too much time and resources on the unnecessary.

V. DISCUSSION

Effective leadership plays an important role in managing a business in the current business environment, for the old ways of business management are not enough to sustain a company in the modern market. Although leadership and management are two completely different systems, an organization might be surprised to find that there is no one system that completely suits their needs, so it advisable that they focus on the skills that are suitable for their organization. Management is a system that is based more on planning, budgeting and controlling. The organization is emphasizes on following the plan that is set by the upper rank executives in the organization, and following their orders to solve problems. Leadership focuses more on guiding the employees, leading them in the desired direction, according to the organization vision and mission while communicating with and motivating them to complete their tasks. Under leadership, the boss guides and works together with their employees to

produce their desired outcome; while old style management orders employees to follow directives while the upper management is focused on planning and both are separate and do not work together.

Besides that, the current business environment requires organization to make changes in order to keep up with the rapid changes in the business environment. If the organization fails to make changes in order to adapt to the market they will fail to survive and will face bankruptcy. Leadership is in charge of providing a clear vision and a systematic way to effectively achieve that vision, for if there is no leadership there is no change in organization management (Atkinson, 2015).

Although leadership can bring lots of changes and increase the organization's performance, but in reality there are more factors to consider that might affect the possibility of the changes to occur. Every employees' behavior and attitudes are different, some employees might be able to easily adapt to the change but some will resist the change; some might accept the ways of their leaders and learn from the action of their leaders but some will become jealous of their leaders and refuse to cooperate. This would drag the performance of the organization down. Effective leadership is the best way to managing changes though it must be remembered that there are no problem solving solutions that are perfect and that issues will still be faced that cannot be fixed.

VI. CONCLUSION

Effective leadership is essential in managing change and change is the only method to sustain the organization in the current business environment. As usual, change is hard for people, people will feel uncomfortable because of change and even sometimes deny the change, continue as they are and be eliminated by the society. Therefore, leadership can be a factor to motivate and encourage people to continuously make change and push them to change. Leadership plays a role in an organization to motivate and encourage the employees to change in order for the organization to be able to sustain and adapt to the business environment, to make sure the organization will improve and be innovative. The case of Nokia, the giant that fell from the top to the bottom, is a cautionary tale on the dangers of failing to improve and should be remembered.

Effective leadership skills can help leaders to gain the trust of employees, making other tasks easier to operate because the employees trust their leaders. This could make other parts of business management easier too, such as shaping the culture in an organization. A positive organizational culture can bring lots of benefit to the organization, as the positive culture can encourage and motivate the employees in the organization to learn, communicate and work with each

other. A good culture in the organization not only provides a good working environment for their employees, but also gives a sense of belonging to the employees and increases the commitment of employees to continue working in the organization. Innovative ideas will be produced when leadership motivates the employees to communicate with each other and share their thoughts with each other.

Leadership skills also enable the leaders to lead their employees into the correct direction, in accordance to the organization vision and mission. When an organization's leader leads the employees in the correct direction and motivates them to continuously improve and innovate, the organization's performance will surely increase and be able to sustain the organization in the current complex business environment. Hence, effective leadership is the main factor that brings change to the organization, if there is no leadership in the organization there will be no chance at all (Atkinson, 2015).

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The Theory of Minimal Risk in Local Development Processes

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Summary- The paper starts from two practical findings: one is that in Romania, as in many other European countries (see Bulgaria, Spain, Greece, Poland, Hungary etc.) there are many local communities living in poverty, where one cannot speak of a local economy (there is a very small number of companies with low turnover), of competent local authorities or developed civic spirit (so a development process cannot be mentioned). There are communities in a T zero state of development, stage persisting despite the existence of national or European policies in the field.

The second finding is that over time a number of theories / methods / models of local development have been formulated, applied with more or less success.

Thus, this paper aims to summarize the main theories on local development and, as a result of their analysis, to propose a model / theory to be applied in local development processes to identify the most suitable model of development.

The proposed model is based on risk analysis in local development processes, thus generating the theory of minimal risk within them.

Keywords: local development, local community, risk analysis, endogenous, exogenous resources.

GJMBR - A Classification : JEL Code: M19



Strictly as per the compliance and regulations of:



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1. LOCAL DEVELOPMENT

Development corresponds to a process of mobility, of change with deliberate character for achieving economic-social objectives. Specialists¹ identify two phases of development - the virtual (VD) and real (RD). Real development has, is or should be accompanied by economic growth and is obtained from the conversion of VD in real development, process mediated by management.

Local development is "the process of development, mainly economic in a given region or administrative-territorial unit, which determines an increase of the quality of life at local level"². Local development has as objective "economic prosperity and social welfare by creating a favorable business environment, along with community integration of vulnerable groups, using endogenous resources, private sector development"³.

Local Economic Development (LED) is "the process through which local public administration and/or the community, based on groups, manages existing resources and enter into a new commitment to partnership either with the private sector, or each other, to create new jobs, employment and to stimulate economic activities in a well-defined economic zone"⁴. Economic development requires "regional or local economic capacity development and formulating the response to economic, technological and social changes etc."⁵

Local socio-economic development (LSED) is a process of development in a specific region or geographical area, which results in a better quality of local life. LSED refers to the development capacity of a local or regional economy to stimulate steady economic growth and thereby to create work places and conditions for capitalizing its own opportunities of rapid changes in economic, technological and social fields.

LSED's major objectives are to contribute to economic prosperity and social welfare by creating a favorable business environment, along with community integration of vulnerable groups and promoting a dynamic and positive attitude of the population towards their own region development issues. LSED considers the social and cultural aspects of development.

DSEL actors include "authorities and government bodies (local, county and central) responsible for sectoral policies (industry, environment, labor, public works, transportation, etc.), representatives of economic activities and public services (businesses, banks, unions etc.), educational institutions, NGOs, mass-media etc."⁶.

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¹ Dumitrescu M., Strategies and strategic management, Ed. Economică, București, 2002, p. 96.

² lat. Disolvere – to grow, to evolve.

³ Parlăgi A., Dictionary for public administration, Ed. Economică, București, 2004, p. 86.

⁴ Economic development – A strategic way for local public administration, Don Morrison, ICMA, quoting Edward J. Blakelz, Planning Local Economic Development: Theory and Practice

⁵ Matei L., Strategies for local economic development, Ed. Economică, București, 2004, p. 86.

⁶ Citizen participation in decision-making – Training manual", USAID-RTI, București 2002, Coordinators Matei L., Dincă D., p. 165.

II. THEORIES RELATED TO LOCAL DEVELOPMENT

Local development envisages the transition of a local community from a state A to state B, superior in terms of quality of life and standard of living, employment, social and environmental conditions etc.

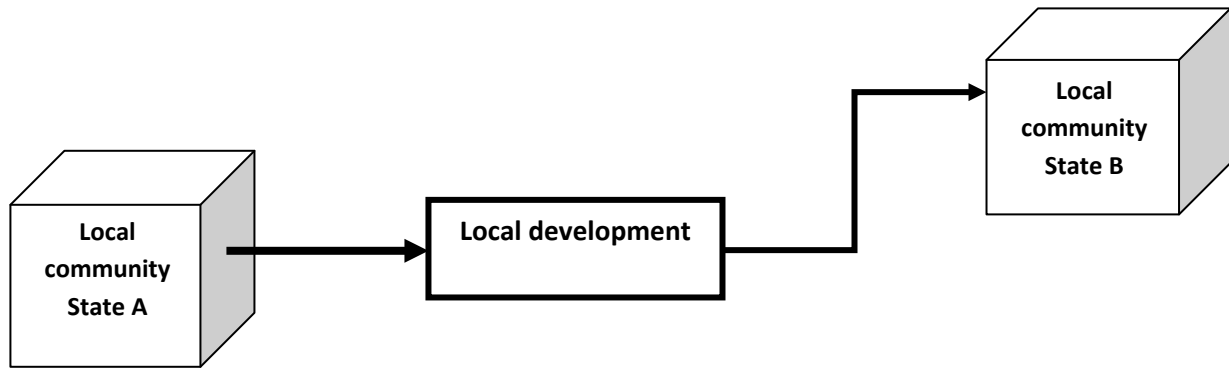


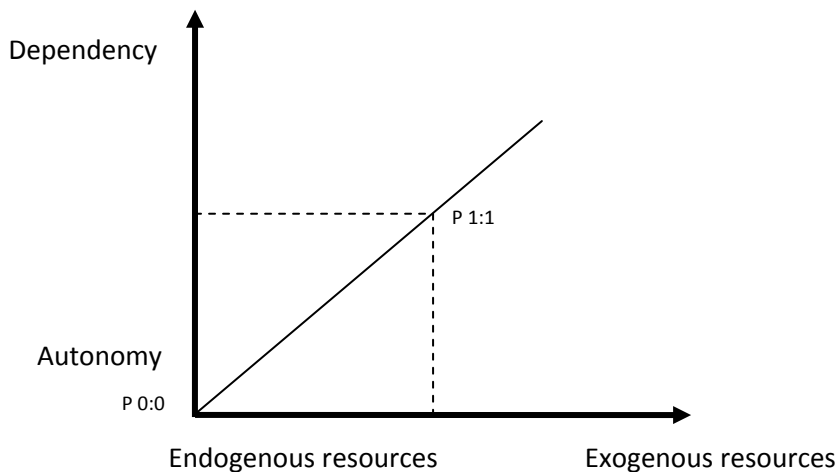
Fig. 1 : Objective of local development

The methods and tools through which a community can move from state A to state B, have been the subject of numerous theories whose practical application has proven more or less successful, the conclusion of various specialists in the field being that existing theories can be applied to a limited number of cases. It cannot be affirmed that one of the theories enunciated represents through implementation, a development panacea, of shifting from VD to RD, from state A to state B.

Most theories focus on the foundation of development, resources needed to support and their

background environment. There are a number of other theories of development, derived from the first category, starting from communities' autonomy / dependence to communities neighboring / bigger / state / growth poles or in whose area of influence they are positioned. There are also theories that focus on the space or time of development.

In other words, development theories revolve around two categories of factors, the second category derived from the first: endogenous / exogenous resources and autonomy / dependence.



Point P0:0 (autonomy and development based exclusively on own resources) would correspond to an utopian isolationism of local communities.

Point P1:1 corresponds to a perfect balance between dependency/autonomy, endogenous / exogenous resources.

Fig. 2 : Foundations of local development theories

a) Theories based on endogenous and exogenous factors /resources

i. The theory of endogenous development⁷

Formed in the late 70s, endogenous development theory was developed due to changes in

existing economic and political conditions at that time, more exactly in the context of economic growth stagnation and crises triggering in all industrialized countries.

The theory of endogenous development as a means to development has two major components, namely:

⁷ It is known also as the "Self-centered development theory".

- *selective isolation;*
- *capitalizing on the local strategic advantage;*

According to this view, the regions cannot specialize in what they do best and thereby to benefit from the results of their own efforts, since the resources at the disposal of other regions give the latter a higher negotiation power on the market, and the only solution conceivable is to refuse to play this game, based on rules according to which by definition they will be overcome.

Selective isolation means an action that aims to satisfy the needs of the region within its own territory, starting from the adoption of appropriate economic policy measures at local level.

The second component of endogenous development, namely the use of regional strategic advantage means an export resource development through a parallel export sector, under tight control and developed only for products for which the region has a foothold in the market, regardless of political or economic requirements, which gives it a limited nature.

A model of endogenous development capable of ensuring the autonomy which is sustainable must be based on local characteristics and on the ability to control certain fundamental variables. In particular, such a model can be based on:

- using local resources (labor, historic capital accumulated, entrepreneurship, specific knowledge of the manufacturing process, material resources)
- the ability to check the local accumulation process;
- innovation capacity;
- the existence of inter-sectoral productivity both intra and inter-sectoral locally;⁸

In this way the local economy is now the product of using and completely developing of local resources and its future can be controlled from within.⁹

ii. *Exogenous development theory*¹⁰

Exogenous development theory aims to analyze the impact and influence that the external economic and administrative environment exert over a local development system, mainly endogenous, with the aim of achieving a uniform local development focused on the development of an innovative area.

Both endogenous and exogenous factors contribute to the achievement of "a process of development, mainly economic in a given region or

administrative-territorial unit, which increases the quality of life at local level", local development representing "the expression of local solidarity, creating new social relations and it manifests the will of the residents of a region to harness local resources".¹¹

Local development is conditioned by factors external from the local level. The local development framework emphasizes the importance of an environment and a policy, capacity building and transfer of resources for local development. Political and institutional environment for local development includes formal institutions such as laws, policies, an organizational system and an informal system represented by a set of values, norms and social practices that support autonomy and local governance, service delivery and the growth of the private sector at local level.¹²

iii. *Systemic analysis of the development*

Systemic analysis of local development tries an integration of endogenous and exogenous factors by analyzing complex environmental and local development process flows.

We can speak of a European system of regional development, in which subsystems of local development can be found. The European system of regional development, like its other subsystems are systems with a mixed architecture, incorporating their own feedback mechanisms and whose evolutions have well defined finalities in the European or national regulatory framework.

Systemic economic administrative local development model (SEADL) includes the following:

- existence of three levels of systemic organization: selector, transducer and achiever, each of which having the features a cybernetic subsystem;
- in local development activities corresponding to the first level belong to the institutions or public authorities (county councils, municipal etc.) or their associative structures and have as object of the foundation of public decision making on local development strategies, selection of policies development, accessing development funds etc.;
- intermediate level - transducer - includes activities conducted by civil servants and civil employees for the operationalization of public decisions, monitoring the implementation of local development

⁸ Edited by Huynh Cao Tri (1998), Participative administration and endogenous development, United Nations Educational, Scientific and Cultural Organization, pag 8

⁹ Stephen Gyrett (anul), Local Development, ED Ashgate Publishing Company, p. 91.

¹⁰ Exogenous development theory aims to analyze the impact and influence that external economic and administrative environment exert on a local development system, mainly endogenous, with the aim of achieving a uniform local development focused on developing an innovative space.

¹¹ Alina Profiroiu, Sorina Racoviceanu, N Țarălungă (2008), Local economic development, Editura Economică p. 8.

¹² C. Dumitrică (2008), "Analysis of the actors involved in regional development process" in the volume „Innovativeness-foreign direct investments relationship - European challenges and opportunities", Institutul de Economie Națională, Editura Universitară, p. 61.

policies, evaluating their results and the social and economic impact;¹³

b) *Theories based on the dependency/autonomy*

i. *The theory of uneven development*¹⁴

In the early 1960s a number of theories of uneven development center-periphery relationship have been highlighted, among the most important representatives of which are John Friedmann, Stuard Holland and Gunnar Myrdal. The basic idea of the development theory as chronological differentiation was developed by Nobel Prize winner for economics, Gunnar Myrdal.¹⁵

It is believed that areas / regional disparities are based on chronological gaps inherent in the integration processes, gaps which result in imperfect mobility of production factors. This theory brings up the issue of economic time homogeneity, the development gaps being interpreted as chronological gaps.

Therefore, underdeveloped regions and areas continue to exist, to the extent that growth process mechanisms merely amplify existing development schemes, as hypothesis evidenced by Gunnar Myrdal as well.¹⁶

The concept most often associated to development is that inequality is itself the essential element of development, both in time and space.

ii. *Theory of growth poles*

François Perroux¹⁷ formulates a theory based on a simple postulate: economic growth is not the same everywhere, and since it is geographically concentrated around key enterprises, Perroux considered that the polarizing agent is the "pilot enterprise". Development does not occur everywhere the same, as it manifests in growth poles that have a variable intensity, spreading through various channels having varying effects on the overall economy.

The concept of polarized space designates "all forces of attraction and rejection that an economic unit exerts upon goods and people in geometric space and the ensemble of attraction and rejection forces exerted on itself"¹⁸.

Balanced metropolis policy has as main objective the polarization of an area / region around several towns.

iii. *Von Thunen model*¹⁹

History of location theory begins with the issue of "Isolated state" written by Johann Heinrich Von Thünen in 1826. Thünen was not the first specialist who analyzed the economic phenomena in space, but he was the first who treated such phenomena using spatial analysis²⁰.

The notion of isolated economy in an idealized space was a new, radical idea justifying why Thünen was considered the "father" of spatial economy.

Von Thünen's analysis shows that the structure of rural areas depends on its articulation to the urban environment; specifically the closest distance to the urban market determines the location of crops and agricultural landscape structure, thus directly influencing the urban landscape of a certain geographical area.

iv. *Weber model*²¹

Weber's book, "Theory of branches location" has to be considered a successful treaty in the theory of location in that it shows a continued interest and it stimulates analytical work in the theory of location as a specialized branch of the economy.

Alfred Weber's main area of interest was the choice of industrial localization. He was preoccupied with the analysis of the general factors of localization, applicable to a greater or lesser extent in every branch of industry.

It can be argued that a "strong" point of Weber's model lies in its ability to be operational. Appreciable influences of this theory are met in the analyzes regarding the optimal location of hospitals, warehouses, fire stations and other objects of interest, or production units of certain multinational companies.

v. *Hotelling model*²² - *models of the localization interdependence theory*

The essential contribution which the localization interdependence theory brings is easing this hypothesis, considering the spatial implications of oligopolies with no understanding among participants.

The first work developed in this direction belongs to Hotelling, the theory being extended by Lerner and Singer.

¹³ Matei A., Matei L, Systemic Models of Local Development, Theoretical and Applied Economics, nr.1/2007, p.16, www.store.ectap.ro

¹⁴ This theory can be interpreted from the both perspectives of chronological differences and cumulative causation.

¹⁵ He was a Swedish economist and politician, representative of the School of Stockholm, Nobel laureate for economics (1974).

¹⁶ G. Myrdal (1957), Economic Theory and Under – Development Regions, London, Duckworth.

¹⁷ François Perroux, is the one who introduced in 1949 the economic growth poles theory. Perroux defined economic growth poles in terms of what he called "abstract economic space" According to Perroux, the concept of abstract economic space is represented by three elements: "economic field", "a field of forces or influences", "homogeneous aggregate"

¹⁸ F. Perroux (1954), L'Europe sans rivage, Paris, PUF, p. 353.

¹⁹ Johann Heinrich von Thünen's lived in Germany (1783-1850) bringing its contribution to the development of modern science through the work "Der Isoliert Staat" - The Isolated State (1828) which was the first work of German origin in the history of the "theory of central places" .

²⁰ M. Blaug (1992), Economic Theory in Retrospect, Editura Didactică și Pedagogică, București, p. 650.

²¹ A.Weber (1929), Theory of the Location of Industries, Edited by C.J. Friedrich, Chicago, University of Chicago Press.

²² Harold Hotelling (1895 – 1973), graduate of the Faculty of Mathematics at Princeton University

Hotelling's model remained an important starting point in the analysis of spatial and non - spatial oligopoly.

vi. *Christaller's model*²³ - *models based on the theory of central places*

The development model focused on central places theory is one of the most elaborated space analysis models. It is affirmed that without this theory "it would not have been possible to speak of an independent theoretical geography from other sciences,"²⁴ this theory being initially developed by W Christaller and A. Losch.

The purpose of this theory was to explain the size and number of cities, as well as the distance from where they are located within a given territory. The theory is based on the definition of the city, which is perceived as representing "a distribution center of goods and services for a certain number of inhabitants"²⁵, and the differences between these centers that provide goods and services to outlying areas.

Therefore, Christaller considered that a central system consists from: "a number of central locations grouped around a main central place"²⁶ this being the hypothesis that constituted the base of the theory of central places formulation.

Thus elements that make up such a system have been identified by Christaller as being the following:

- a main urban center located in the middle of the system;
- a certain number of urban centers positioned around the main urban center;
- the distance among urban centers;
- the position in which the urban centers are compared to the system of central places, and to other central systems within the region;
- area occupied by such a system of central places;²⁷

The notion of centrality²⁸ justifies grouping of services, with the same standard, for the public in one place, these being subsequently provided to additional regions or areas of influence, which are thus polarized by the center.

vii. *Losch's model*²⁹

In relation to theories based on cost, placed in the spatial monopoly context and to the theories of location interdependence, seen in the spatial oligopoly context of a small number of producers, the school of attraction area of a market leads the structure of competition one step further, placing it in the spatial oligopoly with a large number of manufacturers³⁰.

Losch, as well as Christaller showed that regional networks have multiple dimensions. But regional networks are reducible to the functions of supply and demand for products of the same or different type. When it comes to an economic environment such simplifications can no longer be made, because, as Losch exemplified, an economic environment is a system of different markets, it is a body and not an organ³¹.

viii. *Zipf's model*³²

Zipf's law known as the law of "Rank - Size" correlates the size of a city (population size) with its rank (the position it occupies in the hierarchy of the urban system).

The *rank-size* relationship considers cities as elements of a system within which each of them is closely interdependent with the others, showing the hierarchical organization as the main form of organization.

Rank-size distribution of the urban system highlights its particular elements, such as the evolution of urban growth or competition between cities, providing an overview of the representation of cities' sizes in the territorial profile of the country.

Zipf's Law, states that the population of a given city, tends on average to be equal to the ratio between the population of the most important center and the order number of that city rank, rank determined from the size of the population.

In these circumstances, knowing the population number of the most important city, both the population of the other cities and the total urban population can be deduced.

The relationship rank-size has a high diagnostic power of urban systems, being able to *absorb* and to *produce* spatial information for short periods of time.

III. MINIMUM RISK THEORY

Dictionary of Finance and Banking defines the risk as the possibility of suffering a loss or damage in

²³ W. Christaller (1966), *Central Places in Southern Germany*, translated by C.W. Baskin, Editura, Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

²⁴ D. Jula (1996), *Regional economy*, Universitatea Ecologică București.

²⁵ T. L. Bell, S. R. Lieber, G. Rushton (1974), „Clustering of Services in Central Places”, în „Annals of the American Geographers, Vol.64, No.2. p. 216 www.jstore.org

²⁶ R. E. Preston (1971), "The structures of Central Place Systems", în *Economic Geography*, Vol.47, No.2., p. 137, www.jstore.org.

²⁷ idem.

²⁸ The feature of certain urban centers offering quality services to outlying areas is called centrality.

²⁹ A. Losch (1954), *The Economics of Location*, tradusă de către W.H. Woglom, New Haven, Connecticut: Yale University Press.

³⁰ V. Nicolae, Daniela Luminița Constantin (1998), *Regional and Urban Economics Basics*, Editura Oscar Print, p. 76.

³¹ idem

³² G. K. Zipf (1932), *Selected Studies of the Principle of Relative Frequency in Language*. Cambridge (Mass).

transactions³³. Risk is defined as the "potential adverse deviation from expected results"³⁴.

In this logic, risk in the local development process represents the non-achievement of the goals undertaken or the inability to move from VD to RD.

Authors like M. Blaug³⁵ or F. Knight³⁶ suggest that risks can be calculated. In fact there are methods of calculating the risks of the public organizations in Romania.

The minimum risk theory in the local development involves identifying risk, calculating the probability and their impact, risk tolerance assessment and formulating measures to counter the risks. Real local development means, according to this theory, a sum of processes with minimal risk. Calculating the risks and applying those processes whose risks are minimal, it is possible to implement, as appropriate, any of the above theories. Each, depending on particular cases, may be applicable, may have results or may not.

According to the formulated definition, the application of risk theory in the local development process assumes the completion of certain stages.

a) Local development risks identification

Risk identification is closely related to the formulation of development objectives. Risks can be formulated only related to objectives whose achievement is affected by their materialization. Risk identification process is not and objective but a subjective process, related to experience and knowledge of the one who identifies them. Risks are actually perceptions on factors that may affect the achievement of certain objectives. The same objective formulated in different communities may be subjected to the same risks, but with different probability and impact, or may be subject to different risks.

But beyond individual cases, we intend to identify common risks specific to the general objectives of local development, the transition from the VD to RD or moving from the state A to B. These general objectives are subsumed to their specific community goals, SMART objectives.

Specific risks of the endogenous growth theory are: physical capital risks, risks relating to technological innovation, human capital risks and public capital risks.

From the exogenous development theory, we can identify the following categories of risks: risks concerning the macroeconomic environment, risks

regarding the technological environment, ecological environmental risks, risks relating to the cultural environment, infrastructure risks, and risks relating to the political, governmental or legal environmental risks.

The first phase of local development is the construction of the development partnership. By the theory of *endogenous development this is about the representatives from local business, public sector and civil society*.

From the exogenous perspective, representatives of the macroeconomic, technological, ecological, cultural, political / governmental, legal environment are involved.

In any of the cases, there is a risk of non-participation and non-involvement of either category.

b) Risks evaluation

Once the risks are identified, the next stage is their evaluation from the probability of materialization and of the impact (consequences) over the objectives. The combination of the estimated probability and impact levels represents the exposure to risk based on which the risks profile is developed.

An evaluation method is the one proposed by *The Internal Control Framework / Committee of Sponsoring Organizations of the Treadway Commission (COSO)*³⁷:

³³ Oxford, A Dictionary of Finance and Banking, Ed. Oxford University Press, 1997, pag. 309

³⁴ A. Kuritzkes, T. Schuermann, *What we know, don't know and can't know about bank risk: a view from the trenches*, Ed. Princeton University Press, 2007, pag.3

³⁵ M. Blaug, *Economic Theory in Retrospect*, Ed. Didactică și Pedagogică, București,

³⁶ F. Knight – *Risk, Uncertainty and Profit*, Ed. Signalman Publishing, 2010

• ³⁷ Presented in METHODOLOGY FOR IMPLEMENTATION OF INTERNAL STANDARD CONTROL "RISK MANAGEMENT", Ministry of Public Finances, January 2007.

Very high	5	<div>IMPACT</div>	5	10	15	20	25
High	4		4	8	12	16	20
Moderate	3		3	6	9	12	15
Low	2		2	4	6	8	10
Very low	1		1	2	3	4	5
0		PROBABILITY					
		1	2	3	4	5	
		Very low	Low	Moderate	High	Very high	

By applying this method of assessment for identified risk, it is possible that, for example, for the non-participation of citizens in local development processes in a community, the risk to have a medium probability and low impact, resulting in a score of 6, and in another community, the probability to be very high and the impact high, resulting in a score of 20.

In the case of support or interest from macroeconomic environment, in a community the risk may have a high probability and moderate impact, resulting in a score of 12, and in another community, the probability to be low and the impact low, resulting in a score of 4.

In such a hypothetical situation, applying minimal risk theory, the first community will be based predominantly on endogenous elements and the second on exogenous.

c) *Formulating responses to risk*

Once identified and measured, risk minimization plans, measures are necessary. Response to risk depends on the nature of risk seen from the perspective of controlling possibilities (of power). In fact, it is about the answer to the following questions: can risks be controlled by the community or not? If yes, can the community control the risks to a satisfactory level? If not, can the community outsource risks or risks generating activities?

IV. CONCLUSIONS

Local development is a process that is based on endogenous and / or exogenous factors. The ratio of these factors and the success of the development process starting from one or the other category of factors can be determined / calculated by applying the risk theory. The success of development processes requires consideration of processes with minimal risk and a greater probability of achievement. It is true that the economic theories argue that results can be achieved in conditions of maximum risk, the private investor being the one to decide to what extent and which risk categories are assumed. However, in the case of the local development process, coordinated by public policy makers involving public resources one cannot speak about a maximum risk taking. In these

circumstances the minimum risk theory becomes applicable, as a source of local development.

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Perceptions of the Impact of Trade Union Disputes on University Management

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Abstract- This study investigated the major factor associated with trade union disputes and the impact of the disputes on university management. Two research questions were raised and three hypotheses tested. The sample consisted of 281 academic staff, 166 non-academic and 14 students' union Executive members. The multi-stage stratified sampling technique was utilized in selection of subjects for the study. A questionnaire titled "Trade Union Disputes in Nigeria University Questionnaire" (TUDNUQ) was designed to elicit information from respondents. Data obtained were analyzed statistically using Z test and F-Ratio test (ANOVA), percentages and standard deviation. From the analysis of data it was found that poor conditions of service and remuneration, under-funding of the University system, poor communication between management and unions, autocratic leadership styles of some university administrators, non-participation of union in university decision making process and government intervention in universities' internal management were the major factors associated with trade union disputes in Nigerian universities. The main impact of trade union disputes in Nigerian universities included disruption of academic calendar and programmed, low morale among staff, brain drain among professional staff and poor relationship between unions and management.

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Abstract This study investigated the major factor associated with trade union disputes and the impact of the disputes on university management. Two research questions were raised and three hypotheses tested. The sample consisted of 281 academic staff, 166 non-academic and 14 students' union Executive members. The multi-stage stratified sampling technique was utilized in selection of subjects for the study. A questionnaire titled Trade Union Disputes in Nigeria University Questionnaire" (TUDNUQ) was designed to elicit information from respondents-Data obtained were analyzed statistically using Z test and F- Radio test (ANOVA), percentages and standard deviation. From the analysis of data it was found that poor conditions of service and remuneration, under-funding of the University system, poor communication between management and unions, autocratic leadership styles of some university administrators, non-participation of union in university decision making process and government intervention in universities' internal management were the major factors associated with trade union disputes in Nigerian universities. The main impact of trade union disputes in Nigerian universities included disruption of academic calendar and programmed, low morale among staff, brain drain among professional staff and poor relationship between unions and management. Responsibility in the sampled universities differed significantly in their perceptions of the impact of trade union disputes on students' academic programmes and on government intervention in universities' internal management. As a result of the conclusions derived from the study, it was recommended that the Government should inject more funds into the university system and the Education Tax funds should be disbursed appropriately and on time, the conditions of services of university staff should be made more attractive. The Staff unions should be meaningfully involved in the university governance and decision making process. Also, a joint consultative forum should be formed where the various groups can meet and discuss common problems, and sort out their differences with little or no disruption to the system. Collective bargaining should be utilized by university administration to resolve all grievances and trade union disputes in order that industrial peace may thrive on the campuses.

I. INTRODUCTION

Universities occupy a strategic position in the education ladder of the nation. They help to produce the much needed high level manpower essential for the nation's growth and development. They are also centres of excellence, research and store-houses of knowledge (Federal Republic of Nigeria 1981,

p, 8). The university staffs play a major role in the running of the system and in the achievement of the organizational goals. They constitute the "life wire" of the organization. It is therefore obvious that the survival of the university depends on the relationship existing between labour and management. This relationship can be sustained if there is industrial peace and harmony amongst the work force.

The Nigeria University as a social group is made up of students (who are to receive education), academic staff Lecturers, who are to carry out teaching and research activities, non-academic staff junior and senior who are to carry out various support tasks and top administrators who coordinate the activities of the stakeholders, and groups. These stakeholders, with widely varying priorities, aspirations and own perception, all exist, working towards the achievement of organization goals. Management sees to the administration and work ability of the system, while the students are at the centre of the educational system. All activities are carried out within the university and directed towards developing their personality to the fullest.

When university workers enter into the employment contract, it is with the agreement to provide their labour, while employment in return accepts to provide conducive working conditions for the supply of such services. But in most cases, when these agreements are not kept, workers become frustrated. In their individual attempts the gain equitable treatment, they respond by forming trade unions to satisfy important needs.

The university staff unions are representative of the various subgroups and they assign themselves the responsibility of negotiating grievances on behalf of the groups. Within the Nigerian university system, exist such unions as:

- Academic Staff Union of Universities (ASSU)
- Senior Staff Association of Nigeria Universities (SSANU)
- Non-Academic Staff Union of Universities (NASU)

Nigerian Universities and the society at large have been witnessing serious problems in recent years in the area of trade union disputes. These disputes which culminate in strike action result in the eventual closure of the universities. There has been an increase in trade union activities over the past seventeen years in

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every sector of the Nigerian economy. These work stoppages involved a huge loss of man-days and a great loss in productivity (Central Bank of Nigeria Report, 1990). This situation must be ameliorated if the universities are to witness some measure of industrial peace. The frequent occurrence of trade disputes in Nigeria universities has done incalculable damage to the over all development of the institution. Nwaokoio (1995) asserts that from 1981 to date, the universities have witnessed the largest number of strikes in the education sector. The series of industrial action has seriously affected the level of academic development within the university. The purpose of this study therefore was to investigate the major factors associated with disputes in Nigerian Universities and the perceived impact of the disputes on university management.

To guide the study the following questions were raised:

- What are the factors' associated with trade- union disputes in Nigerian universities.
- What is the impact of trade union disputes on Nigerian university management?
- Is there any difference between male and female and staff perception on the impact of trade union disputes on industrial peace in Nigerian universities?
- Is there any significant difference in the perception of respondents in the first, second and third generation universities as regards the impact of trade union disputes on inter- union relationship in Nigeria universities?
- there any difference in the perception of respondents in federal and state universities on the impact of trade union disputes on students' academic

The following null hypotheses were generated from questions 3- 5 and tested.

- There is no significant difference between male and female staff perception on the impact of trade union disputes on industrial peace in Nigeria universities.
- There is no significant difference in the perception of respondents in the first, second and third generation universities as to the impact of trade union disputes on inter - union relationship in Nigerian universities.
- There is no significant difference in the perception of respondents in federal and state universities on the impact of trade union disputes on students' academic programmed.

In the context of the study, first generation universities refer to the first set of federal universities established In Nigeria before 1975, second generation universities are the second set of federal universities, while third generation universities third generation

universities refer to the third set of federal and state universities established on Nigeria between 1981-1986.

II. METHODOLOGY

The design of the study was ex-post facto as it utilized the descriptive survey research method to examine factor associated with trade union disputes in Nigerian universities. The independent variables (sex ownership and generation) were already in existence, and ail the events of interest in the study have also occurred. There was therefore no manipulation of variables of the study.

The population comprised of all staff on Nigerian universities who were members of the staff union (ASUU, NASU, and NANS).

The multi -stage stratified random sampling procedure was adopted in the selection of universities and subjects for the study to ensure adequate representation of the different subgroups in the population Out of the 36 Nigeria universities at the time of the study (24 federal - and 12 state - owned universities) 4 federal and 2 state - owned universities were selected respectively, from selected faculties. 10% of the academic staff (281), 5% of the non academic staff (166) and 144 students' union executive members was randomly selected using the simple random sampling procedure. This consisted of 306 males and 255 females. Two hundred and eight were from the federal universities, while two hundred and eighty- one were from state university- The students' union executive members were included in the sample because they were representative of the entire student body, and also because students are the basic raw materials in the university educational system.

The main instrument used in this study was a questionnaire titled "Trade Union disputes in Nigerian Universities Questionnaire" (TUDNUQ). The instrument was on a 5 - point Likert scale yielding interval data. This instrument was designed after a through review of both indigenous and foreign literature on trade union disputes. The instrument consisted of 40 items grouped in to 6 sections A -E. each section was intended to obtain particular information from the respondents.

Section A:- sought general information (which were socio- demographic in nature) from the respondents. It inquired about their sex, marital status, highest academic qualification, union affiliation, job experience and so on.

Section B:- comprised 4 items eliciting information on the impact of trade disputes on inter-union relationship in the universities. It was directed at finding out the respondents' perception about relationship between staff, students and management in times of crisis.

Section C:- comprised 12 items designed to elicit information from respondents' on whether perception of

their working environment and conditions of service give them job satisfaction.

Section D:- comprised 7 items eliciting information on the impact of trade union disputes on students' academic work.

Section E:- comprised 4 items, which sought respondents' opinion on the impact of trade disputes on government's intervention in university internal management.

The instrument was subjected to criticism by experts in industrial relations and university management. Suggestions and recommendations of the experts were incorporated in the final draft of the instrument. This procedure ensured the content and construct validity of the instrument.

The reliability of the instrument was determined using the split - half reliability coefficient. A pre-test was carried out on 20 subjects who would not form part of the sample for the study. The Pearson product moment reliability coefficient 'r' was applied to measure the reliability, and the coefficient obtained was .60 which was stepped up with the spearman brown formula. The coefficient resulting from the correlation of the scores of two halves of the test was .70, which indicate the degree to which the two halves were equivalent, and as a result, reflected the internal consistency of the instrument.

On the whole, 600 questionnaires were given out. However, the number of questionnaires properly completed and returned was 561 (93.5%).

The data collected through the questionnaire (TUDNUQ) were computerized for statistical analysis. The statistic package for the social science (SPSS) was used, to analyze the data. The statistical methods employed were simple percentages, z-test for two independent means and the one way Analysis of variance (ANOVA) and F-radio test.

The responses got from section B- E on the interval scale were converted to nominal data. The frequencies of the responses were calculated and percentages were used to determine the major factor associated with trade union disputes.

Hypotheses 1, 2 and 3 were analyzed by applying the statistic z-test of difference between two independent means, while the F- Radio test (ANOVA) was utilized to analyze hypothesis 2 and 3.

III. ANALYSIS OF DATA

Five hundred and sixty one subjects (93.5%) provided information for the study. Six institutions were selected for the study and questionnaire were administered on the subjects and retrieved. The respondents were categorized by gender as shown in Table 1.

Table 1 : Distribution of Respondents by Gender

Respondents	Frequency	Percentage
Males	306	54.5
Females	255	45.5
TOTAL	561	100.0

The figures in Table 1 indicate that 306 (54.5%) of the respondents were males, while 255 (45.5%) were females.

The subjects were further classified by their unions as shown in table 2.

Table 2 : Distribution of Respondents by Union / Groups

Union/Groups	Frequency	Percentage
(i) National Association of Nigerian Students (NANS)	114	20.3
(ii) Non- Academic Staff Unions	166	29.7
Academic Staff Union universities (ASUU) 281	281	50.1
TOTAL	561	100.00

An examination of the data in table 2 reveals that 144 (20.3%) of the respondents were students, 166 (29.7%) were non- academic staff while 281 (50.1%) were academic staff.

Respondents were also categorized on the basis, of institution ownership as shown in Table 3.

Table 3 : Distribution by Institutional Ownership

Ownership	Frequency	Percentage
a) River State University of Science and Technology, Port Harcourt b) Enugu State University of science and Technology, Enugu c) University of Benin Benin City d) Obafemi Awolowo University, Ile-ife e) University of Jos, Jos f) NnamdiAziki University, Awka		
TOTAL	551	100.0

The total number of respondent who were from state owned universities was 281 (50.1%) while 280 (50%) were from federal universities, the respondents were also grouped according to the generation of the universities. 187 and third generation universities had 93 (26.6%) and 281 (50.1%).

The following section answers the question asked in the study.

Question one (a)

- What are the major factors associated with trade union disputes in Nigerian universities?

The question was to determine the major factors associated with trade union disputes in Nigeria universities. The result of the analysis is as show in Table 4.

Table 4 : Major Factor Associated With Trade Union Disputes In Nigeria Universities

Major factor associated with trade union disputes in Nigeria universities	Factor Frequency	Percentage
i) Poor condition of services and remuneration	306	54.5
ii) Under funding of the university system	120	21.5
iii) Poor communication between Management and Unions	61	10.9
iv) Autocratic Leadership styles of some University Administration	52	
v) Non - participation of Unions in university decision making process	20	9.3
vi) Government intervention in university internal management	2	0.4
Total	561	100.0

An examination of Table 4 shows that 306 of 561 respondents (54.5%) perceived that poor conditions of service and remuneration were the major factors associated with trade union disputes. One hundred and twenty respondents (21.4%) perceived under funding of the university system as a major factor associated with

industrial unrest in Nigerian universities-Sixty- one of the 561 respondents (10.9%) perceived poor communication between management and union as one of the main factors associated with trade union disputes. While 52 (9.3%) were of the opinion that the autocratic leadership styles of some university administrations was

the major factor association with crisis in Nigeria universities.

Also- 20 (3.6%) respondents perceived non-participation of unions in university decision making process as a factor associated with trade disputes, while 2 (0.4%) of the total respondents perceived

government intervention in university internal management as one of the major factors associated with industrial unrest in Nigeria universities-

Question one (b)

- What is the impact of trade union on the universities?

Table 5 : Perceived Impact of Trade Union Disputes on the University

Perceived impact of trade union Disputes Universities	Frequency	Percentage
i) Disruption of Academic Calendar and programmed	290	151.7
ii) Low morale among staff and students	142	25.3
iii) Brain drain and attrition among professional staff.	79	14.08
iv) Poor relationship between unions.	50	8.9
TOTAL	561	100

The data in Table 5 shows that 290 (51.7%) respondent perceived disruption of academic calendar and programme as the most serious impact of trade union disputes on the universities, while low morale among staff and students was perceived as the most serious impact 142 (25.3%) respondents. Brain drain and attrition among professional staff was perceived by 79 (14.08%) respondents as the most serious impact of industrial crisis on Nigerian universities. 50 (8.9%) of the total respondents perceived poor relationship between unions as the most serious impact of trade union disputes on Nigerian universities.

The hypotheses proposed for the study were tested and discussed as follows:

Table 6 : Z Test of Difference Between Male and Female Respondents' Perception on The Impact of Trade Union Disputes on Industrial Peace in Nigerian

Sex	No. of Cases	Mean X	S.D	Calculated Z-test	Critical value of Z-test	Decision
Female	255	15.8	0.0			
				1.36*	1.96	Not significant
Male	306	15.4	2.8			

P < 0.05

As depicted on table 6, the Z- test calculated value of 1.36 is less than the Z-test critical value of 1.96 at 0.05 level of significance. Therefore, the hypothesis of no significant difference in the perception of male and female respondents on the impact of trade union disputes on industrial peace in Nigerian universities is retained. This signified that male and female respondents were not different in their perception on the impact of trade union disputes in industrial peace in Nigerian universities.

Table 7 : Analysis of Variance of Subjects' Perception in First, Second and Third Generation Universities on the Impact of Trade Union Disputes on Union

Source	DF	Sum of Squares	Mean Squares	F-Ratio	Critical F-Ratio	Decision
Between Group	2	304.45	152.22	17.23*	19.50	Not
Within Groups	558	1928.83	8.83			

P < 0.05

Hypothesis Two

H01: there is no significant difference between male and female staff perception on the impact of trade union on industrial peace in Nigerian Universities.

In testing this hypothesis, the z-test was employed to determine if there was any significant difference in the perception of male and female staff respondent on the impact of trade union disputes on industrial peace in Nigerian universities.

The analysis of the data is as shown in table 6 below.

Hypothesis Two

H02: there is no significant difference in the perception of respondents in first second and third generation universities regarding the impact of trade union disputes on inter-union relationship in Nigerian universities. The one way analysis of variance test (ANOVA) was employed to investigate this hypothesis. The result obtained is show in table 7.

The calculated F- test of the one- way analysis of variance test for respondent in the three sets of universities was 17.23, while the critical F- radio value of 19.50; level of significant was higher. The hypothesis of no significant difference in the perception of respondents in first, second and third generation universities on the impact of trade union on inter-union relationship is retained. This implies that subjects, in the first, second and third generation universities did not differ significantly in their perception on the impact of

trade union on inter- union disputes on inter-union relationships.

Hypothesis three

HO3: there is no difference in the perception of federal and state universities on the impact of trade union disputes on student' academic programmes.

The result of the analysis of data relating to this hypothesis are shown on Table 8.

Table 8 : Z- Test Analysis of the Subjects Performance in Federal and State Universities on the Impact of Trade Disputes on Students Academic Programme

Ownership of University	No. of Respondents	Mean X	S.D	Calculated Z-test	Critical Value of Z-test	Decisions
Federal	280	27.34	4.66	-3.360*	± 1.96	Significant
State	281	28.68	4.13			

*p < .05

An observation of the data in table 8 indicates that the calculated Z-test value is -3.360, while the critical Z-test value of 1.96 is lower. As a result, subjects in federal ¹ and state universities differed significantly in their perceptions on the impact" of trade union disputes on student's academic programme at 0.05 level of significance.

IV. MAJOR FACTORS ASSOCIATED WITH TRADE UNION DISPUTES IN NIGERIAN UNIVERSITIES

The findings on the major factors associated with trade union disputes indicate that many variables are associated with trade union disputes in Nigerian universities. Amongst major factors identified are poor conditions of service and remuneration, under-funding of the university system, poor communication between management and unions, autocratic leadership styles of university administrators, non-participation of unions in the decision-making process in the universities and government interference in university interns! management. This finding agrees with the views of Obiegbu (1994), ASUU (1986), Dimowo (1991), Chuta (1995) that, the issue of poor conditions of services and remuneration, lack of university autonomy coupled with "chronic under-funding" of the universities, are some of the major factors associated with frequent industrial crises in these institutions.

These major factors have led to long drawn battles between Governing Council and University trade unions, sometimes culminating in resort in industrial courts. In the last decade the universities have become varitable "battle fields" either between the academics and non-academic staff or university administrator.

These trade union disputes sometime result confrontation, protests, demonstration and the intervention of security agents. The government, being tie sole proprietor of university education quickly intervenes in the internal management of the universities by the appointment of Sole Administrators. Such appointments often compound the problems in the institutions, leading to further crisis between government and the trade unions. At the end the institutions are closed down resulting in changes and disruption of academic calendars and programmes.

The findings suggest that the disruption of academic calendars and programmes were the most serious impact of union disputes on the system. Other factors that had serious-, impacts, on the university system include; low morale amongst staff and students, brain drain and attrition among professions; staff and poor relationship between unions. This finding corroborates the opinion of Nwaokolo (1935), who earlier noted that from 1981 to 1936, the universities had -witnessed the largest number of strikes in the education sector. This according to him has adversely affected the level of academic development within the universities leading to disruption of academic calendars and programmes.

The findings on the perceived impact of trade union disputes further shows that many workers in the Nigerian universities, especially the academic staff low morale due to the poor economic situation in the university system and the country in genera!. This finding supports the opinion of Obiegu (1994). Fashoyin (1988) and Otoho (1987), who had earlier stated that poor conditions of service and remuneration coupled with under-funding of the universities have gone £ long

way to erode employees' dedication to their jobs, in their views, economic issues have been so central in many of the trade union disputes in Nigerian universities.

The view of the Presidential Committee on Brain Drain (1989), ASNU (1993), Dimowo (1991) and Obiegbu (1994) agree with findings of the study, that the exodus of staff from the universities is due to the manifest poor attention given to the university system because of "inadequate funding". This problem has eroded the status and income of academics. This disillusionment and frustration in their own views led to the mass exodus of academic staff from the Nigeria Universities to Europe, Ghana, North America and the Gulf.

The perceived impact of Trade union disputes on Nigerian universities has gone a long way to show that it has led to disruption of academic calendars and programmes, lowered the morale of workers, engendered industrial peace and good relationship between unions and has consequently led to brain drain and attrition; among professional staff. During industrial unrest, the universities are closed and academic programmes are eventually disrupted. At such times the students suffer some hardship and inconveniences and their morale is also dampened. This leads to academic underdevelopment, as the institutions remain closed for a greater part of the session.

a) *Sex and Perception of Respondents on the Impact of Trade Union Disputes on Industrial Peace in Nigeria Universities*

Sex had no significant influence on the respondents' perception of the impact of trade union disputes on industrial peace in Nigeria Universities. Consequently, there was no significant difference in the responses based on gender as illustrated in Table 8.

However, the finding of the study is inconsonance with that of Ogonor (1997), conflict management adopted by University administrators.

This similarity in response may be attributed to the fact that sex is not a determining factor in the university work environment. Jobs and responsibilities are assigned to employees irrespective of sex. There is no sex bias, as the university is managed like any other formal organization.

b) *Generation of Universities and Perception of Respondents on the Impact of Trade Union Dispute on Inter-Union Relationships*

The generation of the universities made no significant contribution to respondent's perception of the impact of trade union disputes on inter-union relationship. Therefore there was no significant difference in the responses based on the generation of universities as they did not differ in their perception on the impact of trade union disputes on inter-union relationship based on the data in table 7.

The similarity in response of subjects from first second and third generation universities may be due to the fact that all Nigerian universities irrespective of generation are managed by either federal or state government. Since they are managed on behalf of the federal or state government by the NUC, in conjunction with the Federal/State Ministries of Education: who see to the smooth running of the institutions.

The reasons for the observed differences in the mean scores of respondents from State and Federal Universities could be due to the fact that administrators in state universities are closely monitored by the proprietors (State Governments). This may be due to the fact that the lion's share of their budget goes to education.

Therefore, State university administration in order to avoid industrial unrest and closure of the universities may tend to utilize the disputes strategy to resolve disputes than administration in Federal universities. This is to ensure that student's morale is not dampened with frequent disruption of the universities system.

The finding of this agrees with the view of ASUU (1986-1994) and Obiegbu (1994) who stated earlier that in some universities some students demonstrate during crisis to show their dissatisfaction with such disputes. When there is any industrial unrest in the universities, the students become victims of circumstances, as academic calendars are changed, universities are closed and they are forced to go on holidays. The closure of the universities has some impact on students' morale as it sometimes result in killings, arrests, and wanton destruction of properties.

The finding of the study agrees with the finding of Ogonor (1987), who stated that there was a significant difference between university administrations in federal and state universities in the utilization of the formal disputes strategy. Administration in state universities used the formal disputes strategy, more than those in federal universities.

V. CONCLUSION

The following conclusion were drawn from the finding of the study:

Poor condition of service and remuneration, under funding of the university system, poor communication between management and unions, autocratic leadership styles of some university administrators, non-participation of union in University decision-making process and government intervention in university internal management were the major factors associated with trade union disputes in Nigerian universities.

The main impact of trade union disputes on Nigerian universities were disruption of academic calendar and programme. Low morale among staff and

students, brain drain and attrition among professional staff, and poor relationships between union and management.

The finding of the study also indicated that students, society, employees, parents and management were most affected in times of trade union disputes. Male and female respondents did not differ in their perception on the impact of trade union disputes on industrial peace in Nigerian universities. Also, students academic and non- academic staff in first, second and third Generation universities did not differ in their perception on the impact of trade union disputes on inter union relationship in the universities.

a) *Implication of Findings for Educational Administration*

The study revealed that poor condition of service and remuneration and under-union disputes resolution, and should be utilized by university administration in order to restore industrial peace on campuses.

Based on the foregoing finding and conclusion, the following recommendation are made.

- Government should inject more funds into university system through private participation and the education tax funds should be disbursed appropriately and in time.
- The conditions of service of University staff should be made more attractive.
- University administrators should democratize the governance of the universities, so that the different subgroup will be meaningfully involved in the governance and decision-making process.
- A joint consultative forum should be formed by university administration, through which the various sun groups can meet regularly and discuss common problem, and sort out their differences with little or no disruption of the system.
- Vice-chancellors as heads of the university administration should be willing to tolerate and give students a sense of belonging, by allowing them a say in the affairs of the system to which they belong.
- Collective bargaining strategies should be utilized by university administrators for resolution of all trade union disputes in order that industrial peace may thrive in the universities.

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A Winner Never Quits and Quitter Never Wins

By Muhammad Saqib Khan, Sidra Ali Naqvi, Ayesha Rahim & Ayesha Gondal

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Abstract- Students rely on different tools, method and techniques to overcome and cope with their stress which effects their schooling achievements. Stress is a part of our life and by using various techniques we can reduce stresses and could lead to a better life and can achieve academics goal and target. The objective of our study is to examine and observe the different kinds of stresses of the university's students which have great effect on their study. There could be many stresses like the stress of controlling, leading and managing new responsibilities, financial stress, which heavily affect the lives of students. In order to analyze the research objects various statistical tools has been done on the data so as to find that there is a significant relation between stress and student performance. The study is based on the students of private and government universities and colleges of Islamabad, are taken as population and target on the result of the student performance and their success in the academic year.

Keywords: *student stress student performance energy crisis teaching methodology motivation depression.*

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A Winner Never Quits and Quitter Never Wins

Muhammad Saqib Khan ^α, Sidra Ali Naqvi ^σ, Ayesha Rahim ^ρ & Ayesha Gondal ^ω

Abstract- Students rely on different tools, method and techniques to overcome and cope with their stress which effects their schooling achievements. Stress is a part of our life and by using various techniques we can reduce stresses and could lead to a better life and can achieve academics goal and target. The objective of our study is to examine and observe the different kinds of stresses of the university's students which have great effect on their study. There could be many stresses like the stress of controlling, leading and managing new responsibilities, financial stress, which heavily affect the lives of students. In order to analyze the research objects various statistical tools has been done on the data so as to find that there is a significant relation between stress and student performance. The study is based on the students of private and government universities and colleges of Islamabad, are taken as population and target on the result of the student performance and their success in the academic year.

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I. INTRODUCTION

We all have many dreams, dreams of becoming a successful person and lead a peaceful life. But in order to turn dreams into reality, it require an awful lot of determination, hardworking, dedication, struggle, self-discipline, and effort that's why we chose our topic name "The winner never quits and quitter never wins".

When talking about a student life then academic stress is considered the most common stress amongst this class. The idea of entering in professional fields just after few years of study not only is a source of delight, that an individual would finally be considered an independent and responsible member of society, but also a source of distress and tension about the economic pressure, financial status and competition.

To accomplish the future goals of having a good job and a luxurious lifestyle, a student suffers from the urge of getting good grades in his graduate examinations. Due to the increasing competition, he goes through several mental tensions including the stress of competition, meetings deadlines and mastering a number of books in a small fraction of time. They tend to surpass there challenges by the power of social support, leisure activities and changing methods of study.

To meet these challenges the main factors contributing towards his performance are teaching methodology, motivation, passion, concentration, energy crisis, interpersonal relationships with friends, family and teachers, financial barriers and economical hurdles.

Motivation is a psychological feature that is responsible for achieving certain goals. University Students are more motivated to Study, hard work and struggle if they know what goals they are working for Student's outcomes is greatly influence by the way teachers deal them and motivate them towards their targets. For this teachers should keep in touch with their students to know their worries, help them to get out of it and make them mentally relax and focus towards their goals.

Students may does not perceive the lecture and classroom's climate as supportive and favorable due to which they cannot concentrate and cannot deliver as it should be delivered.

A university's physical and emotional elements have major influence on student's learning, ethical, emotional development and academic performance. When students find their university's environment supportive and easy to cope with, they are less likely to get involve in violence and will not cause behavioral problems. They are more likely to have positive attitude towards others and will show better academic result.

II. LITERATURE REVIEW

Darling (2005) and Galiher (2006), utilized GPA to gauge understudy execution on the grounds that they fundamental concentrate in on the understudy execution for the specific semester. Some different analysts utilized test outcomes or earlier year result since they are mulling over execution for the particular subject or year (Hake, 1998 and Hijazi and Naqvi, 2006).

The system urges the understudies to hunt down applicable information as opposed to the teacher consuming the transmission of data to the learners. All things considered, examination confirm on showing methodologies keeps up that this showing system is viable in enhancing understudies' scholastic execution (Rengarajan&Damodharan, 1999).

Stress is defined as an emotional state of distress and pressure in which a person is unable to achieve the state is eustress and is unable to make an equilibrium between the demands placed by his environment and his personal capabilities. On the other hand, stressors are the stress causing materials. Many

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behavioral science scholars conduct research on stress and stressors and identified this area required supplementary attention (Redfern and Rees, 2000; Ellison, 2004; Agolla and Ongori, 2008; Agolla, 2009).

There are two sorts of variables that influence the understudies' scholastic execution. These are inner and outer classroom variables and these elements firmly influence the understudies' execution. Inner classroom components incorporate understudies ability in English, class timetables, class size, English reading material, class test outcomes, learning offices, homework, environment of the class, intricacy of the course material, instructors part in the class, innovation utilized as a part of the class and exams frameworks. Outside classroom elements incorporate extracurricular exercises, family issues, work and money related, social and different issues. Bogart, Wheat & Kernan (2011), scholarly accomplishment of graduate understudy will be upgraded if the ideal wellbeing related obstructions are low. There is negative relationship between college credit and push however frail relationship between Grade Point Average and anxiety. (Espenshade, Lynch and Zajacova, 2005).

Some examination finds that when the social foundations of understudies are considered, school qualities don't appear to impact understudy results, proposing that schools don't serve as parkways for upward portability, however rather strengthen existing social and financial disparities (Coleman et al., 1966; Jencks et al., 1972). Different scientists fight that school attributes can have a more noteworthy impact on understudy results than would be normal based upon understudy foundation (Lee, Bryk and Smith, 1993).

From the last 5 to 10 year in Pakistan literacy rate and education system is improved and many of the institution in Pakistan had improving the educational level and produce educated, and highly skilled people (Muhammad Saqib Khan & Ahsan Ahmed, 2015).

If didactic or interactive teaching methods are more effective in teaching elementary school children. They find that interactive teaching is associated with higher gains in test scores (Smith, J. B., Lee, V. E., and Newmann, F. M. (2001).

III. RESEARCH SIGNIFICANCE

The aftereffects of this study will give valuable bits of knowledge on the differential adequacy assorted showing routines have on student's academic performance. It encourage educating foundation to actualize the enhanced arrangements which upgrade the understudy's performance and nature of educating by changing the state of mind of understudies towards learning and encouraging. It additionally give the data that how much teaching methodology, depression, energy crisis and motivational factors had impact on the study of students.

a) Contribution

Different researchers analyze diverse variables however this examination paper is distinctive along these lines that it is the first research in which we investigate the four elements which are teaching methodology, energy crisis, depression and motivational factors that influence the educating accomplishments.

• Hypothesis

There are four hypothesis which have to analyze and they are:

H1: There is relationship between Energy crisis and student performance

H2: There is relationship between teaching methodology and student performance

H3: There is relationship between student motivation and student performance

H4: There is relationship between depression and student performance

b) Research objective

The fundamental concern of directing this examination is to locate the variables that has positive and negative connection with scholarly execution.

Question:

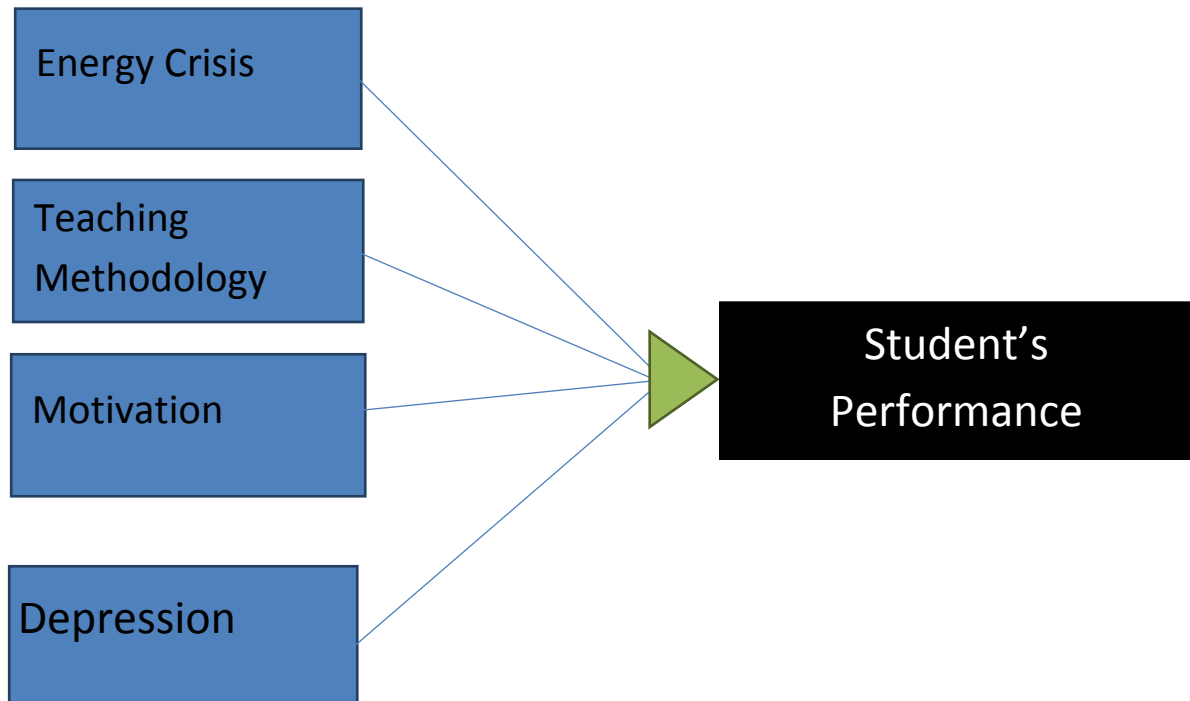
Exploration inquiry is: what are the elements which impact the scholarly execution of universities understudies of Islamabad?

IV. THEORETICAL FRAMEWORK

Factors:

Independent variables

Dependent variable



V. METHODOLOGY

In this we will analyze the variable choice, specimen determination methodology, model utilized for the examination and the statistical tools.

a) Measurement

Variables in this examination are measured on the 5 focuses Likert scale from strongly disagree to strongly agree. Extending from "strongly disagree" "disagree", "neutral", "agree" and "strongly agree" and marked as 1, 2, 3, 4, 5 accordingly.

b) Data set

The data for this research is primary data get form questionnaires

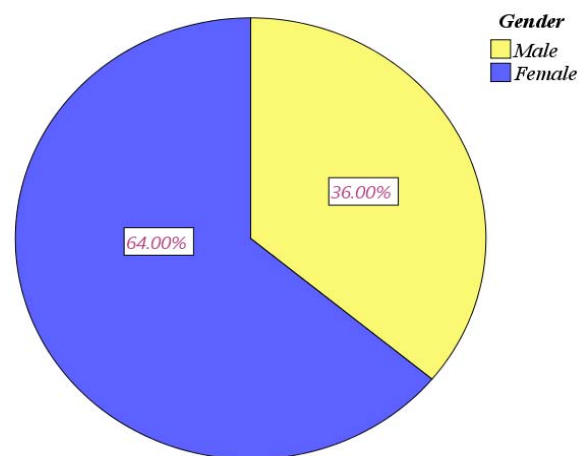
c) Statistical tool

Mean, median, standard deviation, Correlation, Regression ANOVA used for analysis.

VI. RESULT AND CONCLUSION

Discoveries of the study are examined as under.

a) Data Analysis and Discussion to meet the reason for the study, this segment has five sections for examining the information gathered for the study. The Five sections are: (an) information test data, (b) distinct examination, (c) connection investigation, (d) relapse investigation and (e) Hypothesis testing.



a) Demographic Analysis

Demographic results were acquired. The aggregate sample size was 150 in which male students were 54 which 36 percent of the total and 96 were female students which is 64 percent of the total 150. The fountain of information for this study is essential information gained through survey as shown in table 1 below.

Table 1 : Demographic

Gender	Frequency	Percent
Male	54	36%
Female	96	64%
Total	150	100%

b) *Reliability of the Scale*

Reliability or unwavering quality of aggregate or total Items is 0.793 in Table 2 which demonstrates its importance.

Table 2 : Reliability Statistics

Cronbach's Alpha	N of Items
.793	23

variables, Study shows that mean of student performance is 3.4467 and standard deviation is .56919. Mean of Energy crisis, Motivation, Depression and Teaching Methodology are 3.3267, 3.9644, 3.4000 and 4.1716 respectively, which shows that respondent are agree that these variables effect student performance and standard deviation for these independent variables are 0.69992, .70170, .71344 and 0.58028 respectively. Which is shown in Table 3:

c) *Descriptive Analysis*

Descriptive statistics represents the calculated means and standard deviations for the dependent

Table 3 : Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Teaching methodology	150	1.43	5.00	4.1716	.58028
Depression	150	1.00	5.00	3.4000	.71344
Motivation	150	1.00	5.00	3.9644	.70170
Energy crises	150	1.00	5.00	3.3267	.69992
Performance	150	1.00	5.00	3.4467	.56919
Valid N (listwise)	150				

d) *Correlation*

There is a level of relationship between Teaching Methodology and understudy execution that is 34 percent furthermore there is level of relationship

between Depression, Motivation and Energy crises with understudy execution are 13 percent, 20 percent and 2 percent individually as indicated in Table 4.

Table 4 : Correlations

		Performance	Teaching methodology	Depression	Motivation	Energy crises
Performance	Pearson Correlation	1	.348**	.489**	.351**	.423**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	150	149	150	150	150
Teaching methodology	Pearson Correlation	.348**	1	.324**	.539**	.264**
	Sig. (2-tailed)	.000		.000	.000	.001
	N	149	149	149	149	149
Depression	Pearson Correlation	.489**	.324**	1	.514**	.488**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	150	149	150	150	150
Motivation	Pearson Correlation	.351**	.539**	.514**	1	.361**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	150	149	150	150	150
Energy crises	Pearson Correlation	.423**	.264**	.488**	.361**	1
	Sig. (2-tailed)	.000	.001	.000	.000	
	N	150	149	150	150	150

** . Correlation is significant at the 0.01 level (2-tailed).

e) *Model Summary*

Model synopsis is demonstrated in Table. Estimation of RSquare (R²) is .0672 demonstrates that

67% variety in understudy execution because of the free variables motivation, depression, teaching methodology and energy crises. Shown in table 5.

Table 5 : Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.819 ^a	.672	.293	.47909

a. Predictors: (Constant), Energy crises, Teaching methodology, Depression, Motivation.

f) *Coefficient and Hypothesis testing*

On the basis of Beta coefficients the model shows that Teaching Methodology causes 18% variation in student performance and t-value is also significant. So we accept H1 which states that "there is positive relationship between Teaching Methodology and student performance. Depression causes 25% variation in student performance. Here t-value is also significant. So we accept H2 which states that "there is relationship between Depression and student

performance, Motivation causes 60% variation in student performance in positive direction and t-value is also significant. So we accept H3 which states that "there is positive relationship between Motivation and student performance and in last Energy crises causes 17.5% variation in student performance but in negative direction and t-value is significant. So H4 which states that "there is negative relationship between Energy crises and student performance.

Table 6 : Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.227	.316		3.886	.000
Teaching methodology	.180	.081	.183	2.225	.028
1 Depression	.254	.069	.319	3.666	.000
Motivation	.603	.074	.008	.084	.933
Energy crises	.175	.065	.215	2.683	.008

a. Dependent Variable: Performance

VII. DISCUSSION

This study was directed to investigate the vital elements that influence the understudies' scholarly execution. Exploration was led on schools, colleges in Rawalpindi and Islamabad. Four theory utilized as a part of the study to check the impact of free variables on ward variables. By utilizing the proper measurable bundle it is found that motivation, depression, teaching methodology and energy crisis are the variables that influence the understudy execution.

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The Relevance of Programme Evaluation and Review Technique (PERT) Network and Management by Objectives (MBO) towards Organization Efficiency at the Export Processing Zone, Calabar Cross River State

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Abstract- The reality that the Nigeria Government has judiciously invested over three billion naira towards the improvement of the Export Processing Zone (EPZ) in Cross River State is a significant demonstration of the degree of productivity which is expected from the EPZ operations there. This is the time for all Local Government administrators in Cross River State to adopt the information management styles relevant to export products specification, assessment, and Evaluation and transportation modalities to help process goods to the required destinations of the EPZ. The Local Government officials must open EPZ offices in their areas and establish viable links between those offices and the main EPZ office at the State Capital. Management by Objectives (MBO) has been applied to indicate how the EPZ can succeed if the MBO is practiced. Also, Programme Evaluation and Review Technique (PERT) network can be used to enhance EPZ activities as specified projects can be broken down into identifiable activities, where it can be calculated mathematically to know which activities could be done within specified time frames.

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Abstract- The reality that the Nigeria Government has judiciously invested over three billion naira towards the improvement of the Export Processing Zone (EPZ) in Cross River State is a significant demonstration of the degree of productivity which is expected from the EPZ operations there. This is the time for all Local Government administrators in Cross River State to adopt the information management styles relevant to export products specification, assessment, and Evaluation and transportation modalities to help process goods to the required destinations of the EPZ. The Local Government officials must open EPZ offices in their areas and establish viable links between those offices and the main EPZ office at the State Capital. Management by Objectives (MBO) has been applied to indicate how the EPZ can succeed if the MBO is practiced. Also, Programme Evaluation and Review Technique (PERT) network can be used to enhance EPZ activities as specified projects can be broken down into identifiable activities, where it can be calculated mathematically to know which activities could be done within specified time frames. When, for instance, Government agents give the dates when some specific commodities are to be assembled for them at the State Capital, the Local Government administrators become mandated to work with the local producers to ensure that specific projects are commenced at appropriate times, since PERT analysis of time durations for accomplishing the activities in the plans can be measured mathematically and evaluated to know which pathway is the most appropriate to follow.

I. INTRODUCTION

For any enterprise to prosper, a high degree of organizational efficiency must be maintained. Being prosperous in this context implies that the objectives for which the enterprise was set up are being realized. Such prosperity can only be attained through some well structured and properly programmed system of management of information and material resources.

In the context of this paper, 'efficiency' refers to the positive, favourable, significant relationship between inputs into a system and the outputs from the system. For instance, in any given organizational situation, it is

necessary to define the objectives one intends to attain and the specific outputs expected from the activity. It is usually said that an enterprise is efficient if it produces maximum output with a commensurate quantity of input; that is, when a given quantity of input produces the highest possible amount of output. Efficiency in information and resources management is, therefore, measured by the degree to which the resulting output of goods and services approximates or exceeds the value of information input fed into the system. This is the concept of maximum output from minimum input.

Under the prevailing atmosphere of crisis and depression in world economy in general, and Nigeria in particular, in the previous millennium, the economic survival of the nation has become a challenge to our business and chief executives both in the public and private sectors. So for contemporary Local Government Administrators to rise up to the challenges posed by the prevailing economic situation; they must of necessity, have a firm grip and an up-to-date knowledge of what information management is all about; the modern management techniques, and the essential ingredients for their use to achieve predetermined results- Over the years, there had been a lot of controversy over both theories and techniques of management. But in times however, there has been the encouraging recognition of the fact that no one theory or technique is applicable in all circumstances. Luther Gulick in the 1930's adopted the approach of breaking down management job into components. He coined the acronym POSDCORB from the initial letters of the seven management functions of planning, organizing, staffing, directing, coordinating, reporting, and budgeting. (The extra 'O' was added in order to make the acronym pronounceable) (Dale 1981:4). We shall not bother to go into details of what each of the management functions involves. This is implicit in the words themselves; as they are self-explanatory.

A Local Government Administrator that wants to achieve a high degree of management efficiency in his jurisdiction must efficiently perform all the seven

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management functions. Management of information is garnered through these seven avenues following a well-set organizational plan, established to bring about pre-determined outputs. But the extent to which every administrator performs each of the functions varies from situation to situation, since the local governments have little information apparatuses for effective information management. Also the degree of success of the administrators will depend on business climate, the circumstances in which individual administrators find themselves, and the degree of urgency involved in supplying the information at the required time. This point is very crucial because of the high level of poverty of the people at the local areas: this poverty manifesting itself in the inability to afford the radio and television, efficient means of transport. The result is ignorance of what happens beyond people's door step, culminating in the obliteration of information concerning the particular area of the economic activity such as the Export Processing Zone (EPZ).

The EPZ is an enterprising economic development. The fact that the Nigeria Federal Government has judiciously invested over two billion naira towards the improvement of the Export Processing Zone in the Cross River State is a significant demonstration of the degree of productivity expected from EPZ operations. One wonders whether the Cross River State Local Government Administrators realize the significant role which this project places on them, since most of the exports accepted for processing should come from their areas of operation. To what extent are they prepared for this activity? It must be made abundantly clear that at this instance if the administrators do not perform well, they will be selling their regal first position for a pint of porridge as the Biblical Esau did to his younger brother, Jacob. That means if the local government administrators do not measure up in their preparedness towards supplying required export commodities for processing, other states of the Federation will take over this position. This is true because as soon as the machinery is set for the operations to commence, the Federal Government agents leading the EPZ.

It must be stressed that poor information flow in the Local Government Areas creates misconception which gives rise to negative attitudes. This is the time for all j Local Government Administrators in Cross River State to adopt the management styles of information relevant to export products specification, assessment, evaluation; and transportation modalities to help process goods to required destinations of the EPZ. The Local Government Administrators must open EPZ offices in their areas and establish a viable link between those offices and the main EPZ office at the State; Capital Such local EPZ offices serve to disseminate information to the local commodity producers who must have supervisor's to check for quality specification,

assess and evaluate for onward transmission to the State Capital.

In order to protect quality, the Local Government Administrators must allow; the production and processing of commodities designed for the EPZ to be the individual; concerns of the producers. If this happens, they should know what they are handing; over the responsibility of their state to other states. Planning for efficient processing at the Local Government level must start now by improving the current information of systems in the areas. The primary information system is the road. The administrators must ensure that the roads are improved into the hinier-land to enable information; Bearers and the produce transporters easy passage. The mail systems must be reactivated; where telecommunications network had existed, such could be reactivated, and where possible, new ones installed. It must be made clear that advent; of the EPZ is meant to usher in improved systems of communication and commodity production in all facets of our endeavours. The Cross River State must see this as a great step towards its advancement into a more developed community.

There are various management and planning techniques currently in use. But in application, different organizations adopt different management and planning techniques to suit the needs of their establishments. According to a Committee on Administrative Practices of the International Labour Organization (ILO:1970), there are many different techniques of management, which can be categorized into three major headings as follows:

- Budgetary Programming Techniques made of: Cost-benefits analysis, value analysis, budgetary control.
- Quantitative Management Techniques include: M.B.O project evaluation, Program Evaluation and Review Technique (PERT).
- Financial Planning which include: Development-budget, non-development budget: Planning, Programming and Budgeting Systems (PPBS).

We shall examine more closely some of these management techniques:

- Personnel planning and Management by the use of Management by objectives (MBO);
- Programme Planning by the use of Programmes Evaluation and Review Technique (PERT);

II. PERSONNEL PLANNING AND MANAGEMENT BY OBJECTIVES (MBO)

Management by Objectives may be simply defined as a process whereby both the superior and subordinate workers in an organization jointly make work, plans by identifying Common goals and defining

each individual's major areas of responsibility in terms of the results expected of the enterprises. According to Davis (1971; 305-355), MBO seeks to integrate the organizations' needs for growth, fulfillment of its objectives and client's expectations with the individual manager's need to contribute to the organization and to develop and satisfy himself in the process. To this end, MBO makes the organization define its objectives at various levels and assists the manager to define his own key expected results within the total framework. The manager goes on to specify particular standards of performances including the conditions which exist when the result is achieved satisfactorily. At regular intervals, staff reviews are made, involving both superior and subordinate, to encourage a recycling of goal setting and activity behaviour patterns.

In applying the MBO concept in the context of the EPZ project, the Local Government Administrator is the manager, while the various producers of the required commodities in the Local Government Areas are the subordinates, and the particular products required for onward transmission to the EPZ center at State Capital is the Objective. The administrator gets information as to the specifications and quantities of particular commodities required from the EPZ center at the State Capital and disseminates this information at the Local Government EPZ office to the local producers of the commodities. Strict guidelines as to quality and time of assembly of such commodities must be clearly made to the producers. The administrators must recognize the fact that the producers have their own financial expectations from their work. Therefore, there must be co-operation and agreement all the time before the administrator can expect the commodities to be assembled on schedule. That is to say that where the objectives of the administrator and those of the producers are met is the only condition for the programme to work efficiently.

That is why it is necessary to have regular staff reviews where suggestions can be made to take care of any existing bottle-necks either in the administrator's work or in the producer's activity. The earliest exponent of management by objectives was Drucker (1954). His aim was to emphasize the advantages of managing by objectives rather than by unspecified outcomes. He further argues that under MBO, each manager from the highest to the lowest levels of organization should have clearly defined objectives which reflect and support the objectives of higher level management. Under this arrangement, MBO insists on an organization defining its objectives at various levels and assists each manager to define his own key results and areas of effectiveness in the organization (Drucker, 1954).

Studies so far carried out tend to suggest that the application of MBO to modern management has the following advantages:

- It makes for corporate strategies for the organization and ensures participation and contribution of every member of the enterprise to the management, planning decision-making, implementation, and operational evaluation.
- MBO makes for predictability of progress and problems of the organization in relation to the pre-determined goals.
- The technique promotes the proper processing of relevant information, communication, accountability and reporting in an organization.
- MBO encourages self-development through individual staff identification of personal and organizational needs, promotes the development of relevant skills and enhances resources allocation and use.

All the points taken together show that MBO enables a high degree of organizational efficiency to be achieved by business leaders.

III. PROGRAMMES EVALUATION AND REVIEW TECHNIQUE (PERT)

In PERT network, a specified project is broken down into identifiable activities and events. A sequence of activities and events is made based on which a flow diagram is drawn. The performance of each phase of the work is assigned specific time durations based on three time specifications:

- The "pessimistic" time, i.e. the longest possible time it could take to accomplish the task if the condition is adverse. That is designated by the letter a.
- The "optimistic" time, i.e. the shortest possible time it could take to accomplish the task if the condition is excellent. That is designated by the letter b
- The "most likely" time, i.e. the length of time it will take to accomplish the task in normal conditions. That time specification is designated by the letter c.

The expected time, t_c , for accomplishing the task is calculated out as: $t_c = a - \pm 4m_jLb_6$

The answer is given in weeks and fractions of weeks.

The t_c is the basic unit from which other calculations can be made. Such include the total Expected Time (TE); the Latest Expected Time (TL). When time specifications are given in a PERT network and a network diagram is provided, it is possible to calculate mathematically and arrive at the exact date to start a project which is to be completed at a required date in future. Also, when a PERT network diagram with different (up to six) pathways are given, it is possible to calculate mathematically and know which pathway is the most economical and fast in accomplishing, the set task at the exact date in future.

This is the type of information processing which the present administrators of the Local Government Areas of Cross River State need to utilize in preparing for the EPZ enterprise. Management of time to keep dates is of vital importance in the success of any enterprise. When the Government Agents of the EPZ give the dates when some specific commodities are to be assembled for them at the State Capital, it believes the Local Government administrators to get into working with the local producers to ensure that projects which will result in the production of such commodities are commenced at appropriate times. Also embedded in PERT Network Analysis are the concepts of the Critical Path and Slack Time. In the critical path, any deviation will result in a delay in the overall completion date Whereas a pathway which indicates slack times shows that if such pathways are used, no delay (of course of a stated duration of time) will cause a delay in the overall completion of the project. The PERT Network is thus an excellent device for the Local Government Administrator who wants to be successful in keeping pace with the growth of the EPZ in Cross River State. Details of how these techniques are applied can be worked out with the author of this paper.

The application of the PERT Network analysis to an organizational management has the following advantages.

- Network analysis identifies the sequence and relationship of all significant events and activities in the planning of the objectives of the enterprise;
- Time durations for accomplishing all activities in the plans are measured and evaluated to know which pathway is the most appropriate to follow.
- The critical path can thus be calculated and carefully watched and appropriately responded to since any deviation on this path will cause a change in production date.
- Slack areas are shown where some delay will not prevent the meeting of objectives times.
- The probability of meeting scheduled events is open to the administrator.
- It enhances interrelationship, sequence and occurrence in the execution of a project which needs specified time durations to accomplish.

Nwankwo (1918) confirmed that PERT is very useful in analyzing and controlling complex programmes and in distilling a large amount of data into flow diagrams of events and activities which help the decision-maker in arriving at satisfactory decisions. Again, all the above advantages taken together make for enhanced organizational efficiently and greater productivity.

IV. CONCLUSION

In an austere period such as Nigeria is now passing through it becomes a compelling duty for the

Local Government Administrators in particular to ensure greater efficiency in ail operations in their Local Government Areas, in preparation for the EPZ project. One way of doing this is to adopt and use some appropriate management and planning techniques for the attainment of the objectives of the Local Government Area.

In doing this, the starting point is the drawing up of a functional plan, comprehensive programme for action, and the adoption of affective monitoring and supervisory mechanism for the operation of the enterprise. Planning here refers to deciding in advance what the administrator wants to accomplish, (based on the requirements of EPZ government functionaries), and setting short and long-range goals for the state. In this direction, there is need to forecast as much as possible concerning the economic, social and political environment of the state, and the available resources - human, financial, equipment, facilities, etc. of the state. It will be wrong to hand over the processing of commodities meant for the EPZ by individual producers without proper assistance and supervision before such producers reach the EPZ depot at the State Capital.

Thus among the important facts in the management of information and plan implementations are the state of the environment and the resources available to the state. Also of equal importance is the quality of leadership ability which the Local Government Administrator brings to bear on plan implementation and operations in the area.

Such an administrator must not sit in the office and think about managing information received to achieve required objectives. Adequate information management implies putting such information into productive use, and this is done by the personnel which must be directed by the leader. As it had been indicated earlier, such directing is done through the planning and carrying out of plans which produce commodities required by the EPZ.

Some of the essential ingredients for beneficial use of modern information management and planning techniques include the following:

- Through knowledge of various information management and planning techniques, theories and concepts, and the ability to make use of them in practical situations.
- Drawing up a good plan and programme of action for the Local Government Area and ensuring that its operations are effectively monitored and supervised,
- Being constantly aware of the fact that good plans could be marred by some interest obstacles to effective plan implementation; and guarding against this.



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Strategies for Business Growth in Robotics and Automation

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Keywords: *technology strategy, operations strategy, business strategy, business growth, robotics and automation, dimensional map.*

GJMBR - A Classification : *JEL Code: M10*



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Strategies for Business Growth in Robotics and Automation

Vijay Kumar Dharmadhikari^α & Dr. PC Basak^σ

Abstract- Managing technology integrated with operations strategies is a challenging task and has prime importance in a firm's business strategy formulation. Today technology and disruptive manufacturing methodologies can make the difference between a winning or losing competitive strategic alternative. This research work is targeted towards the formulation of winning strategies including analysis on technology and operations strategies for business growth with focus on robotics and automation. Also included is a practical illustration of a company in real time who have identified and successfully implemented robotics and automation as their prime business growth area. How the formulation of correct strategies brought business growth and success to the organization has been studied and enunciated. Also developed is an advanced Gap Analysis framework which is basically a Dimensional Map to identify the strengths and weaknesses of the factors affecting business growth of the organization. Also, this helps in identifying those factors which needs strategic reinforcement. In conclusion we obtain a prediction factor list to identify the winning operations, technology and business strategies adopted by leaders in the Robotics and Automation industry for business growth.

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I. INTRODUCTION

Robotics and Automation [RAA] has touched almost all aspects of industrial applications from Welding, Assembly automation, Painting, Pharmaceutical, Packaging, Spot Welding, Food & Beverages, FMCG, Healthcare, Rehabilitation and many more sectors. Apart from the manufacturing industry, robotics also finds its niche place in defence and power sectors. The nuclear sectors are extensively using robotics for material handling, inspection and maintenance needs. The myriad of high technology applications are not limited to those mentioned above.

India is on the fast track of becoming an international manufacturing hub. Manufacturing alone contributed to about 79% of FDI investment and 27% of GDP (2006). The 17th PWC Annual global CEO survey

(2014) indicates that 80% believe that technological advances will take place in their industries within the next five years. This economic growth is expected to see an unprecedented acceptance of the applications of robotics and automation in the Indian industry.

Operations are under increasing pressure as a result of low cost competition, stricter environmental legislation and falling skills within industry. With the added pressure to improve levels of productivity, quality and safety for better business, adoptable sustainable manufacturing practices present a cost-effective route to improve economic, environmental and general plant performance.

Today industry is increasingly getting competitive and the pressure of performing repetitive activities consistently is increasing day by day. Industry today is convinced with the Return on Investment and payback periods justification of using robotics for many types of jobs and is willing to invest in the same to reap their advantages.

Management of robotics assisted automation also makes strategic management complex due to the various social issues that crop up in terms of workforce displacement, specialised education and training that needs to be imparted to meet technological needs, right man for the right job has never been so much more complex, international competition to meet the needs of automation of emerging markets. All this calls for a systematic and step by step approach to strategy formulation. This can be achieved by integrating Technology and Operations Strategy with Business Strategy for business growth in robotics and automation.

II. OBJECTIVES

- Linking of various Technology, Operations and Business Strategies for companies in Robotics and Automation business.
- To arrive at a Conceptual framework for companies in Robotics and Automation to show the extent to which various factors affect the various strategies.
- To test whether this platform satisfies a company case with respect to application in Robotics and Automation business.
- Check the efficacy of the framework by taking up a case study on Robotics and Automation
- To conclude whether it is a wise strategic decision to invest in a Robotics and Automation business.

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III. LITERATURE REVIEW

Although the formulation of robust operations and technology strategies has been the primary focus of various research papers, the integrated approach of linking various strategies like Technology Strategy, Operations Strategy and Business Strategy for companies in the Hi-Tech field of robotics and automation have posed multiple challenges and have relatively churned out less literature. This field has generated a myriad of allied papers which draw our attention to the numerous ways in which the different industries approach these issues. But there are rarely any hardcore papers on this subject which go to the root of the facts and provide a ready reckoner data, making this an interesting research topic.

This literature review covers surveying of over 300 national and international papers spanning the research field over a period of 20 years. The reviews have primarily focussed on the research context, theoretical bases, research methodology used, analytical techniques employed, and applications covered. This has thrown open the wide perspective as to how the situation has posed several challenges from robotics becoming a key factor to improving productivity of firms to spurring the growth of the state of the art robotics and automation industries.

This literature review gives a fundamental approach to the various keywords used in the literature namely Technology Strategy, Operations Strategy, Business Strategy, Linking Technology and Operations Strategy, Integrating Operations with Business Strategy, Aligning Technology Strategy with Business Strategy, Managing Technology and Operations Strategy with Business Strategy, Business Growth in Robotics and Automation.

a) *Technology Strategy, (Vijay Kumar Dharmadhikari And Pc Basak, 2015)*

In today's fast paced competitive environment technology becomes a central component of strategy making process. Integration of technological concerns into business strategies of organizations is facilitated with global perspectives on the subject. Books and research papers published on technology strategy have addressed economic, organizational as well as cultural implications of technology, (R. Rumelt, 2004).

Strategy-technology integrated companies have shown better financial and operational performance. Strategies of technology leadership and market orientation were also associated with enhanced financial performance, (M. Schneiderjans, Q. Cao, 2009). The evolution of technology strategy has been dealt with in a lucid and step by step manner in this book (Ricardo Santa et al, 2010). How Technology based firms address and approach formulation of technology strategy to gain competitive advantage in turbulent markets has been covered by many authors. (Arthur D

Little, 2001 and Hector Montiel Campos et al, 2009). Technology strategy for managers and entrepreneurs examines technology strategy from perspective of various established companies, gives a balanced theoretical and practical view of this subject (Scott Shane, 2007).

In order to achieve sustainable competitive advantage, according to Porter, firms must adopt one of the three generic strategies, namely, cost leadership, differentiation and focus (Mas Bambang Baroto et al, 2012). While no strategy can be universally effective, technology is becoming an important factor for serious consideration. However, since opportunities created by advanced technologies, such as computer integrated manufacturing (CIM), Robotics and Automation, etc., are open to all competitors within the same industry, how a firm should capitalize them is not only a technological issue but also a strategic issue. In the increasingly volatile business environment, the process of finding a solution able to resolve both issues satisfactorily has been described as a journey into the unknown. To survive the journey, innovation is becoming crucial (Lee Zhuang, 1995). Based on the author's personal interest and professional approach the same conclusions have been arrived at after conducting a detailed study on this topic.

b) *Operations Strategy*

How to formulate and implement a winning Operations strategy has been addressed very well so far for both domestic and foreign markets. Competitive strategy has also been dealt with by various authors to define the role operations strategy plays in a company's business strategy and manufacturing programs showing how programs such as quality management, six sigma, agile manufacturing, and supply chain management fit within the operations strategy (John Miltenburg, 2005). These tools help companies not only to plan and execute, but also monitor, learn, test, and adapt their strategic assumptions and practices to achieve sustainable success (Scott Shane, 2007). The manufacturing function requires a strategy to ensure a match, or Congruence, between the company's markets and the existing and future abilities of the production system. Manufacturing strategy generally addresses issues including (John Miltenburg, 2005):

- ✓ Manufacturing capacity
- ✓ Production facilities
- ✓ Use of technology
- ✓ Vertical integration
- ✓ Quality
- ✓ Production planning/materials control
- ✓ Organisation
- ✓ Personnel

There is a common belief that manufacturing is an important part in corporate success. And yet, there is a lack of understanding of how manufacturing success is linked to corporate success. "It is quite possible for a firm to be successful with a bad manufacturing strategy and fail with a good one. In other words, manufacturing matters, but not unconditionally" To establish a link between manufacturing success and business success, it must be first determined how manufacturing strategy relates to three areas (Skinner W, 1969):

- ✓ Relative Managerial Success
- ✓ Relative Manufacturing Success
- ✓ Economic Success (which signifies business success)

Conclusions include the partial indictment of operations management literature through the themes, that can be shored-up through increased empirical research in operations strategy that focuses on content, process, and performance (Everett Adam and Paul Swamidass, 1989).

c) *Linking Technology and Operations Strategy*

Operations contributes 6.7 trillion pounds (10.93 USD) to the global economy. Many European countries including UK are strategizing to enhance their High Value Manufacturing [HVM] base and investments in order to be able to meet their Balance of Payments [BOPs] requirements. UK's Strategic landscape document have identified 22 competencies to ensure support is focused on where there is the greatest potential to deliver high value economic impact across multiple global market sectors. HVM is a leading edge technical knowledge and expertise to the creation of products, production processes, and associated services which have strong potential to bring sustainable growth and high economic value to a country. Activities may stretch from R&D at one end to recycling at the other. Fig.4 shows that such potential is characterised by high R&D intensity and high Growth. (Technology Strategy Board (TSB) UK, 2012-15).

"Fig 4 about here"

It has been realised that developing competitive advantage by using technology alone is unlikely to be sustainable. These technologies are also weapons of the competition, and have to be coupled with effective market and manufacturing strategies in order to win (Clark, 1989, Hong Liu and Peter Barrar, 2008).

d) *Integrating Operations with Business Strategy*

(R.Michael Donovan, 2011, Sohrab Khalilli et al, 2013) One paper seeks to examine empirically from a contingency perspective the influence of business strategy on the relationship between operations strategy and business results. (Maria Oltra and Luisa Flor, 2010).

In order to survive, thrive, and create real value in increasingly competitive global markets, organizations are adopting increasingly complex strategies. And even

when they choose the right and the most brilliant strategies, the battle is only half won - if that. As companies try to execute on more and more intricate strategies across larger, more complicated, and widely dispersed operations, they confront challenges of a magnitude well beyond their past experience.

Although strategy execution is clearly an issue of high importance, there is also ample evidence that organizations find it difficult to fully deliver on their strategic and operating plans. Bain & Company director Chris Zook, in the book "Profit From the Core: Growth Strategy in an Era of Turbulence," notes the following startling statistic: In the decade between 1988 and 1998, only one out of every eight companies was able to deliver at least 5.5 percent real growth in revenues and earnings every year while covering its cost of capital. First, converting a strategy into results usually requires the coordination of disparate people and processes through activities including — but not limited to — strategy development, strategic and operational planning, budgeting, talent management, initiative management, forecasting, and technology.

On top of people's failure to understand that strategy and operations truly need to be linked, the second truth one has discovered over the years is that coordinating these disparate elements requires a performance management process that links strategy to operations and demands that all parts of the organization work in concert to deliver performance.

e) *Aligning Technology With Business Strategy*

Technology based approach is recommended for flexible automation user in the selection and implementation of business strategy (Raghavan Parthasarthy and Prakash Sethi, 1992). Flexible automation includes robotics and automation. Technology Strategy, like any functional strategy has two purposes. On one hand it is the translation of the overall strategy of the organization into a coherent set of long term instructions of investments, which are active in technology development. But at the same time it is also the development of technology based opportunities or options for the organization to steer future developments, i.e. provide the capabilities that enable the organization to shape its future (de Meyer and Loch, 2008).

f) *Managing Technology and Operations Strategy with Business Strategy*

The findings reported in one other paper are that of improvements of operational performance can only be achieved by aligning technological innovation effectiveness with Operational effectiveness. Confirmatory factor analysis [CFA] was used to examine structural relationships between the set of observed variables and set of continuous latent variables. (Ricardo Santa et al, 2010).

The limitations of prior studies are that there are only a handful of hardcore papers and fewer practical case-studies which have dealt with the influence of strategies for business growth in Robotics and automation. Virtually this is still a greenpasture and thus carries huge potential for further research.

IV. RESEARCH METHODOLOGY AND STUDY

After a detailed literature review of over 300 national and international journal papers from various sources, a Critical to X (CTX) (Amitabha Saxena, 2010) tree was derived. CTX trees are diagram-based tools that help to translate broad Strategies to specific, actionable and measurable requirements. The X's here

stand for varying dimensions like Technology Strategy, Operations Strategy, Business Strategy, Linking Technology and Operations Strategy, Integrating Technology with Business Strategy, Aligning Operations with Business Strategy and Managing Operations and Technology Strategy with Business Strategy.

In this research the broad goal is Sustained Business Growth in Robotics and Automation (RAA) and we drill down from this broad goal to specific, measurable dimensions (factors) and sub-factors that can be used to improve performance of the RAA firms. Figure 1 gives a typical CTX Tree which was derived after literature review phase was completed.

"Fig.1 about here"

Organize the factors into inputs and outputs ie the x's and Y's of the general equation

$$Y = g(x_1, x_2, x_3, x_4, x_5, x_6) \quad \text{Eq (1)}$$

Where, x_1 = Operations Strategy

x_2 = Technology Strategy

x_3 = Business Strategy

x_4 = Linking Technology with Operations Strategy

x_5 = Integrating Operations with Business Strategy

x_6 = Aligning Technology with Business Strategy

x_7 = Managing Technology and Operations Strategy with Business Strategy

Y = Sustained Business Growth in Robotics and Automation

$$E(x_1) = f(A, B, C, D, E)$$

$$\text{ie } E(x_1) = f(\text{Quality, Flexibility, Speed, Technology, Cost}) \quad \text{Eq (2)}$$

$$E(x_2) = h(W, X, Y, Z)$$

$$\text{ie } E(x_2) = h(\text{Market Structure, Technological Characteristics, Business Strategy, Firm Performance}) \quad \text{Eq (3)}$$

$$E(x_3) = k(9, 10, 11, 12, 13, 14)$$

$$\text{ie } E(x_3) = k(\text{Political, Economic, Social, Technological, Environmental, Legal Factors}) \quad \text{Eq (4)}$$

$$E(x_4) = l(L, M, N, O, P)$$

$$\text{ie } E(x_4) = l(\text{Resource Efficiency, Manufacturing Processes, Materials Integration, Manufacturing Systems, Business Models}) \quad \text{Eq (5)}$$

$$E(x_5) = m(F, G, H, I, J, K)$$

$$\text{i.e. } E(x_5) = m(\text{Operational Effectiveness, System Effectiveness, Plan Governance, Effectively Prioritizing Strategic Initiatives, Effective Allocation of People & Financial Investments, Plan Bi-Directionally}) \quad \text{Eq (6)}$$

$$E(x_6) = n(Q, R, S, T, U)$$

$$\text{i.e. } E(x_6) = n(\text{Market Dynamism, Technological Complexity, Firm' Innovation Resources, Innovation's Competencies, Capabilities of the firm}) \quad \text{Eq (7)}$$

$$E(x_7) = p(1, 2, 3, 4, 5, 6, 7, 8)$$

$$\text{i.e. } E(x_7) = p(\text{Robotics \& Automation Strengths of Scope and Change, The Strategies of RAA reflect scope flexibility choices, Business Strategies Involves Speed-Flexibility and Quality Leadership Choices, RAA has Direct Automated Links between Technical Core and Operations Constituencies, RAA Organization is of Team Type, Diversified Skills In Shop Floor Personnel, Concurrent Engineering is applied in RAA Firm, Uses Project Teams for functional Co-ordination at Operational Level}) \quad \text{Eq (8)}$$

In the above equations,

- E(x1) is a measure of "Operations Strategy",
- E(x2) is a measure of "Technology Strategy",
- E(x3) is a measure of "Business Strategy",
- E(x4) is a measure of "Linking Technology with Operations Strategy",
- E(x5) is a measure of "Integrating Operations with Business Strategy"
- E(x6) is a measure of "Aligning Technology with Business Strategy"
- E(x7) is a measure of "Managing Technology and Operations Strategy With Business Strategy"

We selected the scale and units for the various factors and conducted the DOE-Survey and rated the various factors that affected the corresponding strategies and their interactions. The rating of the various factors was recorded using Likert scale from 1 to 5 (with 1 indicating Strongly disagree and 5 indicating Strongly Agree). The responses from the Survey Questionnaires were tabulated as shown in Table 1 of Annexure A. The number of respondents that provided inputs for the survey were 109. The respondents were top management officials like CEOs, CFOs, CTOs, COOs, Directors, VPs, GMs, etc chosen from RAA businesses organizations.

Now, the Dimensional Map was drawn by marking the discrete responses on the scale shown on the map. The Gap between the outer line which corresponds to 5 on the Likert scale and the level of a given factor shows the level of agreement of experts in the field of Robotics and Automation on the factors that affect the corresponding strategies in order to sustain business growth. Fig 2 gives the Dimensional Map for Business Growth in RAA.

"Fig 2 about here"

109 Senior Management Professionals like CEOs, CFOs, CTOs, COOs, Directors, VPs and GMs from various Robotics and Automation(RAA) industries answered the survey. The dimensional map is showing the final agreement of the senior management professionals from RAA industry.

Fig-3 gives the conceptual framework showing the strategic model including dependencies and factors affecting the various strategies and their inter-relationships.

"Figure 3 about here"

"Figure 4 about here"

As seen in Fig.4 Robotics and Automation falls under high R&D intensity and high business growth area. Hence this linking of operations and technology strategies helps to answer the question "Why RAA is an attractive proposition for investment?".

The step by step Research methodology adopted in this research is shown in Annexure-3.

The answers to the survey questionnaire are recorded in a tabular form and their summary is shown in Annexure-1, Table 1.

V. RESULTS

- a) The Dimensional Map derived for firms involved in Robotics and Automation [RAA] helps to identify those strategic factors according to the CEOs, COOs, CFOs, CTOs and other top management officials which affect the relevant strategy verticals or their interactions. [See Fig 2].
- b) Test of Hypothesis 1 was carried out for the verticals. Null Hypothesis 1 was stated as "Not all the verticals of strategies are equally important" Test of Hypothesis using Pareto diagram indicated that "all the verticals of strategies are equally important", the same was verified using Chi-square as a non-parametric test. See Annexure-2 for details.
- c) Hypothesis 2 was stated as "Not all the questions of important verticals are equally important". Testing of Hypothesis using Pareto diagrams yielded that all the questions of important verticals are equally important for "Business Strategy", "Linking Operations Strategy with Technology Strategy" and "Aligning Operations with Business Strategy". See Annexure 2 for details. The same result is depicted in the Dimensional Map-Fig.2.

VI. DISCUSSION

India is a growing market as far as Robotics and Automation field is concerned and will need a lot of India centric research to be taken up by industries and academia in order to meet the forth coming challenges in this field. Hi-Tech areas which includes High value manufacturing and RAA are growing at around 4% globally whereas in India the growth rate is almost 3 to 4 times higher. The Epi-centre of this growth is shifting to India and China leaving a lot of work to be done by researchers in this field. Today in many of the industries we see islands of automation and this needs to be looked at from the consolidated point of view. The cost benefit analysis of such an implementation has to be worked out in greater details by the industrial engineering team along with accounting teams to reap future benefits. There is also the aspect of social implication of introduction of RAA in Indian Industry that needs to be taken into account (which is often neglected) while automation is taking centre-stage. Building strategies for business growth has never been so much more challenging that it is now due to the

multiple non-linear variables involved, involvement of resources from allied fields, Top management involvement required and also Technological challenges such as Research, Development, Training and Education and many more.

Another field of research which has taken revolutionary standing in the countries like Japan, USA, South Korea, China and now India is that of Low cost Automation. Gnashing your teeth because your firms' hefty investments in R&D generate weak returns makes no sense and we need to take the baton and move on. By taking well managed and well informed decisions to avoid any fiascos of humungous losses due to over-investment in advanced technology areas without considering the ROI and payback calculations can be a deterrent to the company's growth.

The introduction of the rupees 10000 million revolutionary concept of adoption by GE Multimodal Manufacturing facility at Chakan near Pune, India is clearly a winning strategy. Here the company has strategized its efforts on building flexible automation platforms which could be used across the product lines of GE such as Energy, Aviation, Oil & Gas and Transportation. This energy efficient effort is in line with the current governments much popularized "Make in India" initiative. Below we discuss a practical case study of a company Viva Automation which is in the business of Robotics and Automation and how their young and dynamic CEO brought exponential business growth to the company in a record time in spite of economic slowdown.

a) *Case-Study:- Viva-Automation's Survival-Madan Mohan's Revival, (Vijay Kumar Dharmadhikari and PC Basak, 2015 from ET Cases)*

Industry 2008-2011 was facing turbulent times and mostly Automotive, Engineering, Steel, Infrastructure, and related industries were under economic slowdown. Business was tough and many companies were laying off their staff and some were even closing shops. Investments were not forthcoming and no new ventures were being initiated across the sectors.

Viva Automation was involved in the field of Robotics and Automation. Viva was at cross roads, it had not grown substantially in the last 8 years since 2003 and its turnover was hovering around the rupees 40 million mark for the past 8 years. The number of employees in this company as of 2011-12 were 25 with diverse skill sets. The management were not sure how to deal with this stagnated situation. The low growth rate had caused a climate of low morale among the employees. Customers were not considering repeating orders on this company. Economic slowdown had struck and survival of the fittest was the watch word of the industry. Management were unable to decide whether to divest from this current business, the

recession loomed large and employee turnover was on the rise.

The past experiences of the company about their financial performances were not very satisfactory. Viva Automation saw a string of new leaders and most did not have a strong vision to grow this business in the right direction. The kind of projects executed mainly were those of selling of components used in robotics and automation industry namely motors, drives, controllers, some automation solutions were provided for cement, steel, textile, Automotive industries, and some non-critical mechanical and electronic components were provided by taking up outsourced job works from these industries. This direction of business helped little to develop the skill sets of their employees to those levels which were required to be able to take up high end robotics and automation industry projects with exponential returns. The Business Growth Areas in focus too were very diverse and incoherent.

Viva Automation did not grow substantially during the period 2003 to 2011. There was a strategic need to relook at the strategic intent of the company. The business model followed by the company was quite unique. The project planning was distributed among the employees based on availability of the employees at the time of execution of the project. There were many occasions when employees were shuffled between projects as per convenience of the then leader. Also there were situations when the project leaders were also asked to take up other responsibilities of other new projects that were won. Delivery dates were quite often not met and customer satisfaction suffered. Customers who repeated did so only on the good will gained due to personal relations with some of the employees and managers. Time and again customer complaints were not attended to on a fast track. Customers were slowly shifting to the competitors of Viva. There was no after sales service process and no focus was placed on CRM [Customer relationship management].

January 2011 saw the dawn of a new era in the Viva Automation. A new dynamic CEO Mr. Madan Mohan took the reins of the Company. He had worked in diverse automation industries in the US and returned for good after a long stint in the field of Robotics and Automation. He had also managed diverse portfolios like R&D, Manufacturing Engineering, After Sales Service, Customer Relationship Management and Assembly Lines Automation abroad.

This is when the new leader who very well knew the rules of the game and had handled similar situation in the past and was willing to put his buck and bets on those areas that he considered were least affected by recession and had the potential to grow in the near future. On the basis of experience he had gained by applying some serious thought to studying in depth the current Business model of the company and he came

out with a new Business model to suit the present scenario.

Madan Mohan, took reins of Viva Automation, when the company was in deep trouble. After discussing with employees and analysing the past trends in the company, Madan was deliberately looking for answers to the difficult questions faced by top managers: How to face recessionary trends in the industry? How to come out as clear winners against stiff competition? How to design effective business models for exponential growth? How to make the right choice of business growth areas? How to survive the business in these difficult times?

The first thing that was done by this dynamic leader was to interview all the employees and find out the domain expertise of the current employees and took up the arduous task of preparing a revolutionary Business Plan 2011 -2014 for Viva. He studied the current Business Growth Areas in depth and set out to identify other newer Business Growth Areas that could bring in new business and help the company to grow exponentially. He also chalked out new business models for the company with a revolutionary outsourcing model and aggressive partnering with leaders in the fields of interest.

As part of the Business Plan Madan set out to define a new Vision and Mission for the company. Viva Automation continued to work with their current customers on the current Marketing platforms [i.e. those projects that continued fetching orders]. These were the projects which also provided funds (hence were the cash cows) to some of the other projects. The company also identified those areas where it had to exit out of those markets which were not giving a steady flow of returns, taking away unnecessary resources and also were a volatile business.

The CEO did a detailed analysis of his team's strength and areas of improvements. He arranged for training of the staff to improve on the Domain Expertise of the Viva Automation. He introduced the staff to those areas which were most required in the new scenario of tie-ups with the various national and international partners he had chosen to spear head into the market with new vigour and focus.

Madan identified five Business Growth Areas [BGAs] based on Scope, Market Trends, Viva Automation's approach and buttressed the action plans with strategic initiatives.

- Assembly Automation Solutions
- Machine Tool Solutions
- Turnkey Solutions
- Contract Manufacturing Solutions
- Standard Products

Viva Automation used the concurrent Engineering methodology to meet the time to market

requirements. Madan performed a proper Gap analysis to understand the weaknesses of taking up any particular project. The types of projects that required an Enterprise level of management were not taken up because he knew the company was not ready yet for these kind of projects. Only those projects that require Task, Project Oriented, and Program Oriented Management were taken up. He was confident that this would increase the success rate of the company's execution and start meeting the time to market goals successfully.

Viva Automation by shifting focus to those potential Business Growth Areas which were involved in those industrial sectors that were least affected by recession like Defence, Pharmaceuticals, Food and Beverages, Energy (Nuclear in particular), Textile, Medical, Research, etc the company ensured that it did not place all its eggs in one basket. Each sector was like a new S curve and focus on these ensured a high probability of success in at least a few of them. Thus Viva Automation achieved exponential growth in spite of the economic slow-down.

As can be seen so far the focus of the company was on the factors such as Technology, Quality, Responsiveness, Delivery, Cost, and Innovation. These were the clear competitive factors which made this company a winner against its competitors.

Madan thought to take Viva Automation to the next level of growth there were many hard decisions that had to be taken. The current scenario vis-a vis the scenario prior to 2011 clearly indicated the radical shift in the approach to the company's business strategy. The aggressive tie ups with market leaders helped this Viva Automation to ride the rising wave in business growth areas which were least affected by the slow down. By focusing on proper planning and execution Viva Automation involved in the Robotics and Automation business stood out to be a clear winner among its competitors. This company grew exponentially from 40 million rupees company to a phenomenal 300 million rupees company between 2011 and 2014 paving a roadmap for many a start up Automation companies.

VII. CONCLUSIONS

- a) The concept of dimensional map depicted in Fig-2 is essentially a pictorial representation of an advanced SWOT analysis and helps to derive those strategies that can put a company involved in RAA business on track to sustained business growth.
- b) The strategic responses of the top management of a company in the RAA business that are leaders in the field and focus of such companies on which of the factors that affect sustained business growth help us to conclude "what are the winning strategies that make such companies leaders in their field".

- c) How investment in the field of RAA is an attractive proposition for a company? Is answered in this research.
- d) The case study illustrates how a company can strategically position itself in the wake of economic slowdown? Also enhances our understanding about how it can come out as clear winner by sustaining and successfully building strategies in turbulent times, (Vijay Kumar Dharmadhikari, 2011) .

VIII. LIMITATIONS OF THIS RESEARCH

- a) This research does not consider the effects of scale of the organization completely while formulating the strategies
- b) Technology aspects in this research are limited to Robotics and Automation area our conclusions are dependant on the small sample of respondents' correctness of information. This needs to be further investigated with other Hi-tech areas to verify the application of the principles.
- c) Limited cost benefit analysis has been carried out for Robotics and Automation.

IX. FUTURE RESEARCH DIRECTION

- a) Future holds greater promise where companies can strategically invest in High Value Manufacturing Technologies, Multi-Robot lines, Service Robots for Rehabilitation, Medical Robots, Robots for Tactical Warfare, Advanced Space Applications and Nuclear power Generation applications, etc and gain high returns on their investments.
- b) Formulating business strategies that encompass all aspects of operations and technology strategies will pose bigger challenges of Human Engineering and will require a different level of Operational excellence. Only futuristic Hi-Tech research will be able to resolve all the issues that will emerge.
- c) With above challenges calculation of ROI and Payback period will also be more complex and will need lateral thinking in the economics and financial accounting fields to handle this new and challenging situation.

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ANNEXURE - 1

Table -1

STRATEGY VERTICALS	FACTOR AFFECTING THE CORRESPONDING STRATEGIES	SCORE- MAX 545	SCORE REDUCED TO 5
MANAGING TECHNOLOGY & OPERATIONS STRATEGY WITH BUSINESS STRATEGY	1. ROBOTICS AND AUTOMATION (RAA) STRENGTHS OF SCOPE AND CHANGE	425	4
	2. BUSINESS STRATEGIES OF RAA REFLECT SCOPE FLEXIBILITY CHOICES	418	4
	3. RAA BUSINESS STRATEGIES INVOLVE SPEED, FLEXIBILITY AND QUALITY LEADERSHIP CHOICES	431	4
	4. RAA HAS DIRECT AUTOMATED LINKS BETWEEN TECHNICAL CORE AND OPERATIONS CONSTITUENCIES	415	4
	5. ORGANISATION STRUCTURE IS OF TEAM TYPE	425	4
	6. DIVERSIFIED SKILLS IN SHOPFLOOR PERSONNEL	357	3
	7. CONCURRENT ENGINEERING IS APPLIED IN RAA FIRM	432	4
	8. USES PROJECT TEAMS FOR FUNCTIONAL COORDINATION AT ORGANIZATIONAL LEVEL	412	4
BUSINESS STRATEGY	9. POLITICAL FACTORS	434	4
	10. ECONOMIC FACTORS	415	4
	11. SOCIAL FACTORS	299	3
	12. TECHNOLOGICAL FACTORS	427	4
	13. ENVIRONMENTAL FACTORS	349	3
	14. LEGAL FACTORS	416	4

(Sameer Prasad, Sunil Babbar, Jaideep Motwani, 2001, Oltra, Maroto, Segura, 2005, Diaz Garrido et al, 2007, Kongkiti Phusavar, 2009, Art Kleiner, 2010, Gatot Yudoko, 2012)

Table 1 : (Contd.)

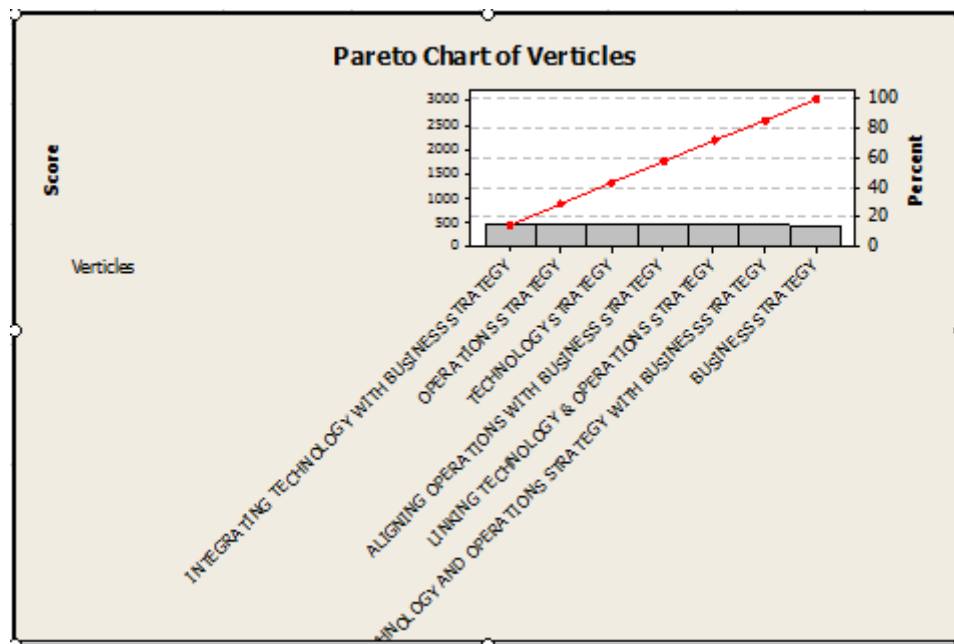
STRATEGY VERTICALS	FACTOR AFFECTING THE CORRESPONDING STRATEGIES	SCORE-MAX 545	SCORE REDUCED TO 5
OPERATIONS STRATEGY	A. QUALITY	451	4
	B. SPEED	424	4
	C. DEPENDABILITY	423	4
	D. FLEXIBILITY	422	4
	E. COST	454	4
ALIGNING OPERATIONS WITH BUSINESS STRATEGY	F. OPERATIONAL EFFECTIVENESS	422	4
	G. SYSTEM EFFECTIVENESS	407	4
	H. TOTAL RESPONSIBILITY MANAGEMENT	410	4
	I. EFFECTIVELY PRIORITIZING STRATEGIC INITIATIVES	424	4
	J. EFFECTIVE ALLOCATION OF PEOPLE AND FINANCIAL INVESTMENTS	448	4
	K. PLAN BI-DIRECTIONALLY	372	3
LINKING TECH.& OPERATIONS STRATEGY	L. RESOURCE EFFICIENCY	434	4
	M. MANUFACTURING PROCESS	444	4
	N. MATERIALS INTEGRATION	349	3
	O. MANUFACTURING SYSTEMS	432	4
	P. BUSINESS MODELS	431	4
INT. TECH. W. BUSINESS STRATEGY	Q. MARKET DYNAMISM	422	4
	R. TECHNOLOGY COMPLEXITY	424	4
	S. FIRM'S INNOVATIVE RESOURCES	400	4
	T. INNOVATIONS COMPETENCIES	409	4
	U. CAPABILITIES OF THE FIRM	415	4
TECHNO-LOGY STRATEGY	W. MARKET STRUCTURE	427	4
	X. TECHNOLOGICAL CHARACTERISTICS	424	4
	Y. BUSINESS UNIT STRATEGY	410	4
	Z. FIRM PERFORMANCE	442	4

ANNEXURE - 2

Test of Hypothesis-1

Null Hypothesis 1 - Not all the verticals of strategies are equally important. Pareto Diagram was used to Test the Hypothesis.

Verticals	Score	%
BUSINESS STRATEGY	460	15.09682
OPERATIONS STRATEGY	447	14.67017
TECHNOLOGY STRATEGY	443	14.53889
LINKING TECHNOLOGY & OPERATIONS STRATEGY	427	14.01378
INTEGRATING TECHNOLOGY WITH BUSINESS STRATEGY	450	14.76862
ALIGNING OPERATIONS WITH BUSINESS STRATEGY	436	14.30916
MANAGING TECHNOLOGY AND OPERATIONS STRATEGY WITH BUSINESS STRATEGY	425	13.94815
	3088	



Conclusion from the above Pareto diagram is that "All verticals of Strategies are equally important". The verification of this conclusion was carried out using the Chi-square as a non parametric Test. The Chi Square value was calculated as 18.35. With 6 degrees of freedom and 5% level of significance Chi square value from the table is 12.6 and at 1% level of significance chi square value is 16.8. Since both the table values of Chi square are lower than calculated

value we reject the null hypothesis and conclude that "All verticals of strategies are equally important. (Douglas Montgomery, 2007).

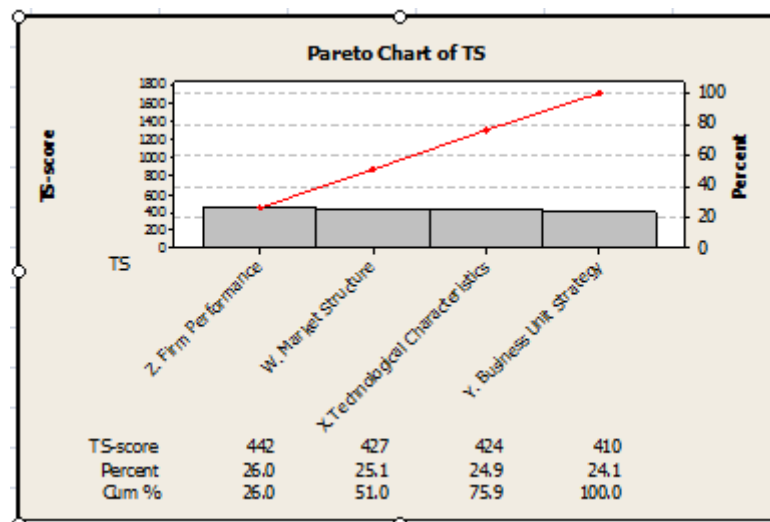
Test of Hypothesis - 2

Null Hypothesis 2:- Not all the questions of important verticals are equally important. Pareto diagram was used to Test the Hypothesis.

Factors(Questions of survey) for Business Strategy	Score	%
9.Political Factors	434	18.54701
10. Economic Factors	415	17.73504
11. Social Factors	299	12.77778
12. Technological Factors	427	18.24786
13. Environmental Factors	349	14.91453
14. Legal Factors	416	17.77778
	2340	

Conclusion 1 from the Pareto is that the Null Hypothesis-2 is true. ie Not all the questions of important verticals are equally important for "Business Strategy" vertical, "Linking Operations Strategy with Technology Strategy" vertical and "Aligning Operations with Business Strategy" vertical. We verified the above hypothesis using the Chi square as a parametric test. The same is demonstrated in the Dimensional Map Fig. 2.

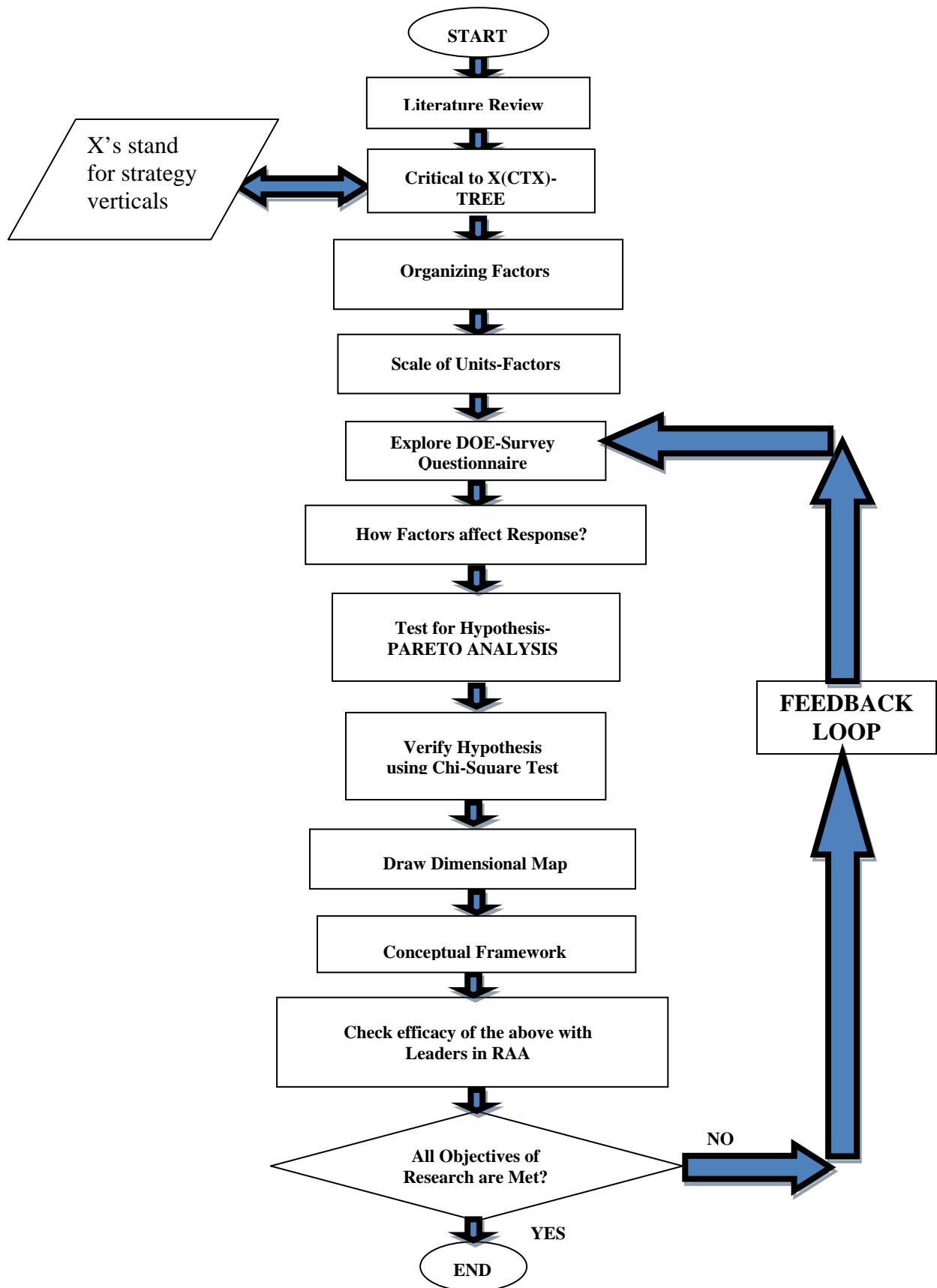
On-"Managing Technology and Operations Strategy with Business Strategy", "Operations Strategy", "Technology Strategy" and "Integrating Technology with Business Strategy". ie All questions of important verticals are equally important. The same was verified using Chi Square as a non-parametric test. Given below for example is the pareto for Technology Strategy (TS) Vertical.

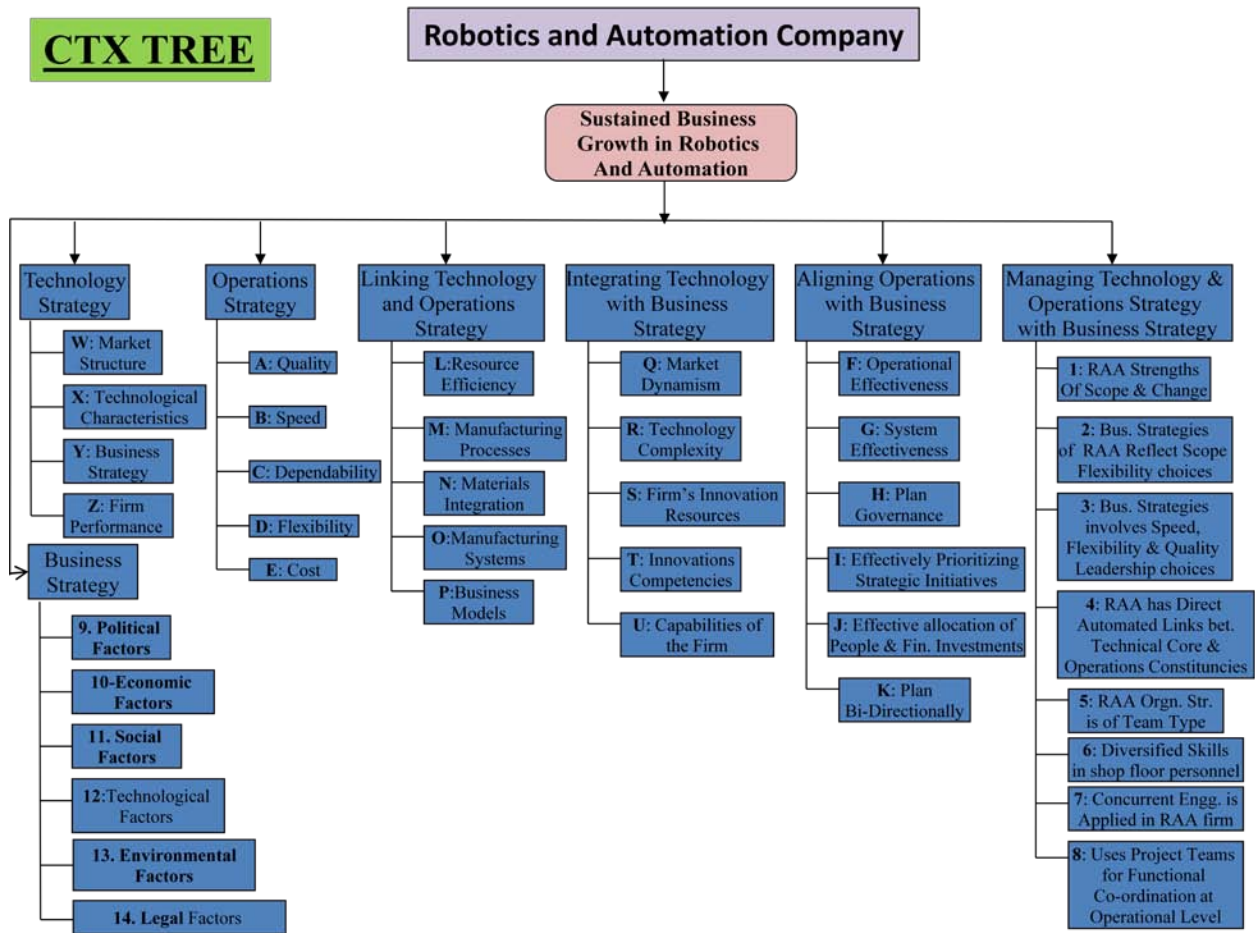


Factor that affect Technology Strategy	Score	%
W. Market Structure	427	25.1
X. Technological Characteristics	424	24.9
Y. Business Unit Strategy	410	24
Z. Firm Performance	442	26
	1703	

ANNEXURE - 3

Research Methodology Steps





(Thomas L Saaty, 1989)

Fig. 1 : CTX Tree- Hierarchical Model

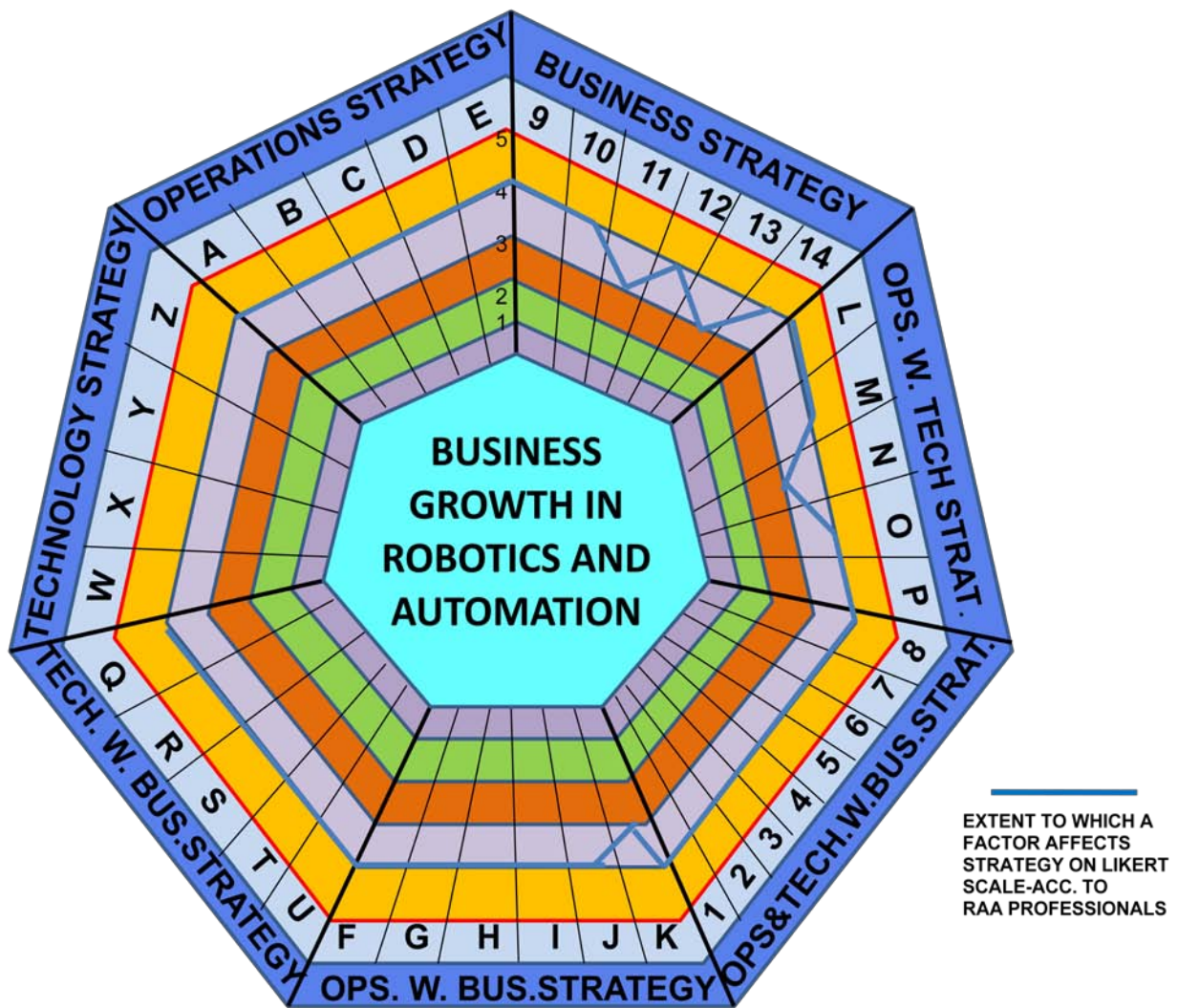


Figure 2 : Dimensional Map for A Company Involved In Robotics and Automation (Raa)

Likert Scale used in the Survey Questionnaire

- 1 - Strongly Disagree that a given factor affects the corresponding strategy
- 2 - Disagree that a given factor affects the corresponding strategy
- 3 - Neither agree nor disagree that a factor affects the corresponding strategy
- 4 - Agree that the relevant factor affects the corresponding strategy
- 5 - Strongly agree that the relevant factor affects the corresponding strategy

Note:- 1) For the scores recorded from survey see Annexure-1, Table 1.

- 2) A, B, C, ..., Z and 1, 2, 3, ..., 14 are factors affecting the corresponding strategy and are shown in Annexure -1, Table 1.

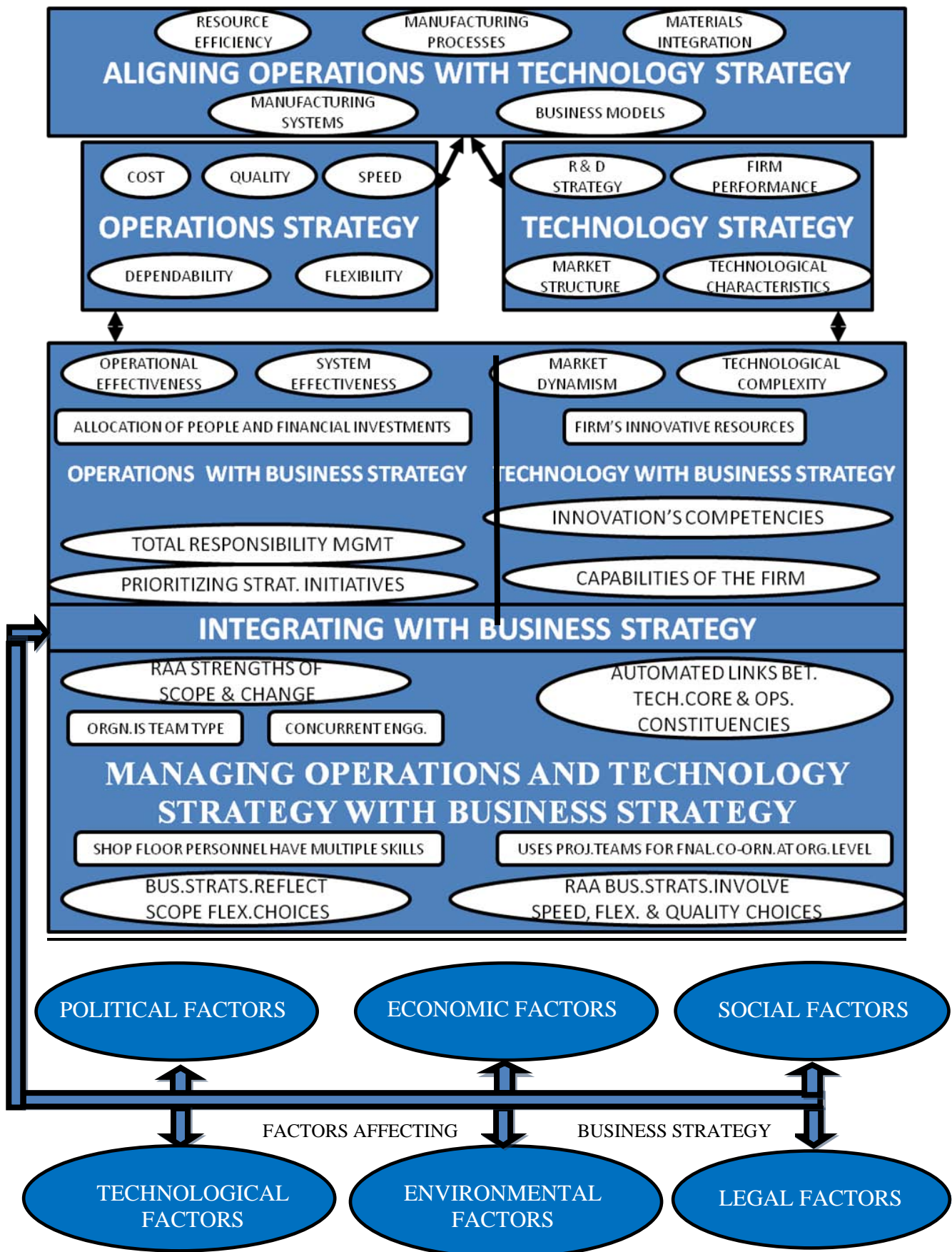
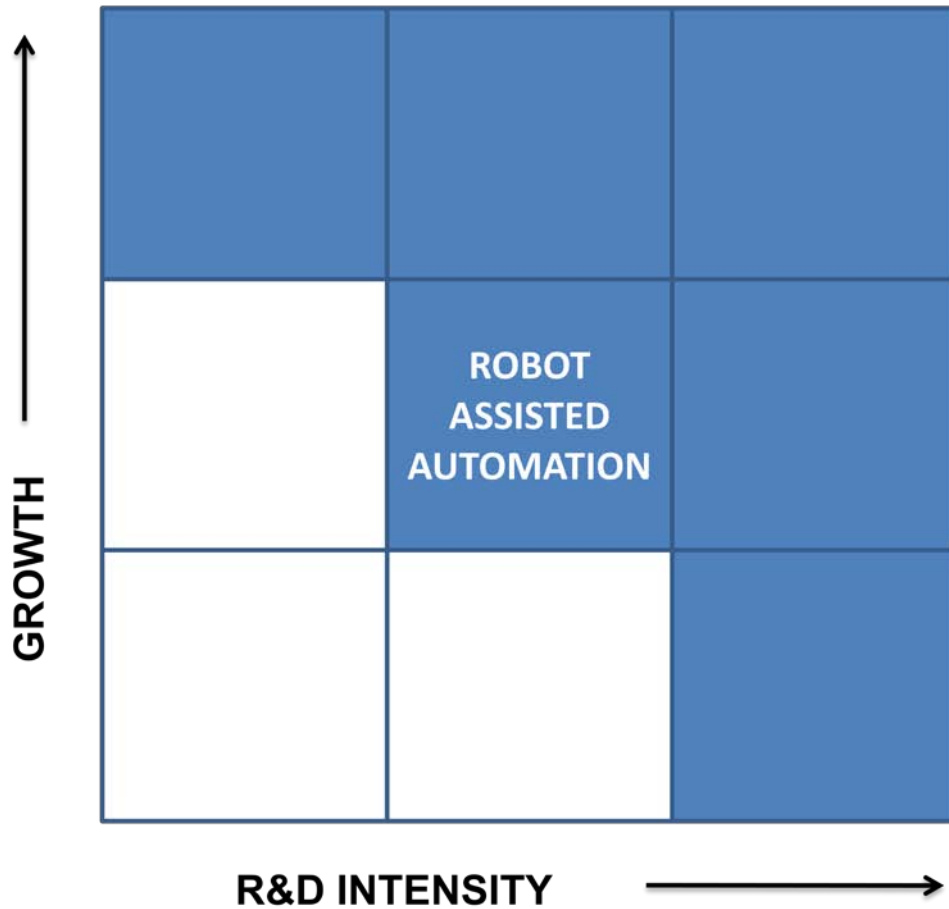


Figure 3 : Conceptual Framework For A Strategic Model For A Company Involved In Robotics and Automation (Raa)

LINKING OF OPERATIONS & TECHNOLOGY STRATEGIES

Why RAA is an attractive proposition for investment?



(Technology Strategy Board (TSB), UK, 2012-15)

Figure 4 : Linking of Operations & Technology Strategies
Why Raa is an Attractive Proposition for Investment?

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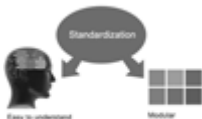
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Discussion:

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- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
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- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
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References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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