

# Evaluation of Information Technology Strategy As A Total Quality Implementation and Management Determinant

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**Abstract-** The aim of this paper is to posit the conceptual model which pretends to investigate the relationship between the use and implementation of Total Quality Management driven Information Communication Technology strategy in organizations. Globally, organizations have realized the important part that controlled quality of goods and services plays in the organizational growth and therefore every organization is making a deliberate effort in implementing Total Quality Management (TQM) irrespective of the business sector. Initially TQM was more prevalent and associated with the manufacturing sector, but presently other sectors also have chosen to adopt the TQM primarily due to its success in manufacturing, (Dias, 1998). The term "Total" implies that quality is important in every function of the organization including systems and processes, services, products, suppliers, customers, internal and external stakeholders as each and every activity's outcome has to be controlled and governed by the predetermined quality. Total Quality Management (TQM) is an intricate structure. At the same time it is a perception that is then translated into a process that will make a difference, process that will add value, system that will improve efficiency, philosophical approach, business strategy that will give a competitive advantage, technique, etc. There has been a pervasive consensus that Total Quality Management is a way of ensuring that organizations functions at the optimum capacity in their endeavor to achieve customer satisfaction. For this reason, TQM has become a "lifestyle" for all departments in the way they do their various tasks as their contribution towards Business Excellence (BE). Based on the literature review carried out, I have identified Information Technology Strategy as a key factor in driving quality management principles and practices in organizations' quality management. Hence looking at an organization's ICT as a driver to reducing uncertainty and variability from the expected quality. To validate this, I will conduct several semi-structured interviews with ICT directors or managers and quality managers in different organizations in Kenya. A questionnaire will be developed, based on the literature review carried out and on the main contributions of the semi-structured inter views. This questionnaire will be sent to all the Kenyan companies both certified according to the ISO 9001 standard and non-certified ones.

**Findings -** It is expected that the result will show a significant relationship between the success of quality management

implementation and ICT strategies as well as the principles and practices where value add has been realized their impact on the companies' quality performance and ultimately the value achieved from the harmonization of the activities.

**Originality/value -** As far as I have found out in the literature review phase, the conceptual model proposed is a new approach to characterize the direct results and effects of ICT strategy on total quality management principles and practices in the companies' quality performance and management. Online research sources were searched for scholarly works published in this area. This will further be researched as indicated above.

**Index Terms-** About four key words or phrases in alphabetical order, separated by commas. Keywords are used to retrieve documents in an information system such as an online journal or a search engine. (Mention 4-5 keywords)

- *Information Communication Technology* – this is a system that an organization puts in place to ensure seamless flow and exchange of information both internally and externally through acquisition of computers or computerized devices and peripherals.
- *Total Quality management* – this is the overall effort by all functions in an organization towards achievement and surpassing customer expectations.
- *Performance Measures Indicators* – Since TQM is a continuous process, organizations must have monitoring and evaluation systems in place and have a benchmark to assess the deviation from the desired quality of goods and services.
- *Principles* – these are the guidelines through which objectives will be met by the organization.
- *Leadership* –for the organizations to achieve the desired results, the management must take lead in making the deliberate effort and must also give the required support towards TQM.
- *Continual Improvement* – TQM has got no end an achieved quality forms a basis for the next desired quality of a product or service and this leads to organizational efficiency.
- *Systematic Approach* –All functions in the organization are expected to contribute towards total quality,

however all tasks must be synchronized, coordinated and controlled for better results.

- *Quality Management System* – processes that an organization puts in place to ensure quality related activities are followed, controlled and pre-determined results are achieved.
- *Practices*– policy guided actions.
- *Modelling* – showcasing of the expected outcome after Research and Development normally done to avoid wastage of resources.
- *Business Excellence* – efficiency and effectiveness which gives an organization an ultimate competitive advantage.

#### Article Classification - Research paper

**Significance of the study:** Automation budgets drain organizations of the much required capital and in some instances, the ICT strategy implementation comes with other challenges which greatly affect the quality of products or services. Organizations are left with major issues with negative impact on customer satisfaction which are mainly to do with processes and procedures mostly on the eight generic quality management principles: 1) Leadership, 2) Customer Focus, 3) Employee Involvement and Commitment, 4) HR Management (reward and recognition), 5) Strategic Planning Management, 6) Process Management, 7) Supply Chain Management, 8) Continuous Improvement of quality and Innovation for sustainable business as well as the quality management practices.

#### Research Questions:

1. What contribution will ICT make towards customer focus and satisfaction?
2. How will the ICT automation enhance organization processes in employee satisfaction?
3. How will the ICT strategy enhance the improvement of quality for products and services?
4. How will the systems and technology components ICT strategy improve the processes?
5. How will the ICT strategy implementation assist the Human Resource Management department in Human Resource Development?
6. How will the ICT strategy enhance the customer relationships?
7. How will ICT strategy enhance the achievements that can be derived from supplier relationships?
8. How will the ICT strategy help in the management of quality improvement measurement system?

#### I. INTRODUCTION

Implementation is transition from use of one system or procedure in matters concerning the actualization of ideas and operationalization of related activities. Total Quality Management aims at controlling the quality of products and or services from the start to the end ensuring that all functions of the organization work towards the same goal of meeting and exceeding customer expectations. Superior performance therefore has to remain as the main focus which is achieved

through increased productivity, lower product cost and better product reliability as well as optimal use of all the resources of an organization, [Kumar and Sharma, 2017](#). As such, no organization can ignore the importance of TQM irrespective of industry it is operating in including not-for-profit organizations as they strive to add value to the lives of the communities that depend on their services. For profit making organizations, competition has taken global and there is an urgent need for any business to benchmark alongside the best not only in country of operation but also globally. This paper introduces the importance of having total quality management being the driving force of an organization's Information Communications Technology (ICT) Strategy. Every organization needs to consider formulating an ICT strategy that will enhance its Total Quality Management strategy to ensure that it not only survives the business environment turmoil but also meets and surpasses its customers' expectations both locally and internationally. To achieve this tall order, the organization will have to deal with the tremendous speed in which information is being shared by the various stakeholders including the consumers, suppliers, employees, competitors amongst others which in turn makes it necessary to make timely decisions that have direct effect on TQM dynamism.

ICT encompasses information technology with communication system, which should give organizations tremendous outcome through deliberate effort in continuous quality improvement. TQM does not allow any complacency scope and this premise can gain from the dynamic nature of ICT. The main backbone of trending technology revolution in any industry is ICT which acts as a catalyst in communicating information within and without a network through which quality correlates will be achieved by the organization depending on its desired organization growth and performance. According to Defoe and Juran (2010), quality can denote "fitness for purpose". However, this fitness is dynamic because as consumers get more enlightened they view product features differently. Goetsch and Davis (2010) reckon that quality is a dynamic state associated with products, services, people, processes, and environments that meet or exceed expectations and helps produce superior value. ICT is not about technology, but about organizational transformation that enables organizations to achieve this superior value. Every organization has to create a sense of urgency to improve the standard of its products and/or services. ICT serves as the backbone for the required speed in quality management systems that organization can efficiently rely on to reevaluate their various tasks and activities that constantly need review and improvement. The urgency is generally taken to mean "creating dissatisfaction with the status quo" through an intelligent effort. Through the use of ICT components which include data, its converted form which is information, computer hardware, computer software, procedures as well as people. These components are used at different stages for intervention and manipulation of the desired outcome most importantly ensuring the timely and informed decisions are made that will keep the business not only on track but also at the desired industry level.

In most organizations, ICT strategies are formulated to achieve efficiency in terms of reducing operational costs. However, this may have a negative impact on the total quality management which will ultimately depend on ICT as the

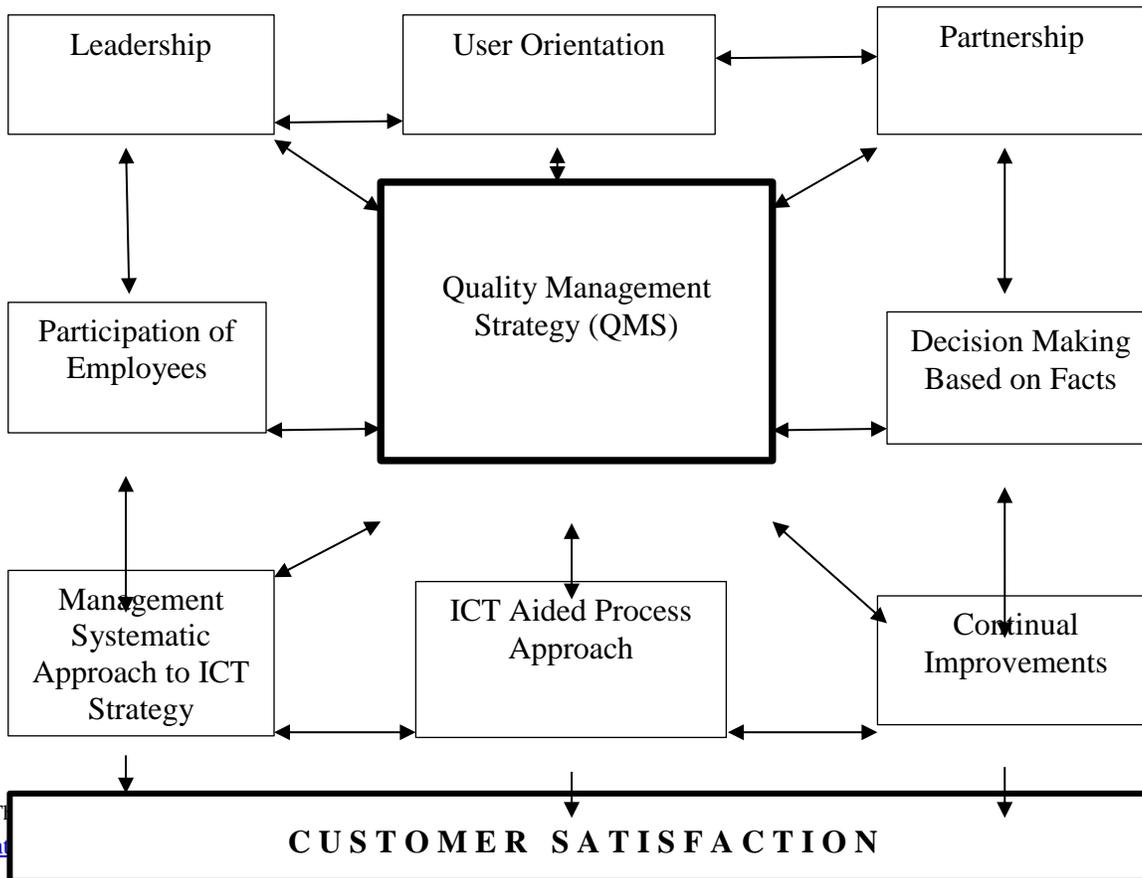
production process backbone for improvements in sensitive areas such as site audits and surveys, research and development of products which have a major impact on manufacturability, project management as products get reviewed and relaunched in line with customers' feedback. Likewise, a systematic approach to recruitment in terms of matching the employee and job requirements in terms of skills and experience in production related functions like logistics and warehousing which is very key in ensuring that the inputs and outputs are available when required and in the desired form or quality, as well as support and maintenance of equipment and machinery involved in the process of providing services or manufacturing goods which could affect the production capacity and ultimately cost of quality. An alternative approach referred to as Appreciative Inquiry(Whitney et al, 2010) states that in most cases what the organization looks for in matters of TQM already exist somewhere in the organization and the task is to discover what works well and understand how that can be grown and expanded in order to operate effectively across the organization. ICT may happen to be one of this requirements. This aids buy-in by celebrating the good in the existing system and looking to grow it which can be done through ICT strategy that is TQM driven. The paper is looking into eight aspects of an organization that management can effectively utilize ICT as an organizational resource to improve on the quality of products and services which are:

- Leadership – where there must be deliberate effort and commitment to TQM.
- User orientation – the interlinking of TQM to all tasks and activities carried out in the organization.

- Partnership – customers, suppliers and other external stakeholders must be enlightened on the objectives that the organization anticipates to accomplish.
- Participation of employees – all employees must own and advocate the importance of TQM
- Management systematic approach to ICT strategy – TQM initiative must be the driving force for the ICT strategy in the organization.
- Decision making based on facts – knowledge management, meaningful reporting and reports should be improved through ICT.
- Continual Improvements – through ICT, efficiency towards TQM must be achieved and implemented at the right time.
- ICT aided systematic approach in every aspect of the business that will involve TQM activities with the ultimate goal being a customer retention strategy.

The cost of producing faulty products in the United Kingdom has been estimated as 10% of the gross national product: several thousand million pounds (Dale and Plunkett, 1991, p. 11). Improving quality aims to reduce this cost which drains organizations of the much required resources. This cannot be achieved overnight but requires an investment to be made in activities which are designed to avoid defective production, not activities designed to detect defects after they have been made. It is about quality assurance and control but not inspection which is reactive. The problem is knowing or prioritizing in what to invest in between systems, technology and people and it is this seems to be an issue in most organizations as they strive to optimize value from scarce resource.

**Structure of quality management system (QMS) as the basics of total quality management (TQM)**



Though customer satisfaction is the desired ultimate result of TQM, it also has an important role to play in minimizing the production inputs and maximizing output both in terms of volume and profitability by ensuring that systems and process are in sync with each other. TQM ensures delivery of superior products and services through effective integration of all the activities and functions in the organizations not only at all levels but also in all respects. For this to be achieved, the employees involved in the production system have to own the need for achieving total quality. Hence, the aspect of recruiting the right people, equipping them with the right training and development tools as well as managing the reward system in an organization becomes paramount because with increased revenue, the ideal situation would be to motivate the workforce and ICT creates the efficiency necessary. An effective ICT strategy helps to synergize all functions and operations in an organization which includes but not limited with benchmarking against global competitors, Research and Development, Product feature reviews, analyzing feedback, recruitment and selection as well as data management and disaster recovery. Ultimately, TQM enables the organization to effectively integrate all functions and activities at all levels and ensures that all focus on total quality.

Owuor (2004) defines Information and Communication Technology (ICT) as the technology which supports activities relating to the design, storage, and transmission of data and voice, jointly with their interrelated methods. Apart from the customer satisfaction, TQM plays a vital role in increasing revenue by minimizing the input and maximizing output. It ensures high productivity levels of an organization. This is due to the proper management of inventory control and reduction in waste

Quality management in an organization helps to design and create products and services which customer wants and desires. This is achieved through elimination of quality costs which come under production cost, eliminating defects, reducing waste, minimizing inventory and incorporating continuous changes and improvements in the system. There is a greater need to understand and identify TQM practices as well as to investigate the adoption of these practices in service industry for enhanced business performance and growth (Karani and Bichanga, 2012). TQM ensures that the products and services delivered to the market meet and surpasses the expectations and promises made to the customers through various modes of promotions. Value add can be achieved through ICT convergence and consolidation where quality will not only be achieved but also costs will be minimized and the funds utilized in research and development of products or for diversification. Multifunction peripherals and enterprise resource planning (ERP) systems provide appropriate platforms to design and create products and services where businesses can leverage on time utility. Information technology makes easy communication between persons or groups who are not physically near the same locality (Raymond, 2005) and this is achieved through consolidation or sharing of ICT resources.

TQM tools are used in every aspect of management for quality planning and continuous improvement. More

importantly, they are used to identify specific information in a specific manner and in many instances they are used in conjunction with other tools so as to make understanding easy for the issue being analyzed or illustrated. Quality planning tools are more inclined to process streamlining, audit and process remedial activities which include Quality Function Deployment (QFD), Concurrent Engineering (CE), Failure Mode Evaluation and Analysis (FMEA) and The New Seven Management and planning tools. For continuous improvement, presentational tools used include pie charts and bar graphs, histograms, run charts, praetor charts, force field analysis, focus groups, plan-do-check-act, flow charts and modelling diagrams, scatter diagrams, relations diagrams, brain storming and affinity diagrams, and tree diagrams.

A clear theoretical framework presently does not exist to show the relationship between embracing technological changes leveraged by ICT with the main objective of improving the quality of products or services. However, there exists a premise that there is a connection between the aspects of improving the systems and work performance for profit gains. The purpose of this paper is therefore to provide a framework that focuses on the interplay of ICT and TQM. In doing so, an attempt is made to incorporate the principles of TQM as the driver for ICT strategy in an organization in a scenario where TQM forms the basis for strategy formulation, deployment, measurement and control. ICT creates an opportunity for change.

Areas and benefits that an organization's TQM strategy can derive from ICT systems include:

- Site Audits and Surveys
- Design and Architecture
- Project Management
- Recruitment
- Logistics and Warehousing
- Cabling and Electrical
- End to End Wireless
- Onsite Deployment
- Support and Maintenance
- Business Relocations
- ICT Facility Management
- Application and Infrastructure Security

#### *Role of ICT in recruitment and retention of employees*

TQM is used in assimilation of complicated information such as Staff duties and work flow analysis and Business structure. Employee engagement and retention continue to be top challenges for many organizations. According to (Musleh, 2014) the TQM principles included ten basic principles: Strategic planning, Attribution and support from senior management, Focus on the customer, Continuous improvement of Education and training systems, Teamwork, Make decisions based on facts, The use of statistical techniques in the measurement and development, and Comparison with the best model. According to Rawat, (2013) organizations face a lot of problems when they have a high turnover rate when employees leave the organization

as this not only destabilizes the human resources department but the impact is directly impacting in all other functions of the organization. Therefore reasons such as job dissatisfaction, poor working conditions, not having a decent salary packages and lack of career advancements have to be part of the Total Quality Management and must be well captured in its eight pillars of Ethics, Integrity, Leadership, Trust, Training, Teamwork, Communication and Recognition. The pillars form a very good foundation for Total Quality Management and have a major influence on the organization culture which in essence determines the quality environment.

According to Gopinath and Becker (2000), organizations provide information on values, mission, strategies, competitive performance, and changes that may affect employees enthuse. Companies have realized the benefits of providing information that employees want and need through the most credible sources e.g., CEO and top management strategies on a timely and consistent basis. In addition, effective communication is imperative where employees are accorded a conducive working environment where they are encouraged to discuss and voice their opinions in improvisation and innovation for increased performance as the best solutions are offered and applied. Govaerts et al. (2011) emphasized that talented employees are willing to continue working in the organization if the management implements an appreciative learning and working climate. Human Resource Management (HRM) is the effective and efficient utilization of human resources to achieve organizational objectives (Opatha, 2010) and therefore when an organization has embraced TQM as its major objective, recruitment and retention must be well managed. Boyd and Ellison (2007) define Social Network Services (SNSs) as: "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection and can exchange ideas, and (3) view and traverse their list of connections and those made by others within the system". Unlike before where prospective employers have had to carry out background checks to the extent of contacting references which was expensive, technology has made it possible to search for online profiles and also use the uploaded details to understand the prospective employees' personalities. This method is not only confidential but also convenient and cost effective for the recruiters.

#### *Management Systematic Approach to ICT Strategy*

The role that ICT plays in knowledge management in an organization which is fundamental for continuous improvement include but not limited to:

- Centralization: where several users are connected networked servers and/or storage in different locations or one central location
  - Physical: where organizations purpose to reduce IT assets by consolidating servers or storage systems with the same application types or platforms onto fewer or larger systems with the same application type or platform through virtualization.

- Data Integration: combining data with different formats onto a similar format or platform where it is shared for use by different functions of the organization.
- Application: consolidating servers or storage systems supporting different types of workloads onto fewer or larger systems
- Storage: consolidating storage onto fewer or larger storage systems independent of server type, OS, or application. This also works as a disaster recovery strategy and can be housed either within a campus or remotely.

The ICT infrastructure forms the backbone of the TQM Integrated Management System by creating efficiency in operational activities. Integrated management system is therefore a competence model where the management system with all integrative systems (quality, environmental, safety, security, social responsibility and riskmanagement system), and all structural elements are harnessed.

#### *Leadership*

Clear leadership and vision are considered to be the most important critical success factors of TQM. Teamwork and team leadership play a specific role in the total quality management, top managers have the key responsibilities, and activities of the medium and lower level managers together with all employees are of immeasurable significance. Managing the teamwork within the total quality management is not only a requirement for its set up, development and implementation, but also for its survival. Total Quality Management is a managerial philosophy and a mode of running a business in order to achieve success where the top management must lead from the front. Continuous improvement is defined in terms of the process of the organizations; it is the ongoing process to remedy the workflow for the betterment of the organizations. Moreover, the leaders must take the course of action to attain continuous quality improvement by implementing minor to major changes as improving TQM rather than radical changes (Kumar and Sharma, 2017). They must oversee the development of quality procedures throughout the organization.

Team leadership roles inspire and drive continuous improvement. An organization's leadership self-assessment should demonstrate the drive for excellence, communicate clear vision, mission, values and structure that focuses on TQM, recognize and appreciate employees' efforts and success, empower the employees by providing the appropriate resources and above all entrust the role of promoting the excellence of the organization to the employees as its ambassadors. Without this solid foundation, the four sides of the 'pyramid' will never be built. Ultimately the leaders must be involved in determining and communicating the company's mission, purpose and goals as well as planning and setting principle processes and programmes for focusing on and achieving the predetermined goals.

Quality motivation is all about people because it is people who make quality. There must be a reward and recognition policy in place to ensure that the employees are recognized for their valuable contributions. It is said that 'an organization is as good as its people'. It is well-known that the majority of quality-

related problems within our organizations are not within the control of the individual employee. As many as 80% of these problems are caused by the way the people are organized and managed. Most important, it is about making the employees to own process of Total Quality Management.

The role of managers within the organization is to ensure that everything that needs to be done is done right the first time thus allowing people to make and appreciate quality. There must be systems and procedures in place that will make all activities in the organization smooth. However, in recent years the business world has changed rapidly and business processes have accordingly changed with it. These has translated into having the managers involved in the act of change management as necessitated by competition driven factors. Most of them are due to the modern quality revolution which, in turn, has created the customers' higher quality expectation of products and services.

For the adaptation of these changes many organizations have followed a streamline route, i.e. a method to eliminate unnecessary work processes, duplication of workload and extra cross-functional co-operation. Although streamline routes are desirable for many organizations, nevertheless, our human system organized in this way could easily create some negative and undesirable activities, e.g. loss of enthusiasm, lack of creativity and motivation. It is therefore the leadership of the organization that must play an active role in preserving the positive aspects of the human system and stimulate the individual in its real desire to work.

Leadership is therefore the beginning of the quality improvement process and further continues with other principles and concepts of Total Quality Management. According to the European Model for Total Quality Management, leadership is the driving force behind policy and strategy, people management, resources and processes, leading ultimately to excellence in business results. Leadership means showing the way and setting the direction towards higher quality levels in an organized group which includes business setting where it must be managed so that it is aware of its mission, led by its vision, by planned and defined clear strategy elaborated through policies, realized by fulfilling objectives and particular managerial targets which must be backed-up by all the operational activities in the organization. The real leader (management) should ensure consistency of: mission, vision, strategy, policy and objectives of the organization. One of the ways to develop the TQM model on the road to Business Excellence is leading guided by the quality management principles. Proper leadership ensures continual improvement of all structural elements of TQM, on the road to achieving the Business Excellence stage.

#### *Participation of Employees*

The human resource aspect is key to quality. All human actions and reactions become quality related, and therefore expensive failures and the accumulation of hidden costs may be reduced to an acceptable minimum or even prevented altogether when employees are made to fully participate in the endeavor. The belief is that when people are well motivated then they can overcome any difficulties they experience in solving their problems. Further, whatever work they are associated with, the self-originated motivation will give the required drive to achieve our work objective. Personnel competence is the most used

phrase and it means formal and specialist education of employees for carrying out activities in processes, i.e. the management system, as well as psychosocial characteristics of employees needed for performing activities in processes, the result of which gets its confirmation in the market in the form of a product or a service, meaning that its characteristics, or rather its quality, are subject to judgement and evaluation of the customer or user by the employee. Personnel competence is the most used phrase and it means formal and specialist education of employees for carrying out activities in processes, i.e. the management system, as well as psychosocial characteristics of employees needed for performing activities in processes, the result of which gets its confirmation in the market in the form of a product or a service, meaning that its characteristics, or rather its quality, are subject to judgement and evaluation of the customer/user.

As the employees are allocated different roles in Total Quality Management, there will be a need not only to consider their competence and skills but also to consider their personality traits. It is apparent that different personality traits will have differing attitude towards TQM efforts as dictated by their personal values such as integrity, resilience, truthfulness, clarity, connection, creativity, discipline, enthusiasm etc.

#### *User Orientation*

Quality has recently become a key slogan organizations strive for a competitive advantage in volatile markets characterized by liberalization, globalization and knowledgeable customers (Sureshchandar, Chandrasekharan, & Anantharaman, 2001). Customer Relationship Management systems have become useful customer satisfaction management tools by another way of initiating and handling customer relationships also the user orientation or relationship could come in between because there is no way a mission can be accomplished in this modern days marketing behavior that strategy will not be included just because it's a way of implementing desire plan towards any business (Anderson & Kerr et al 2002, 2 & 3) but when every aspect of it focus on customer satisfaction in terms of features, ease of use amongst other requirements.

#### *ICT Aided Process Approach*

TQM is process-oriented. Customers, including internal customers (i.e. the firm's employees), are part of the firm's processes. These customers, together with their requirements and expectations, must be identified in all the processes. The next step is to plan how these requirements and expectations can be fulfilled. This requires feedback from the customers, so that their experiences and problems become known in all processes. This feedback is a condition for the continuous improvement of both products and processes. For this to be effective, it seems only common sense that everybody should participate. How technology and intellectual property are managed.

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