Importance of Information Technology In Organizations and How To Have A Successful IT Project

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Abstract: The aim of this research is to prove the urgent need of IT tools and approaches in the nowadays organizations, and the factors that is mandatory for the success of applying an IT project. Technology is prevalent these days, and the existing of these systems is indispensable in leading and wanting to progress organizations. This research paper is build upon the review of many articles from scholar journals related to the use of technology in organization and the approaches for IT emerging. Many technical articles discuss the reasons and the causes of succeeding in IT projects. Also, personal experience in some IT projects, and case studies of other companies implemented IT system is used in this research paper. Human, Technical, and Business factors are the critical factors for the success of any IT project. The role of human plays the most effect of integrating IT in an organization. This research develops a study of the role of IT in firms and the factors that are dependent on to implement an IT/IS system. The research indicated that the success of IT projects depends on Human, Technical, and Business related factors. The factors are categorized under these categories. IT project stakeholders recognize the factors that helps to achieve the success of the project. The model of IT successful project is used as a road plan for any IT project shareholder to achieve the goal of implementing IT system. The value of this research paper that it indicates the common reasons to complete an IT project and implement the intended system.
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1. Introduction

Information technology (IT) has become a necessary and critical part of every business plan and in all types of organizations. From multi-national corporations, which have mainframe systems and databases to small businesses that own a single computer, IT plays a role. IT is considered as the nerve of the company. Information Technology (IT) is defined by many IT specialists and researchers as studying, designing, developing, implementing, supporting or managing computer based information systems, specially software applications and computer hardware. Dealing with the use of software and hardware, IT converts, stores, protects, processes, transmits and retrieves information securely. IT is widely recognized that companies increasingly depend on Information technology (IT) for the implementing of variety of functional, tactical, and strategic procedures (Lewis, Agarwal, & Sambamurthy, 2003). IT projects is defined as the projects that is involved with technology used in the transmission and storage of information, especially the development, installation, implementation, and management of computer systems within companies, universities, and other organizations. IT projects success or failure has been discussed among both practitioners and researchers for many years. Project success can be known if it is within the planned budget and on the scheduled time. Successful projects are those that meet business requirements, delivered and maintained on schedule, delivered and maintained within the planned budget, and delivers the expected business value and return on investment (Berntsson-Svensson & Aurum, 2006), (Nelson, 2007), (P. Powell, 1992), (T. C. Powell & Dent-Micallef, 1997). Also, a successful project is recognized from accomplishing a specified objective through a unique set of interrelated tasks and the effective utilization of the resources. The aim of establishing a project is to fulfill the need identified by the customer (people or organization) who is willing to provide the funds to meet the needs. (Neal, 1995), (Huff & Munro, 1985), (Wateridge, 1995). Some of the common factors that will be explained in the literature as leading to IT or software project success are: Top Management Commitment and Support, Effective Project Management, Organization Flexibility and The Fluidity of Coordination, Competent Project Manager, Qualified Team Members, Client Satisfaction, Effectiveness of the Implemented System, Data Accuracy, Characteristics of Technology Services, and the situation of the IT market (Wetherbe, 1991). Information systems are a popular kind of an IT project that is used worldwide in organizations.

Information systems are implemented within organization for the objective of having better effectiveness and efficiency in that organization. (Hevner, March, Park, & Ram, 2004). When talking about the measurement of information systems success and the studies that contributed to the information systems field the DeLone and Mclean model must be mentioned as the first study to put some order in how IS researchers measure success of the information systems. The model is based on theoretical and empirical research conducted by a number of researchers in the 1970's and 1980's. To build this model, DeLone and McLean reviewed 180 articles containing critical IS success measures published in seven publications during 1981-1987. The model has six dimensions that the success of IS can be known from, which are: SYSTEM OUALITY, INFORMATION QUALITY, USE, USER SATISFACTION, INDIVIDUAL IMPACT, and ORGANIZATIONAL IMPACT (DeLone & McLean, 1992) (See figure 1).

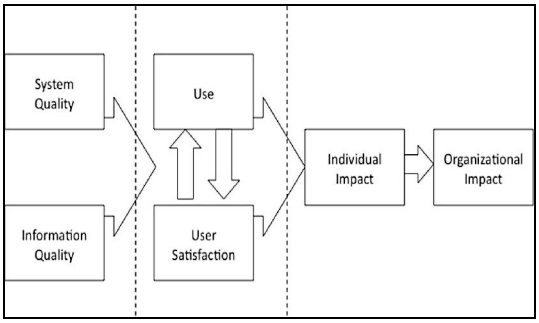

Figure 1: DeLone and McLean model (DeLone & McLean, 1992).

In this research, it will show that the factors in the IT project success model also could be used as independent variables for the variables in the DeLone and McLean model. In this literature, the factors of IT project are categorized into three categories: *Human Related Factors*, *Technical Related Factors*, and *Business Related Factors*. *Human factors* are concerned with the human acts and behaviors that contribute to the success or failure of the IT project. The reason of success or failure of an IT project that is related to the technical part of the project (computer equipment and software) is considered as a *Technical factor*. The *Business factors* are these factors that affect the project success or failure, which is related to the environment, or the client of the project.

2. Research Methodology:

IT study usually use different types and ways of research. In this paper, I want to concentrate on the human, technical, and business behaviors on building a system. To do that, there are different ways of research could be used, also a combination between two or more ways could be used. In this literature, a combination of case study and review centric method are used. Furthermore, review centric is defined as the approach in which the researcher reviews "existing theory and research (LePine & Wilcox-King, 2010) p. 506." Many information technology article were reviewed to gather enough information about the human, technical, business factors that effects the successful completion of an IT project. Case study method is defined as the rational analysis that are based on the real world observation of practitioners and organizations (Eisenhardt, 1989), (Dyer & Wilkins, 1991). According to Bromley (1990), case study research method is defined as a "systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest. (Bromley, 1990) p.302." In this research, the case study method is applied by having a closer look on the documentation by some IT projects, and also based on my personal experience in working within a team in a project, which have the goal of implementing a data warehouse system in the Saudi Technical and Vocational Training Corporation. Nowadays, combining research methods e.g. (Gable, 1994) is increasing the importance of achieving the goal gaining "**rich theoretical insights.** (Dyer & Wilkins, 1991) p. 613."

3. How to achieve a successful IT Project:

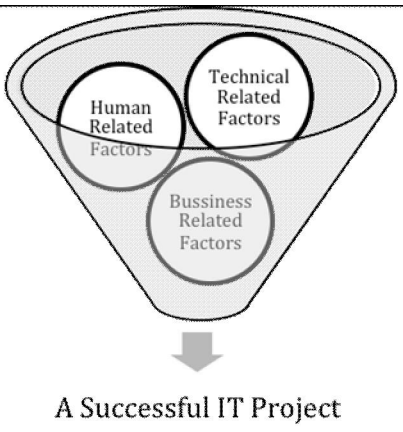

Figure 2: Successful IT Project Model

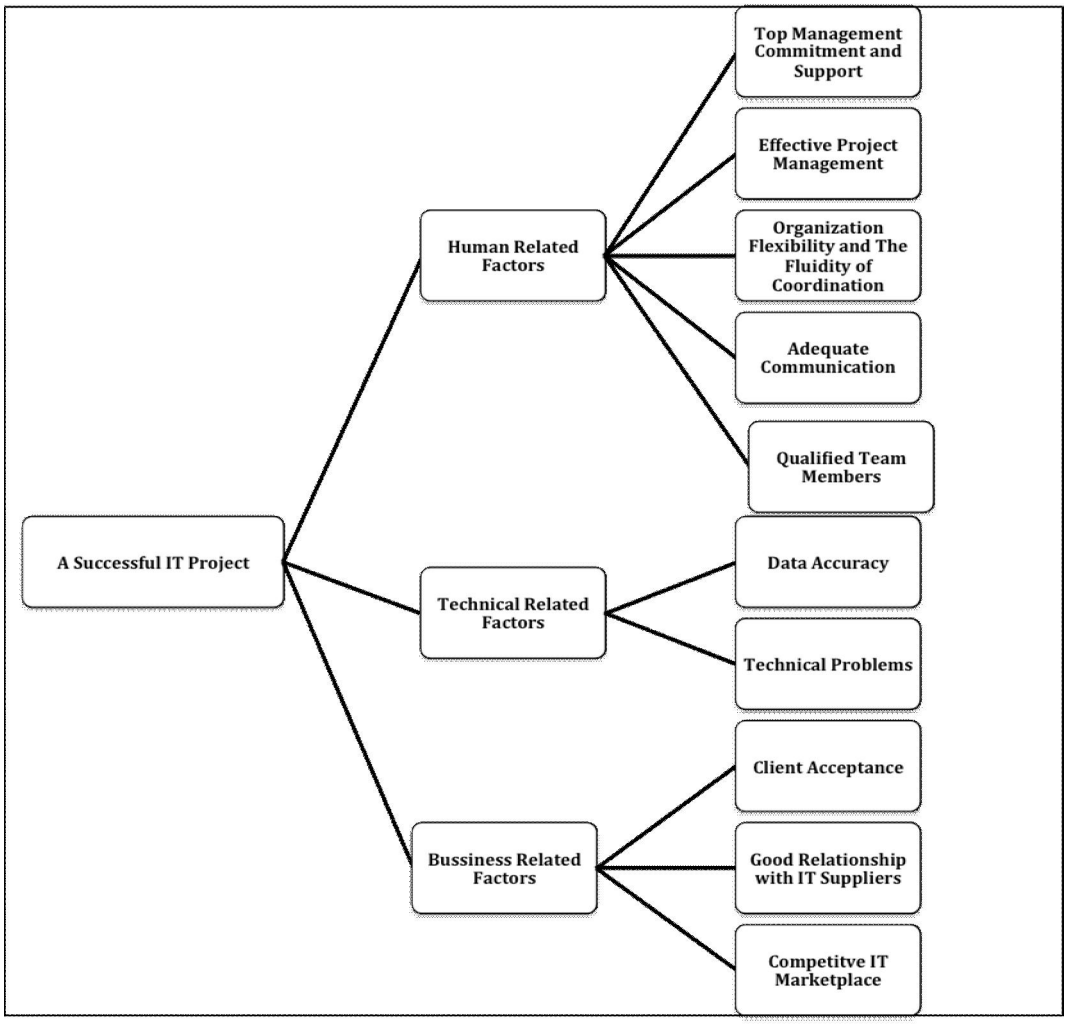

Figure 3: Successful IT Project Expanded Model

4. Hypothesis

Human Factors	**H1:** Top Management Commitment and Support **has a positive effect on** IT project. **H2:** Effective Project Management **has a positive effect on** IT project. **H3:** Organization Flexibility and The Fluidity of Coordination **has a positive effect on** IT project. **H4:** Adequate Communication **has a positive effect on** IT project. **H5:** Qualified Team Members **has a positive effect on** IT project.
Technical Factors	**H6:** Data Accuracy **has a positive effect on** IT project. **H7:** Technical Problems **has a negative effect on** IT project.
Business Factors	**H8:** Client Acceptance **has a positive effect on** IT project. **H9:** Good Relationship with IT Supplier **has a positive effect on** IT project. **H10:** Competitive IT Marketplace with IT Supplier **has a positive effect on** IT project.

Human Related Factors Model:

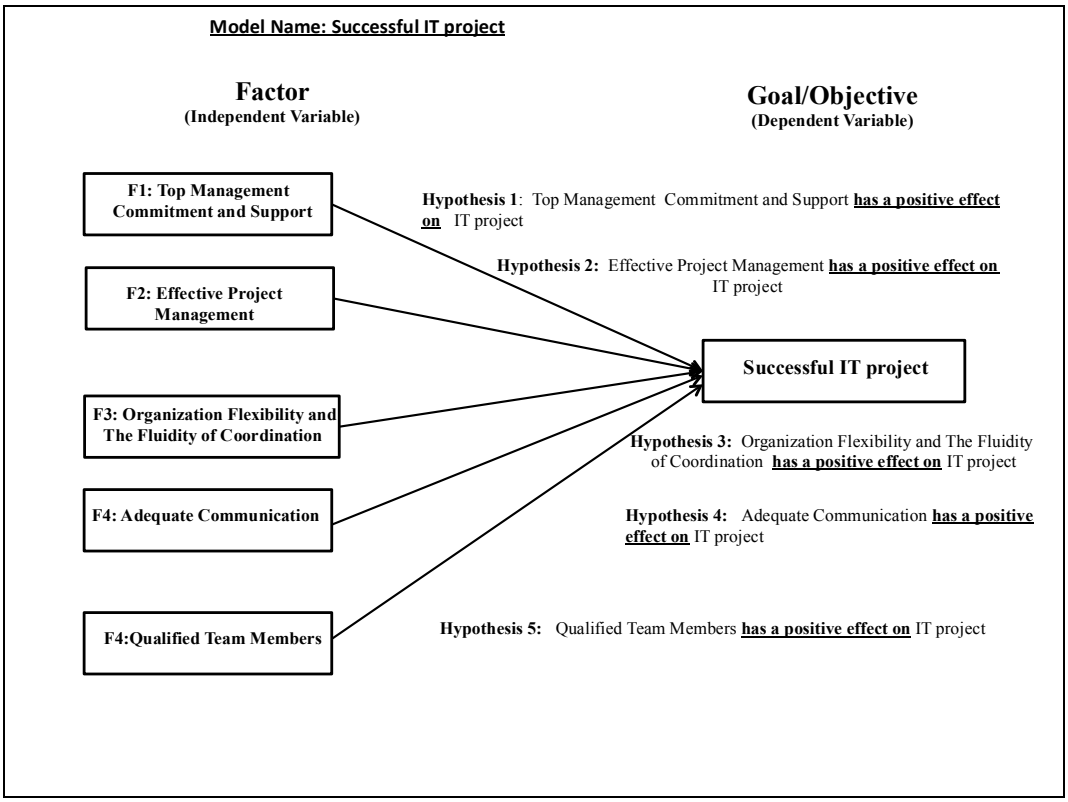

Figure 4: Human Related Factors Model

Quotes and Explanation For The Goal and The Human Factors

Goal: "From the outset, IT researchers advocated tight IT-strategy linkages, asserting that IT affects firm strategies, that strategies have IT implications, and that firms must somehow integrate strategic thrusts with IT capabilities. For example, related IT to the value chain, concluding that the main strategic purpose of IT is to coordinate activities in the chain. IT should support competitive thrusts such as cost leadership, differentiation, innovation, growth, and external alliance. IT serves primarily to 'manage organizational inter- dependence,' i.e., to solve coordination problems among departments and strategic business units. (T. C. Powell & Dent-Micallef, 1997) p.376."

"In sum, the pre-1990 IT literature focused on the strategic importance of IT adoption and innovation and reflected a general optimism concerning IT's potential for creating competitive advantage. (T. C. Powell & Dent-Micallef, 1997) p. 376 – 377."

"Four reasons for using information technology as a strategic resource. These are: to gain competitive advantage; to improve productivity and performance; to enable new ways of managing and organizing; and to develop new business. (P. Powell, 1992) p.29."

Factor 1: Top Management Commitment and Support

"In describing linkages among IT, strategy, and organizational infrastructures Henderson and Venkatraman (1993) emphasized the role of the CEO commitment to the success of IT implementation. According to the authors, successful IT requires a top executive who acts as 'business visionary' and 'prioritizer', clearly supporting and articulating the need for IT, and communicating its functionality within the context of the organization's strategy, structure, and systems. (T. C. Powell & Dent-Micallef, 1997) p.381."

Top management represented by the CEO and his/her direct subordinates all of them, have the responsibility of the firm policy (Green, 1995). Usually, in IT projects top management plays the role of the steering committee and the project sponsor. It is crucial that the top management have the ability and the power to fulfill and satisfy very important tasks and responsibilities, like for example: manage the implementation of project policy, control project planning and progress, perform fast decisions, solve organizational issues, make resources available, support the project manager, and motivate the management (Irani, 2002). Both top and middle levels during the implementation of the system must be involved and willing to allocate important

organizational resources to show the sustained management support which is related with sustained management commitment. Management support is crucial for completing project goals and objectives and aligning these with strategic business goals. Constantly monitoring the progress of the project is another role that is played by top and middle management. Other important fact is to show commitment for a project top management needs to publicly and frankly identify it as a top priority (Esteves & Pastor, 2001).

Factor 2: Effective Project Management

"Information technology managerial efforts involve planning, organizing, controlling and directing the introduction of IT within an organization. Organizations vary widely in the manner in which they apply IT resources. Thus, it should not be surprising to discover that they exhibit a variety of approaches to IT management. (Boynton & Zmud, 1987) p. 59 – 60."

"IT researchers, consultants, and executives have universally asserted that firms should integrate IT with overall strategic planning efforts, and we therefore include IT-strategy integration as a potential advantage-producing complementarity. (T. C. Powell & Dent-Micallef, 1997) p.381."

A successful project needs good management, so there are certain management steps that should be done to get at the end a good output. Planning for an IT project is known as organizational activities managed toward (1) searching for opportunities for using information technology in an organization, (2) find out the resource requirements to utilize these opportunities, and (3) come up with strategies and action plans to recognize these opportunities and to meet the resources needs (Boynton & Zmud, 1987). Another definition for Project management is the process of accomplishing the project objectives, which are project schedule, budget, and performance by doing certain procedures that have timeline, so the end the result is producing the intended quality and quantity deliverables. There are certain steps that should be considered to manage an IT project and deliver a successful system, these steps are:

a) Iron Triangle for A Project Development (Scope, Budget, and Time):

I. Determining the Project Scope:

The project manager at the beginning of the project should specify what is the scope of this project, that means what is the area that it is covering and what its limits. In an organization, if an IS system is going to be implemented the project manager should declare and locate which departments will be able to use this system. Usually, the scope of any project should be known before the initiation of this project. "Project scope determines what part of the development effort will be done by the internal project team. (Clark, 1989) p.1248."

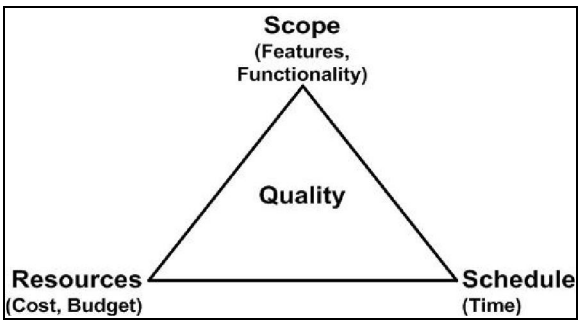

Figure 5: Iron Triangle for A Project Development

II. Cost and Budget Allocation:

At the start of every project, a certain budget is declared to cover the cost of all the resources that are needed to complete this project. Usually in projects, the project manager estimate the costs of the human, equipment, and material resources that are involved in the project, in which he can request the budget that can cover them. Project mangers use cost management in which they predict the impending expenditures to avoid the possibilities of going over the budget. Project Cost Management is a concept that is used by project managers to allocate the expenses with the budget and it have consists of several steps: (1) Resource Planning: specifying the resources (people, equipment, materials) and it's quantities that will be used in performing the project activities, (2) Estimating the costs: estimating the approximate costs of the resources that are necessary to complete the project activities, (3) Determining the budget: after estimating the costs, determining the budget by collecting the total costs, and (4) Cost control: by controlling the possible changes in the budget.

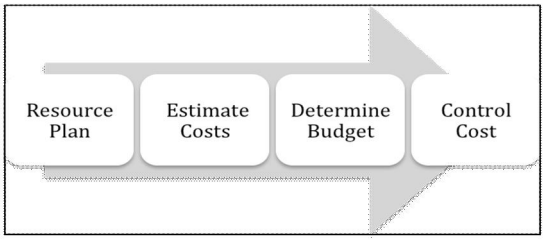

Figure 6: Project Cost Management.

III. Scheduling a Timeline for the project:

Creating a schedule for the project is one of the fundamental jobs for a successful project manager. A project schedule indicates the project's milestones, activities, and deliverables with specifying the time of performing them and defining the start and end of the project. Work breakdown structure (WBS) is considered as tool for scheduling the activities of the

project. WBS usually used in projects to breakdown the work into smaller activates that is restricted with time (Tausworthe, 1980).

b) Choosing the proper System Development Method:

To have a successful project, choosing the proper system development method is one of the essential steps. Naumann and Palvia clarified in there article that "To develop and implement Information Decision Support Systems efficiently, several structured and disciplined methodologies and techniques of system development have been developed and promoted. These system development tools generally attempt to deal with complexity through a procedural approach, with clear definitions of deliverables products and formal controls over personnel, time, budget, and other resources. (Naumann & Palvia, 1982) p.39."

Projects differs from each other based on the duration of the project, the deliverables, the number of the teams and the team members that are working on this project, and the resource allocation of each project. Therefore, project mangers should choose the right development method that is appropriate for the project, "Selecting from the many currently available system development methodologies (SDMs) and development techniques is a difficult problem with economic, technical, and behavioral implications. The IS Manager is typically faced with the challenge of selecting and implementing a package of methodologies and techniques to suit the organization. Selection and implementation of a package impacts standards, training, documentation, communication with users, and communication among DP professionals. Most importantly, the implementation of new methodologies and techniques impacts the work procedures and work styles of people. (Naumann & Palvia, 1982) p.39." There are many kind of development method that could be used in an IT/IS project to implement a system, some of these methods are:

I. System Development Life Cycle (The Waterfall Development):

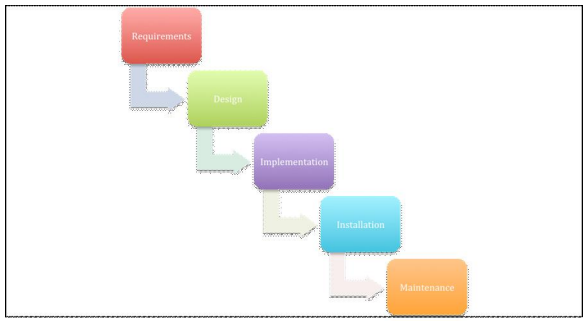

Figure 7: Waterfall process.

The System Development Life Cycle based on the Waterfall model is defined as linear sequential project methodology, which consists of sequence lock phases, a phase starts after the finish of the previous phase. Iteration could be done for only the previous phase to complete or edit the work. The phases of the waterfall development are: requirement analysis, design, implementation, installation, and maintenance. Usually, The first phases in an IT project using this development method performed by system analysts and the rest phases done by programmers (Brehm & Markus, 2000) (Sircar, Nerur, & Mahapatra, 2001).

In the Requirements Analysis stage, team members gather the requirements that are needed for the implementation of the system. Usually, meetings with the client are constructed during this stage to have a clear understanding of there expectations and collect the information needed. During the design stage the project programmers start designing the software solution for the problem. After that comes the implementation stage, and what happens in this stage is that the plan created in the design stage is coded and transmitted to an actual application. In the installation stage, the application or program is executed and used in the company or the organization. Finally, the maintenance stage is the last stage, the programmers modify the system to correct faults and improve the performance of it (Mahmood, 1987).

II. Spiral Development:

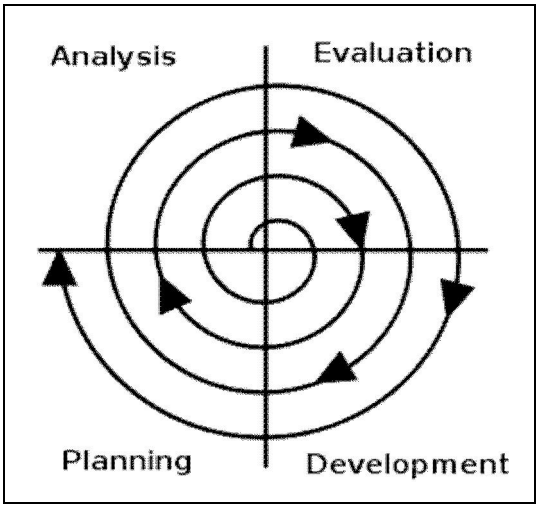

Figure 8: Spiral Process.

The Spiral Development Model is a systems development method used in information technology. The spiral Model depends on breaking down the project into small iterations and it is repeated in a circle until the project is completed. The spiral development consists of the same phases as the waterfall model and they are: requirement analysis, design or planning, implementation or development,

and evaluation. Most project mangers prefer the spiral model than the waterfall model because the possibility of discovering faults is greater (Barry W. Boehm, 1988).

III. Rapid application development (RAD):

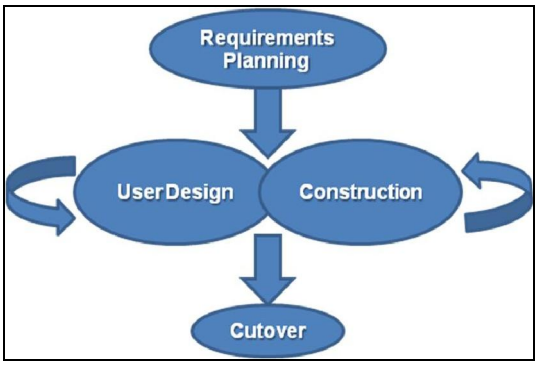

Figure 9: Rapid application development.

Rapid application development (RAD) is a distinguished as a preferable system development methodology by many IT project managers. RAD supports fast, accurate, efficient system development. The rapidity and the quality of the delivered system are the advantages that all the people involved in the project search for exists by using RAD. Rapid application development methodology differs than other system development method that planning phase is shorter than other system development methods, so that gives writing the software code more time which eventually promotes the quality of the system. There are four phases for RAD: Requirements planning phase, User design phase, Construction phase, and Cutover phase.

c) Effective Risk Management:

Project stakeholders relate risks with the possibility concept and the volume of acquiring a bad outcome. Risk management is defined as " a proactive process aimed at favorably skewing the variation in expected outcomes, by means of building the flexibility needed to respond to the occurrence of risk with corrective actions. (Benaroch, Lichtenstein, & Robinson, 2006) p.829." In IT projects, there are many risks that project managers predict during the project progress, such risks could relate to technical factors like IT skills of the project team, size of the project, technical complexity, and team coherence. Also, other risks not related to technicality may appear like conflicts between project team members, or between the corporation departments. Risk management consists of four stages: Risk Measure, Assess, Evaluate, and Manage (Barry W Boehm, 1991). Effective management of a project manager make him predicts the appearance of risks and managing it after it appears.

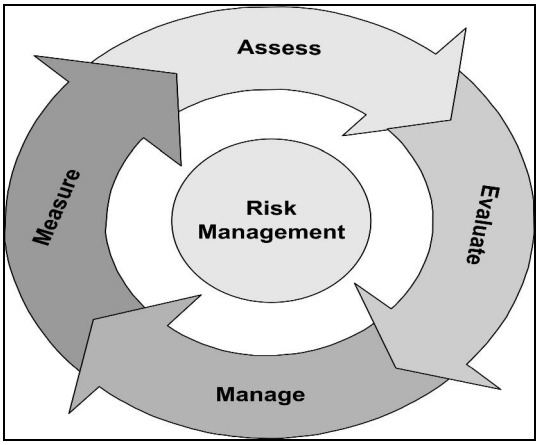

Figure 10: Risk Management.

Factor 3: Organization Flexibility and The Fluidity of Coordination

"IT change process affect every function and organizational stakeholder, and therefore require fluidity of coordination, or organizational flexibility. If ITs require significant alterations is organizational structures, communications patterns, and power relations, then first-order change. (T. C. Powell & Dent-Micallef, 1997) p. 381."

Emerge of IT needs a huge amount of coordination within an organization as a result of the accelerated appearance of IT innovations. The fluidity of coordination between the departments of the organization or the firm makes the implementation of the IT system easier. The more coordination an organization have, the more flexibility they can perform work (Seddon, Staples, Patnayakuni, & Bowtell, 1999).

Factor 4: Adequate Communication

Schultz, Slevin, and Pinto mentioned in their research p.36 a adequate communications in a project as one of the factor for a successful project "Adequate Communication: sufficient information is available on project objectives, status, changes, organizational coordination, clients' needs, and so forth. Further, formal lines of communication have been established between the project team and its clients and between the team and the rest of the organization. (Schultz, Slevin, & Pinto, 1987) p.36."

During a project (especially IT projects) the abundance communications between the project team and the client is important. Good communication skills are very important characteristic for both project manager and the project team. " Technical skills (technical knowledge) were top ranked success factors. Yet, during strategic planning, team members with good communication skills and broad

perspectives were seen as most important. (White & Leifer, 1986)."Poor communication leads to many problems that may end with project failure. Examples of these problems are:

1) Differences in expectations: One of the key jobs that a project manger must accomplish is to ensure that everyone related with the project has the same expectation of what they will deliver, when they delivering it, and the cost of this deliver. The difference of expectations appears if the client is expecting the system that will be implemented to perform a certain job, but the project team is implementing a system that are performing a different job. This problem is a result of low amount of communication between the project team and the client, which may result to project failure.

2) People are surprised: if there is no continuous communication between people that are related to the project, they will be surprised if change happens. For example, if the project end time will be extended the project manger should the client and his top management kept informed, so they don't be surprised and don't build up other plans upon the previous end time like to assign the team for another project.

3) Poor communication affect project team members: If there is poor communication within team members and with the project manager, that will make the appearance of mistakes more often. The adequate communication between team members will ensure that every one is contributing in building the system with specific role distinguished from the communication with the team and the manager. Project managers some times make a big mistake by not communicating clearly the needed work from a team member to deliver, which makes the member spend time in on work that is not necessary.

Factor 5: Qualified Team Members

"People are important when implementing a system and can directly affect its success or failure. In particular, the skills of the data warehousing development team have a major influence on the outcomes of the warehouse project. Team skills include both technical and interpersonal abilities, and a team with strong technical and interpersonal skills is able to perform tasks and interact with users well. (Wixom & Watson, 2001) p.24."

The qualification and the skills of the team members play an essential role in the success of any project. In an IT project, having team members that have technical, communications, and teamwork skills will make reaching success easier. Some personnel are chosen, and trained to form a project team to contribute in completing the project. Knowledge, skills, goals, and personality are considered as people variables that most employers observe. The ability to communicate efficiently and affectively with other team members, the manager, and most importantly with the client is a key skill. Effective teamwork depends on the interpersonal skills of the member, which lead to the intended goal of the project (Pinto & Slevin, 1988).

Technical Related Factors Model:

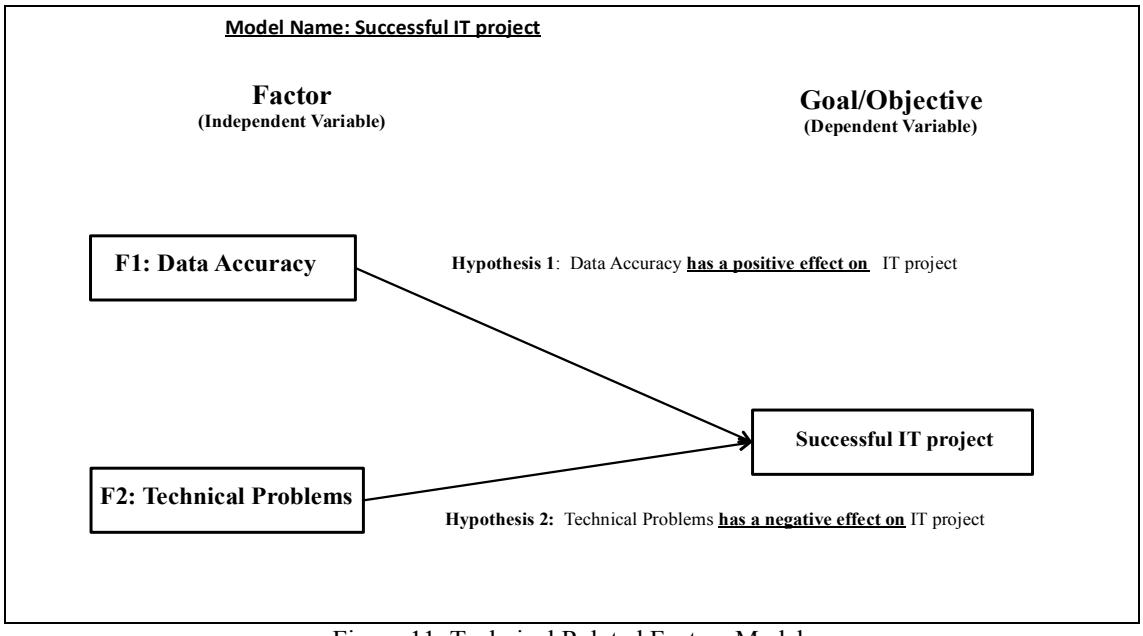

Figure 11: Technical Related Factors Model.

Quotes and Explanation For The Technical Factors

Factor 1: Data Accuracy

The data that is founded in an information system is not considered accurate, if the person did not enter the correct data in the system. Data accuracy is a crucial factor for an information system. Many operations that are done in any system depend on the data that it has " Health care providers, payers, policy makers use administrative data to conduct operations, evaluate population outcomes, and the measure the quality of care. Therefore, assessing the accuracy of such data is crucial, and concerns about in accuracies appear justified. Administrative data sets are ubiquitous and relied upon in all aspects of health care financing and delivery. (Peabody, Luck, Jain, Bertenthal, & Glassman, 2004) p.1066."

The data entered is inaccurate that may conclude to inaccurate system and outputs that will lead to the dissatisfaction of the clients and the people involved to this project, "When someone put the incorrect data, then the error will be a negative effect on domino then it will spread to the whole enterprise (Barclay & Smith, 1997) p.3."

Factor 2: Technical Problems

During the implementation the project team usually face technical issues that may lead to project delay or may be to failure. A well-designed system done by skillful programmers still may fail with the percentage of 10-20% if the system is not accurately implemented (Dorsey, 2000). Also, some issues may appear related to crafting the software like missing software component, new advanced technology not recognized by the programmers, or poor software architecture, which will lead to future errors in the system (Whittaker, 1999). " Technical problems may emerge at various points during a data-warehousing project, such as when many, heterogeneous data sources must be combined and when new technology for data warehousing must fit into an existing technical infrastructure. These technical problems may preclude the warehousing team from creating a repository of high- quality data, and the system may not be as flexible or integrated as the organization requires. (Wixom & Watson, 2001) p.22."

Business Related Factors Model:

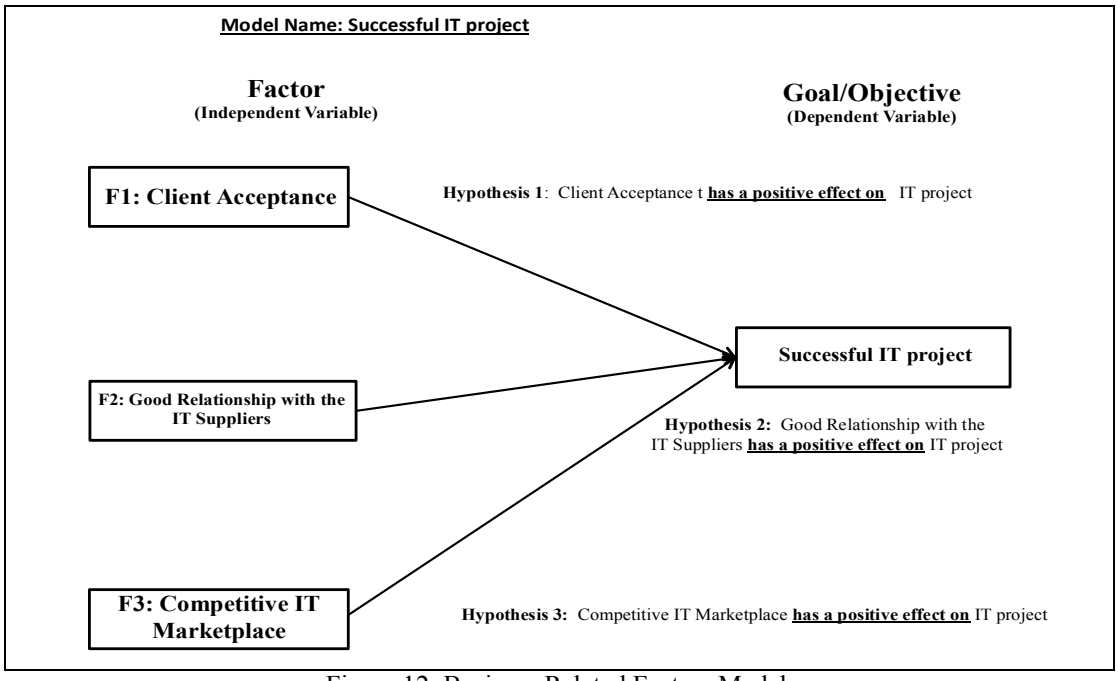

Figure 12: Business Related Factors Model.

Quotes and Explanation For The Business Factors

Factor 1: Client Acceptance

Client acceptance is considered as the final stage of the project. After finishing implementing the system, the client's decision remains to conclude the project. The client acceptance determines the real efficacy of the project and whether it is approved or not. Some project mangers make the mistake that if

the implementation operation is managed perfectly, that will result with client acceptance. Furthermore, the client acceptance is treated as a stage of the implementation phase that should be handled like any other stage (Pinto & Slevin, 1988). "The ultimate success of a project rests with the client's decision of whether or not to accept it. As a result, this stage of the implementation process must be managed like any other, with efforts being made to "sell" the final product to its intended users. (Schultz et al., 1987) p.40."

Factor 2: Good Relationship with the IT Suppliers

IT suppliers provide the required technology equipment for IT project. Keeping a good relationship with IT suppliers help to facilitate the obstacles of IT needs. Some companies maintain a long and strong relationship with certain IT vendors, which promote having reasonable prices and good deals. " Supplier relationships occupy a central role, particularly in light of the rapid expansion of electronic data interchange (EDI) technologies. EDI systems combine intra- and inter organizational information processing to facilitate sophisticated electronic interactions with suppliers. However, in the absence of open and trusting supplier relationships, such systems can do little but magnify existing suspicious, and fracture tenuous relationships. The capacity to craft and maintain trusting and economically viable supplier relationships, and then to leverage these relationships using sophisticated inter organizational ITs, appears to require tacit, complex coordination and communications skills that competitors may find difficult to replicate. (T. C. Powell & Dent-Micallef, 1997) p.382."

Factor 3: Competitive IT Marketplace

Obviously, for any IT project there are requirements for it completion. IT/IS projects require software programs and hardware tools to construct the system. The competition in the IT marketplace between IT providers gives big advantage to organizations and companies that is considering applying IT/IS system. The rising number of IT equipment and IT outsourcing vendors will help the companies and the organizations get competitive prices. "A mature IT outsourcing market place with a pool of vendors gives agencies options from which to choose and the necessary in formation for making an outsourcing decision. Their liability and quality of vendors affects the amount of risks involved in outsourcing. If the risks become too great, public managers may not even consider outsourcing. (Chen & Perry, 2003) p.408."

Importance of IT Project and it's Success Factors

Nowadays, it is difficult to operate and manage an organization's process without using information technology. IT existence in a company have a great impact on it's staff performance, product quality, and financial performance (T. C. Powell & Dent-Micallef, 1997). The implementation of software systems and information systems into an organization needs a precise plan and project approach. In this literature, the human, technical, and business factors could be considered as roadmap for decision makers in an organization to achieve the success. Usually, when a certain organization wants to implement a system, they get attached with the technical part of the systems (which are mostly for IT projects hardware and software) and neglect the other reasons that help to achieve a successful project. Furthermore, human role in implementing and managing the project have the most effect on the success or the failure of any project. Some researchers say that 80% of an IT/IS project success depends on the factors related to human and the other 20% based on the technical and business factors (Clegg et al., 1997). Also, the importance of the human, business, and technical factors comes from reducing the possibilities of project failure and risk appearance before, during, or after the implementation of the project or system. Meeting these factors will help reach the final destination, which is having a successful IT, project and emerging IT in the organization.

5. Conclusion

In this literature, we discussed the possible reasons to achieve successful completion of an IT/IS system. The human role has the biggest impact on IT project. Furthermore, a Successful project indicates that it is managed effectively and the team members are qualified enough. Top management support is required to remove the barriers that may face the project team. Good coordination between the departments and the project team contribute to facilitate project progress. Communicating effectively and frequently make the project team familiar with the requirements and expectations. IT project may fail, if there is no accuracy data entrance or technical issues related to the programming of the software. The IT market and the vendors play a critical role to complete the project by suppling the necessary software and hardware tools. At the end of an IT project, obviously client acceptance is crucial to consider the project is successful.

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