Exploration of Success Factors of Information System

Bikram Pal Kaur[1] and Himanshu Aggrawal[2]

**[1] Ph.D Scholar, Department Of Computer Science Engineering,Punjabi University
Patiala, 147002,Punjab, India**

**[2] Professor, Department Of Computer Science Engineering,Punjabi University
Patiala, 147002,Punjab, India**

Abstract

In current decades, the organization is highly effected by the successful implementation of Information system (IS). In today's business there are also no boundaries and hence the joint venture between customers and challengers are usual. IS provides increased competitiveness and flexibility to business. It also affects the trade relationships in the market. Whenever IS is properly implemented ,it facilitates business redesigning process, supports an organization to offer good products, and services. It also enables organizations to participate in new advertising programmes and initiate operational effectiveness. However the better performance of the organization depends upon the successful implementation of IS. Therefore the objective of this paper is to review the success factors of Information system on the basis of literature survey and proposing the new model for the critical success factors for the Information Systems in an organization.
.

Keywords: Information System,Critical Success Factors,IS Model, ERP,IS Life Cycle.

1. Introduction

This research paper highlights the previous research work and studies conducted by different researchers on Critical Success Factors (CSFs) of Information System. This paper presents the holistic observation of all the researches done earlier. The literature review has been done to collect the overall observations of the subject under study. In this paper the development related to IS systems relevant for the study of the critical success factors have been highlighted.

The literature review is an analytical and in-depth evaluation of the researches done earlier. The information has been collected from various sources which are further documented. It also helps in recognizing the gap that exists in the area of research. For justification of the literature review, the literature has been classified into different sections.

2. Information System: Basic Concept

The studies of Yeo[1] suggests that IS are user-interfaced systems which are required for supplying the information and also for processing the information to support the strategies ,different functions of the various departments as well as ,decision making processing of the management in the business dealings.

The studies done by Delone & McLean's[2] fig 2. represents the three most important dimensions: Service quality, Information quality, System quality which must be monitored for the user satisfaction. Earlier also in Delone & McLeon[3] proposed this model but it was lacking in showing the benefits of services and support for the e-commerce success in business(see Figure 1). Kumar et al.[4] considered certain management related issues regarding implementation of Information System like vendor selection of IS, collaborators in implementation process, project team structure and their training.
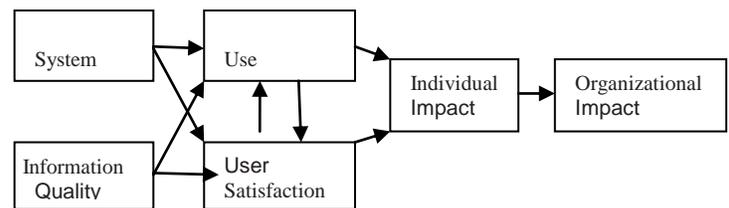

Figure 1 DeLone and McLean IS success model (1992).

IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
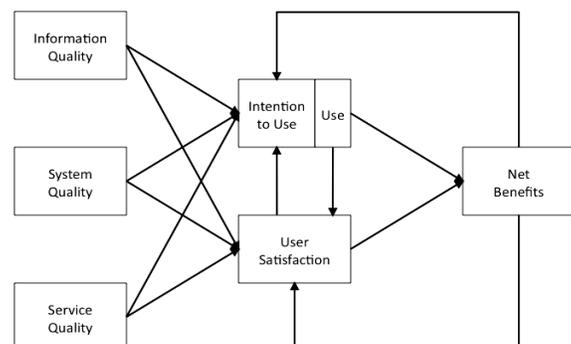ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org

227

Figure 2: Depiction of the Updated ISs Success Model (DeLone & McLean 2003)

Alter[5] elaborates that the organization in which the information systems are implemented are multifaceted, synthetic, and reason fully designed. The information system is composed of people, structure, technologies, and work systems; The IS developers are concerned with the design which is according to the goal of the organization. Figure3 shows the alignments between business and information technology strategies. It also depicts the alignment between organizational and information systems infrastructures Henderson and Venkatraman[6] . The business strategy conversion into successful Information System Infrastructure requires a lot much design processes like organizational design for the formation of organization strategy and information system design for the successful information system infrastructure.
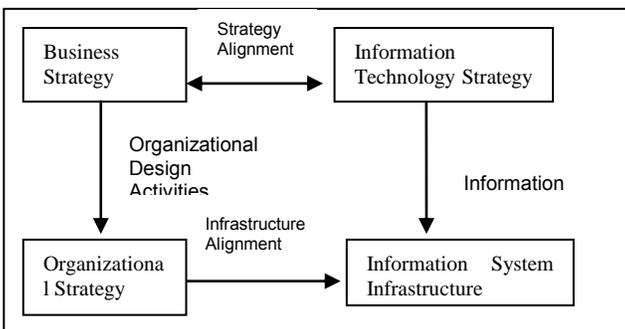

Figure 3. Organizational Design and Information Systems Design Activities (Adapted from J. Henderson and N. Venkatraman), 1993.)

Allen S. Lee[7] elaborates the framework for the evaluation of IS in which the combination of behavioral sciences and design science has been shown in Fig 4.

Shehab et al[8] illustrates that to maintain the competitive edge in the market and also for increasing the efficiency and effectiveness of business process the IS (ERP) is the best enable.

Turban et al.[9] reviews yearly Datamation (a leading practitioner journal of information systems) and then suggests why IS are important for a business organization.
The information systems are required for the following reasons:
• For the business process reengineering.

• To meet the company's goals and objectives.
• Better decision making.
• For the development of the productivity.
• Enhancing the quality of the product.
• Building the competitive edge.
• Retention of change management environment.
• Creation of Research and Innovation environment.

According to Turban et al. the IS projects can be classified into four categories:
a) Commercial e.g. customer relationship management (CRM),e-commerce, knowledge management
b)Strategic e.g. re-engineering, information architecture
c)Organizational e.g. centralization vs. decentralization, outsourcing, resource management;
d) Technological e.g. database, internet and intranet.

Diniz [10],proposed a three dimensional model for the evaluation of virtual business environments from the user's perspective by doing the case study of three banks in a Brazil. The studies includes the services offered, functionality, reliability, security of transactions on the sites and also the users transaction quality. This evaluation approach is useful to known the quality of the sites used for Internet banking .

IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
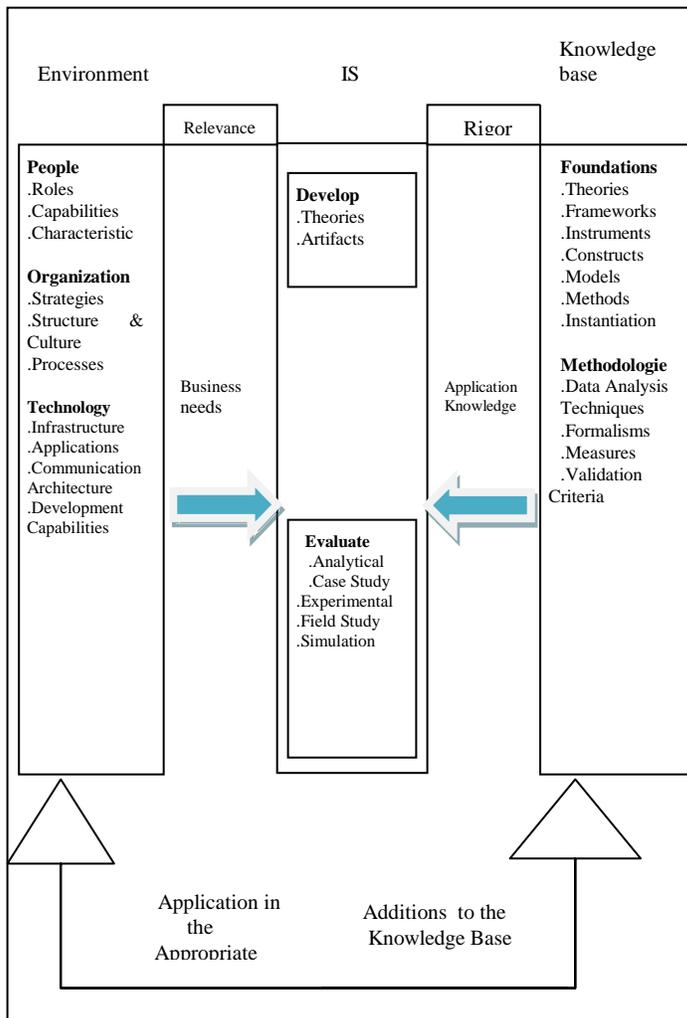ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org

228

Figure4 IS research framework Hevner et al.

Khaddaj [11] suggests the software quality factor have a great impact on the information system performance and should be taken care of large information systems. Khaddaj exposed, many elements which leads to the failure of system's performance. Usability and portability are major problems that need to be considered which affects software quality.

Almutairi & Subramanian [12], supports through their pragmatic application of Delone & McLean model in private sector organization of Kuwait, find the direct linkage between the variables of Delone & McLean modal. They proved that information quality and system quality influences user satisfaction significantly. Similarly system usage has a great control on in individual impact

Wixon & Todd [13] formed an integrated model which differentiate beliefs and attitude about the system from belief and attitudes using system (behavior based).He built a theoretical logic which links the user satisfaction and technology acceptance. This model bridges the gap between the system characteristics and its usage as shown in Figure.5.
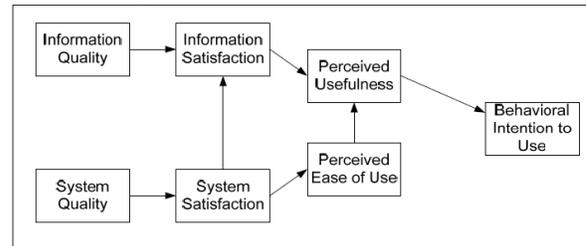

Figure 5: Integrating System Characteristics to TAM, (Wixon & Todd 2005).

Laudon & Laudon [13], describes factors which are highly enhancing the importance of ISs ;

- the extreme use of internet and communication technologies,
- Technology forces renovates of business enterprise
- Globalization of business
- Big prospects on the international level
- Growth of information and knowledge market,
- Appearance of the digital firm leading to business relationships digitally facilitated

Al-adaileh, [14] examines the use of IS not only meant for gaining competitive advantage but also attain valuable benefits for an organization including,

- Raising productivity,
- Small product cycle,
- Automation of operational decision
- Supporting of strategic and tactical decisions

Sørensen et al.,[15] indicates through the   Figure 6 ,the decomposition of the management system of an organization. To enhance the profits and low operating cost to the management can only be achieved through a well-constructed and well-organized IS . IS provides the information about operations for the rational decision making which helps in increasing effectiveness and efficiency.

IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
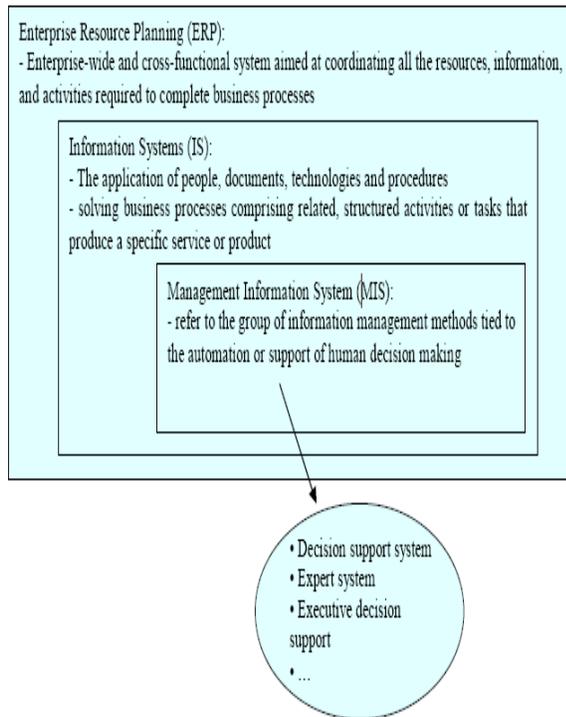ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org

229

Figure 6. Concept of management information systems. [Sørensen, C., Bildsøe, P., Fountas, S.]

Bechor et al [16], suggests that the strategically planning of IS is must. Strategically planning is the process of strategic thinking that identifies the most desirable IS on which the organization can implement its long-lasting IS activities and policies.

Naser Khani, Khalil Md Nor[17] explains that IS capability is related to maintaining competitive advantage in IS field. Information Technology's(IT) competence is in delivering the best IS system, manage IT costs, and shaping goals of the business .In this study the model showing relationship between IS capabilities and strategic planning for IS for the effective IS has been developed. Depending on RBV(Resource Based View) perspective the variation between two variables were studied i.e. IS capabilities and SISP(Strategic Information System Planning) success.

Analysis

IS is the business element required for the future and success of the business. The successful managers are those who use IS so that their business communicates rapidly and effectively over a global network. IS is the foundation stone of this capability. The key reasons why IS are required for the current business processes:

- IS is a competitive weapon
- The line manager take charge of IS
- Information literacy is must
- Pragmatic planning is must.
- Recognition of the Human Resource Factor
- Third Party alliances
- Executive support systems that aid decision making process
- Business reengineering is required

The beneficiaries of these IS system are the top management, IT industry and the operational management. Therefore IS is a thriving force of the current business scenario.

3. IS :Life Cycle

Providing effective information technology (IT) support or business processes has become crucial for enterprises to stay competitive in their market. Thus, process life cycle support W. M. P. Vander Aalst [18] and continuous process improvement adopt a key role in contemporary and future enterprise computing. The process life cycle (Figure 7) starts with the (re)design of a business process. Process modeling and process analysis tools can be used during this phase. Thereafter, the business process has to be implemented resulting in a process-oriented IS. Organizations constantly search for ways to grow and maintain their competitive edge and today's business activities depend greatly on information technology (IT) enablement. This demands that IT maintenance is regarded as a critical process that needs to be performed with the highest possible quality. It requires organization specific knowledge about internal business operations and explicit technical knowledge to achieve the desired IT quality.

Hanlie Smuts,Alta van der Merwe[19] The survey consisted of 12 constructs
• Construct 1 : requirement definition -It includes business and functional requirements, operational processes and procedures and performance requirements.

Construct 2: design made up of solution architecture, reporting solution design, IS operations process modelling and IS infrastructure and environments.
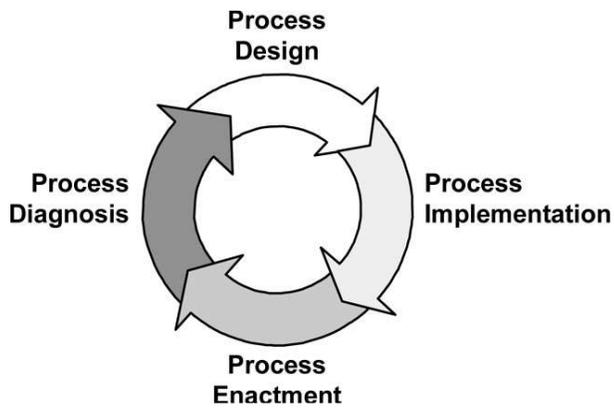
IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org

230

Figure7.Process Life Cycle

• Construct 3 Programming and testing refers to solution and reporting solution development, legacy application development, release management and solution end to end integration.

• Construct 4 is integration and system test and includes business readiness testing, parallel run, user acceptance testing and systems integration testing.

• Construct 5 is Data migration is included data migration planning, data migration testing and data migration execution.

• Construct 6 is cutover and transition and cover transition planning for project to operations, cut over planning, cut over testing and cut over execution.

• Construct 7 is business integration and focuses on end user training, behavioral change management and communication.

• Construct 8 is project control and management and includes scheduling / planning, progress measurement and reporting, roles and responsibilities definition, knowledge management, leadership and project management.

• Construct 9 Governance and sponsorship is and comprises of client organization decision-making, client organization sponsorship, outsources vendor's sponsorship, governance structures and forums.

• Construct 10 is commercial management and points to commercial agreements and administration thereof, as well as value add to delivery milestones.

• Construct 11 is auditing and risk management and refers to macro project risk management, data transformation risk management and internal controls.

• The last construct, 12, is relationships between project team and outsource vendors, between project team and client organization and among outsource vendors.

Analysis

From the above discussion on the life cycle stages of IS, it is concluded that for successful and effective IS implementation, the IS of organization must go through the following phases as shown in diagram:

- Planning process
- Analysis & Design process
- Implementation process
- Testing process
- Stabilization process
- Continuous Updation process
- Evaluation process

4. Information System : Integrated IS Model

It can be concluded from literature discussed above that the information life cycle are important for of managing the corporate application assortment. The approach presented here does not correspond just to the extension of the traditional information system development life cycle. This approach is based in the generic lifecycle employed in other contexts like manufacturing or marketing. In this paper it is proposed a model of an information system life cycle,
supported in the assumption that a system has a limited life. But, this limited life may be extended. This model is also applied in several cases; being reported here two examples of the framework application in a construction enterprise, and in a manufacturing enterprise. this paper is presenting a framework based in the information system life cycle that could be effective to analyze information systems and information technology adopted by a specific enterprise. Although we admit that this framework could be used in other contexts, our purpose is analyzing its effectiveness in corporations whose business is in manufacturing and construction industries.

IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org
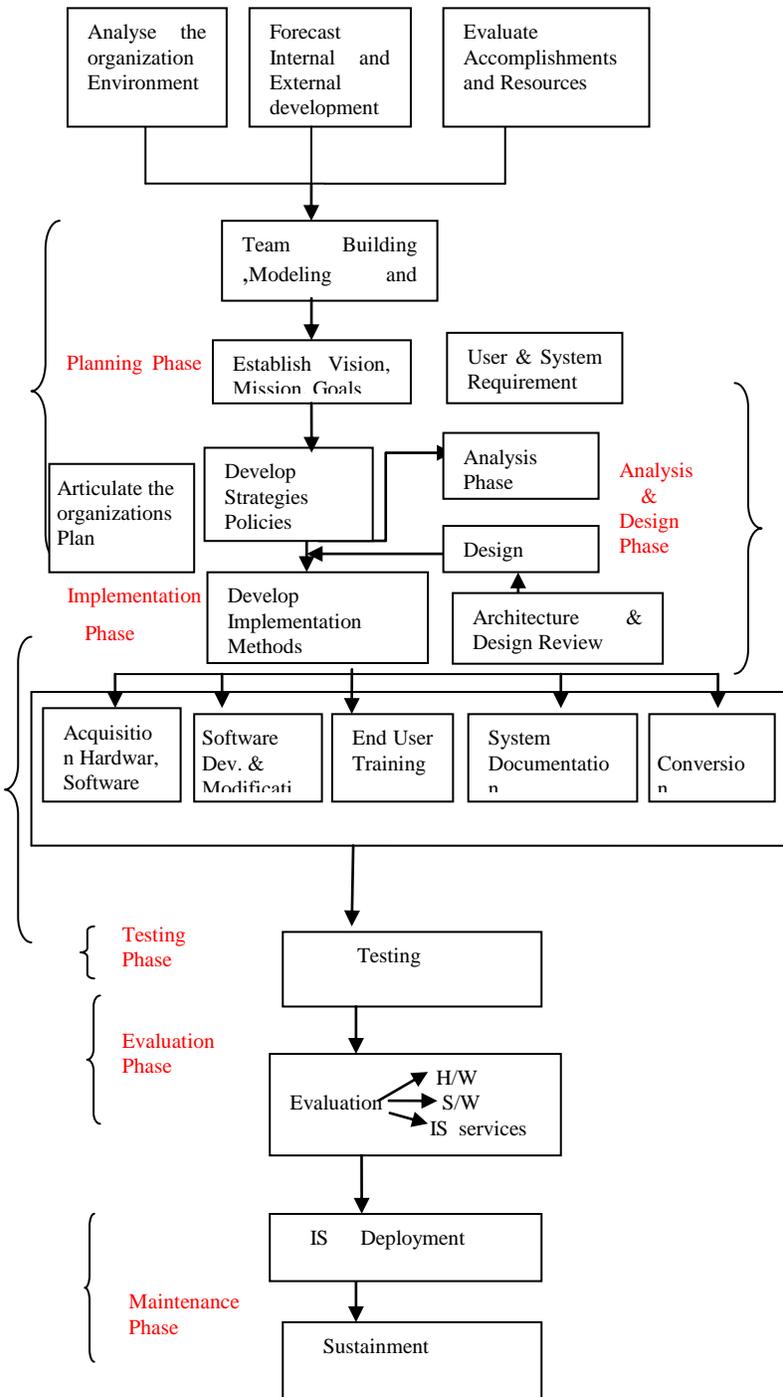
231

Successful planning and implementation is the obvious goal of any organization that has chosen to go in for IS. Planning is very important as well as difficult. So, it is valuable to have a framework to act as guideline for planning process. A large number of models have been suggested and practiced for the Information Systems. An integrated model for successful IS is developed and shown in the Figure.
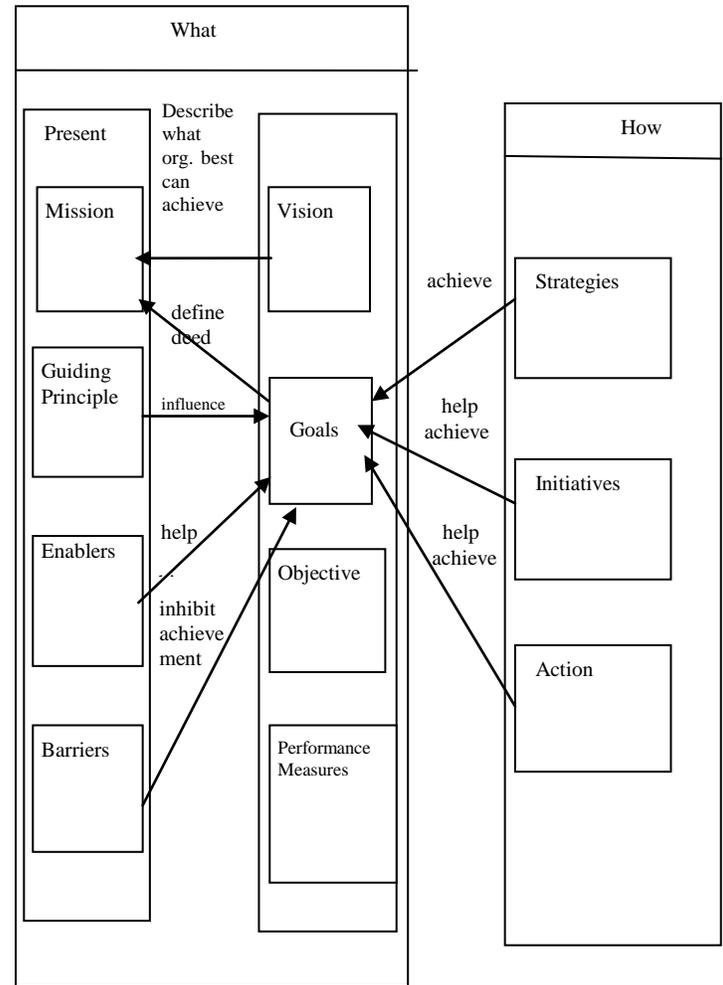

Figure8 Information System Life Cycle

Figure9 An integrated model for successful IS

Typical strategic planning processes examine an organization's current environment and abilities (the present situation), considerations about how it would like to grow or evolve (the desired future), its aspirations as an organization (what it will strive to do), and its intentions for moving forward (how it will move

IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org

232

forward) as shown in figure 9. These high-level elements are described below:

• The What: These are descriptions of what the organization does and what it aspires to achieve—its organizational targets—including its goals, objectives, and quantitative performance measures.

• The Present: The present situation, or current environment, is typically described in terms of the organization's mission, guiding principles (or values), organizational strengths (or enablers), and organizational barriers (weaknesses or challenges).

• The Future: The desired future is described by the organizational vision and targets.

• The How: The preferred route to achieving the organizational goals, objectives, and mission is communicated as a strategy or as strategic goals.6

The studies done by Finch[20] indicates the project implementation profile (PIP) framework can be utilized for supporting future project's success in terms of defining

- Project mission,
- Client consultation ,
- Schedule/plan ,
- Top management support ,
- Personnel Client acceptance,
- Technical tasks ,
- Monitoring and feedback,
- Communication,
- Trouble-shooting .   -

Finch & Olson[21] indicates that the achievement of planning, budgetary, and business goals are the motives of the successful implementation of IS projects. The study has indicated that the successful IS projects has seven characteristics also known as 'critical success factors' (CSFs);within time limit, within the forecasted budget, alignment with the business performance, user's acceptance, minimum disordering of the work flow of organization, slightest effect on the business culture.

Belout and Gauvrea[22] proposed the seven items for the IS project implementation. They are

- Completion of project within time limit.
- Stick schedule of the projects followed.
- project must be within budget
- Users feel good about IS project implementation
- All the requirements must be considered
- Cost objectives must be met
- Intended clients use the project

Horine [23] from an optimistic viewpoint reviews a broad qualities and behavior common among those most successful projects. A thriving project must have:
IS alignment with the company objectives.

- Clear defined scope, deliverables and approach in the process of planning.
- Role and responsibility has to be clearly defined to each user and team members.
- Accuracy must be the priority.
- Realistic schedule need to be developed.
- Project team must be customer- focused and outcome concerned.
- Constant, efficient, and alerts must be present on understanding project communications.
- Progression of the project must be measured.
- Project problems and consequent action items must be followed.
- Cultivate a strong teamwork.
- Prospects and changes in surrounding scope, excellence, agenda, and outlay must be managed.
- Availability of experts as project assets as and when required.
- Identification of risk and its management...
- Predict and conquer barriers to guarantee project accomplish objectives.

P. Soja [24] ,study suggest that the success of IS implementation is only possible if the organization is capable of spending money, time and also provides the resources. The risk management is also required to done on the IS project. The user considers IS a failed project if implementation of projects is late and it cost a more.

D. Aloini, R. Dulmin, V. Mininno [25] reveals factors user satisfaction, computer functions, cost, quality of products, time, that establishes the accomplishment of a project.

Bartis and Mitev[26] defines the IS success is a multi-faceted phenomenon and is socially constructed which is affected by stakeholders' viewpoints.

Thomas and Fernández [27] investigates the organizations of Australia and do the measurment of IS project success. There are three categories of success criterion
- Project management success criteria,
- Technical success criteria,
- Business success criteria.

Therefore the finding of the research is that a clear definition of success and effective measurement of the defined criteria is a factor that causes success.

Kanaracus[28]reveals that even in the economic downera, the companies continue to pay outing on information technology (IT) and their budgets continue to climb. Almost every organization uses one criteria from every category. He states that if there is a project management criteria of 'on-time' and 'on budget', the other organization may have another type of category like business success criteria may have 'delivery of benefits', 'met business objectives' and 'business continuity.

De Lone and McLean (D&M Model)[29] predicts that due to the economic downtime and increasing competition ,cutting the cost is required, which further intricate companies to assess and observe the advantages of costs of technology for calculating the ROI(return on these investments). Human factors, organizational, environmental factors are indirectly affecting the impacts of IT; therefore, measurement of information systems (IS) success is both multifaceted and deceptive.

Ika[30] explains the objective of IS success may follow the criteria of time, cost, and quality where as the subjective perceptions are also important for measuring project success. The evaluation of subjectively perceptions may be done by the satisfaction of different stakeholder groups with regard to the project and its results.

Hisham, B. M. B. & Mohd[31] reveals that the strategic information system planning focuses on budget establishment , goal defining ,the selection of the best methodology and deciding internal and external contributors.

Abdel Nasser H. Zaied[32] has created a new model for the evaluation of success of an information system .He applied the two models, one is Technology Acceptance Model (TAM) and other one is DeLone & McLean update IS success model (D&M).
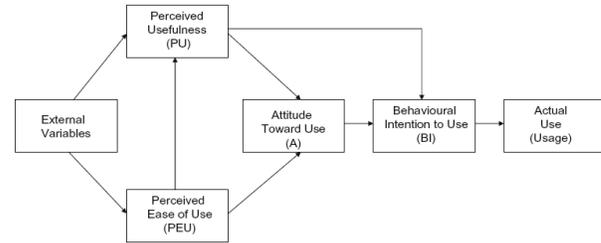

Fig 10: Original Technology Acceptance Model (TAM)

TAM Model & D & M updated IS model were used to generate the integrated evaluation model for IS success. This model is helpful in appraising the critical success factors affecting information systems in public sector in Egypt. This model is useful in supporting the decision makers in evaluating and developing the information systems.
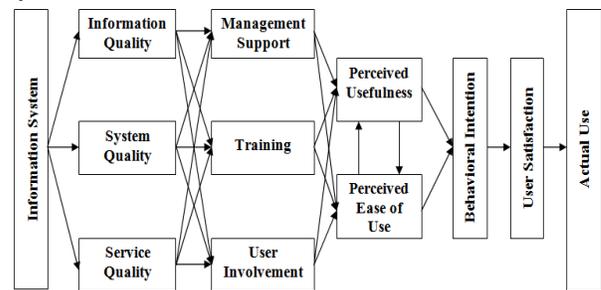

Fig 11: Proposed integrated success model (ISM)

Accordingly, for measuring the IS success ten dimensions were projected .They are
- Service quality;
- System quality;
- Information quality;
- Management support;
- Perceived ease of use;
- Perceived usefulness;
- Training;
- User satisfaction;
- User involvement.
- Behavior intention

The model assumes that information quality, system quality and service quality are linked to management support, training and user involvement, and these in turn; influence perceived usefulness and perceived ease of use which affect on behavior intention and user satisfaction as shown in Figure 11.

IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
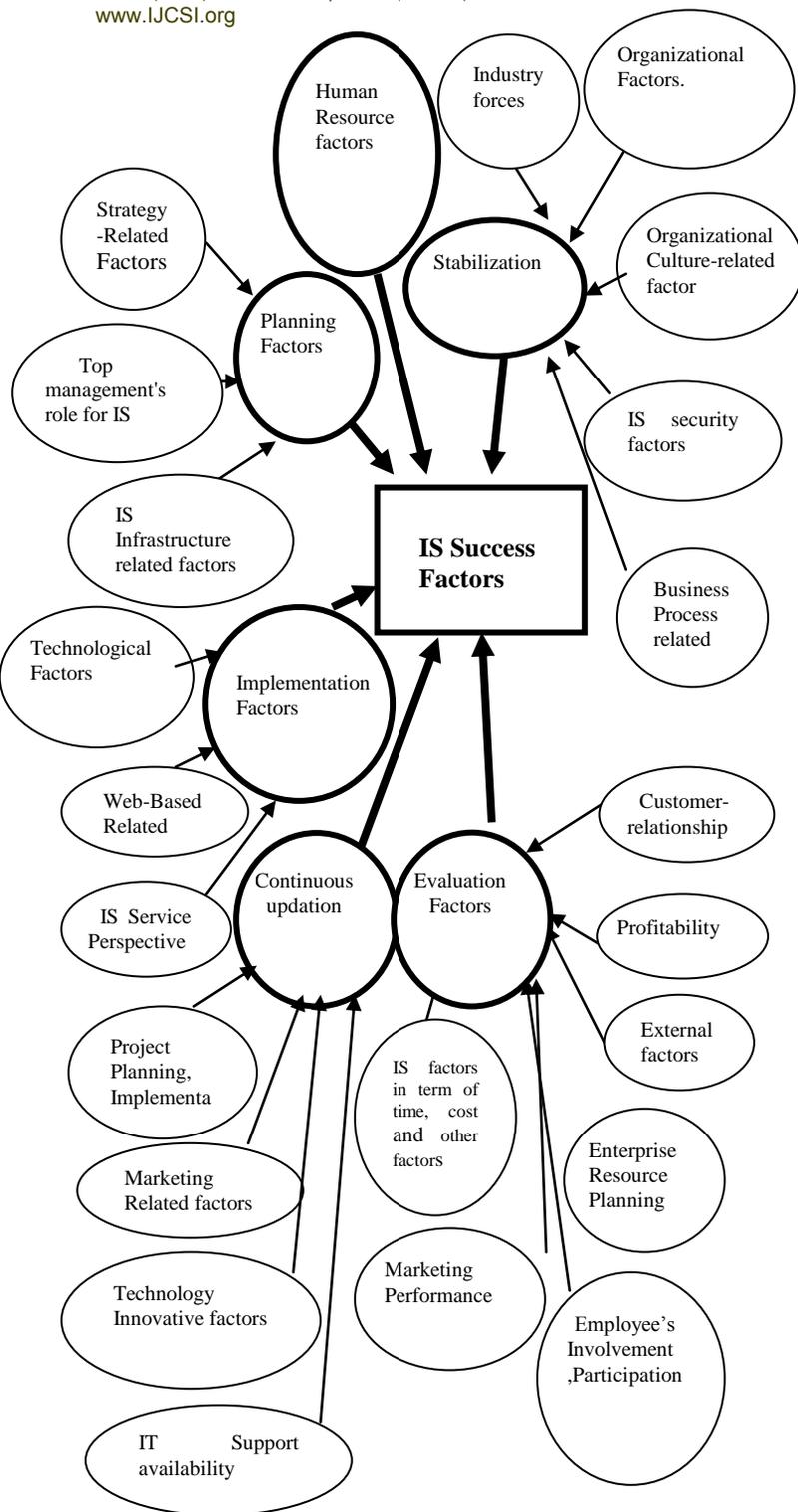ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org

234

Figure12 Critical Success Factors For Information System

Analysis

The critical success factor within the organization is hierarchical in nature and can be evaluated by many different factors. The organizations are not operating in vacuum however they are operating in a some surroundings, society or in a business. Present business is becoming more competitive and global in a society and industry, therefore certain critical success factors are required to consider for the tomorrow's business. Every organization has critical success factors that must direct individuals in turn department and in turn the whole organization for the IS success. At this stage it is important to understand the scope of critical success factors for IS .The greatest success factors for IS are relating to most the human resource factors then the planning factors then implementation factors, stabilization continuous updation and performance factors . There are certain underlying sub factors as shown in fig 12

References

[1] K.T. Yeo ,Critical failure factors in information system projects,Division of Systems and Engineering Management, School of Mechanical & Production Engineering, Nanyang Technological University,Nanyang Avenue, 639798 Singapore

[2] DELONE WH And MCLEAN ER (2003) The DeLone and McLean model of information systems success: a ten-year update. Journal of Management Information Systems 19(4), 9–30.

[3] DELONE WH and MCLEAN ER (1992) Information systems success: the quest for the dependent variable. Information Systems Research 3(1), 60–95..

[4] V. Kumar, B. Maheshwari, and U. Kumar. "An investigation of critical management issues in ERP implementation: Empirical evidence from Canadian organization". Technovation, 2003.23(9), pp.793-807

[5] Alter, S. (2004): Desperately seeking systems thinking in the information systems discipline,Proceedings of the Twenty-Fifth International Conference on Information Systems, 757-769

[6] J. Henderson and N. Venkatraman, "Strategic Alignment Leveraging Information Technology for Transforming Organizations," IBM Systems Journal(32:1), 1993.

[7] 2004: Mårtensson, P. and Lee, A. S., "Dialogical Action Research at Omega Corporation," MISQuarterly (28:3), pp. 507-536.

[8] E.M. Shehab, M.W. Sharp, L. Supramaniam, T.A. Spedding, (2004) "Enterprise resource planning: An integrative review", Business Process Management Journal, Vol. 10 Iss: 4, pp.359 - 386

[9] Turban, E. & McLean, E. & Wetherbe, J. (2005). Information Technology forManagement: Transforming Organizations in the Digital Economy (5th Ed.). New York:John Wiley & Sons, Inc.

[10] Diniz E, Porto R & Adachi T, September-2005. "Internet Banking in Brazil: Evaluation ofFunctionality, Reliability

IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 2, January 2013
ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814
www.IJCSI.org

235

and Usability", Electronic Journal of Information SystemsEvaluation, Vol. 8, Issue 1, pp41-50

[11] .Khaddaj, S, 2005. "The Evaluation of Software Quality Factors in Very Large InformationSystems", Electronic Journal of Information Systems Evaluation Vol 8, Issue 1, pp 43-48

[12] Almutairi, H & Subramanian, G, April-2005. "An Empirical Application Of The Delone AndMclean Model In The Kuwaiti Private Sector", Journal Of Computer Information Systems

[13] Laudon, K. & Laudon, J. (2006). Management Information Systems: Managing the Digital Firm. Ninth edition. Pearson/Prentice Hall: Upper Saddle River, NJ .

[14] Raid Moh'd Al-adaileh,An Evaluation of Information Systems Success: A UserPerspective - the Case of Jordan Telecom Group, Assistant Professor of Management Information Systems, Department of Businessand Management Information Systems, Mutah University, B. O. Box (7)Mutah – Al-karak – JordanE-mail: radaileh@mutah.edu.jo

[15] Sørensen, C., Bildsøe, P., Fountas, S.,Pesonen, Pedersen, S., Basso, B., Nash, E.Integration of Farm Management Information Systems to support real-timemanagement decisions and compliance ofmanagement standards. Center for research & technology, Thessaly, Greece. 2009.Available online at: http://www.futurefarm.eu.

[16] Bechor, t., neumann, s., zuiran, m. & glezer, c. 2010. A contingency model forestimating success of strategic information systems planning. Information & Management, 47, 17-29

[17] Khani, N., Md Nor, K., and Bahrami, M. (2011), A Proposed Research Model for the Relationship between Organizational IS capabilities, Organizational Performance and Strategic Planning, 16th IBIMA Conference (Innovation and Knowledge Management: A Global Competitive Advantage) Malaysia 29-30 June 2011.

[18] W. M. P. van der Aalst, "Business process management—A personal view," BPM J., vol. 10, no. 2, pp. 248–253, 2004.

[19] Hevner, A.R., S.T. March, J. Park & S. Ram (2004): Design science in information systems research, *MIS Quarterly*, 28(1), 75-105.

[20] Finch,Peter (2003) Applying the stevin Pinto Project Implementation Profile to an Information Projects,Project MANAGEMENT Journal 34(3)

[21] Olson, D. (2004), Introduction to Information Systems Project Management, 2nd ed.,McGraw-Hill, New York, NY.

[22] Belout, A. and Gauvreau, C. (2004), "Factors influencing project success: the impact of human resource management", International Journal of Project Management, Vol. 22 No. 1,pp. 1-11.

[23] Horine, G. An Absolute Beginner's Guide to Project Management. (2005).].

[24] P.Soja, Success factors in ERP systemsimplementations, Journal of Enterprise Information Management, 19 (2006) 418-433.

[25] D. Aloini, R. Dulmin, V. Mininno, Riskmanagement in ERP project introduction:Review of the literature, Information &Management, 44 (2007) 547-567 .

[26] Bartis, E. and Mitev, N. (2007). The Effect of Strategic Alignment on Strategic Information System Planning (SISP) Success: An Exploratory Study in Public Universities in Malaysia. International Journal of Scientific Research in Education, 2, 76-87.

[27] Thomas, G. and Fernández, W. (2008) Success in IT projects: a matter of definition. International Journal of Project Management, 26 (7), 733-742.

[28] KANARACUS C (2008) Gartner: global IT spending growth stable. InfoWorldApril 3, 2008.

[29] DeLone, W.H., and McLean, E.R. Information systems success: The quest for the dependent variable. information Systems Research, 3, 1 (2008), 60–95

[30] Ika, L.A. (2009) Project Success as a Topic in Project Management Journals. Project Management Journal, 40 (4), 6-19. .

[31] Khani, N., Md Nor, K., and Bahrami, M. (2010), Factors Moderating the Relationship between IS Capabilities and Strategic Information System Planning (SISP) Success, 3 rd International GraduateConference on Engineering, Science, and Humanities 2010 (IGCESH2010), 2nd-4th November 2010,UTM, Johor

[32] Naser Khani, Iran Khalil Md Nor, Mojgan Bahrami Samani, Malaysia, MalaysiaHossein Hakimpoor, Islamic Azad University–Birjand,International Journal of Strategic Information Technology and Applications, 3(2), 1-17, April-June 2012 , Strategic Information, Strategic Information Systems Planning (SISP),An Empirical Investigation of Capability Factors AffectingStrategic Planning Success.

Bikram Pal Kaur is an Assistant Professor in the Deptt. Of Computer Science & Information Technology and is also heading the Deptt. Of Computer Application in Chandigarh Engineering College, Landran ,Mohali. She holds the degrees of B.tech. M.Tech, and M.Phil.. And is currently pursuing her Ph.D.in the field of Information Systems from Punjabi University, Patiala. She has more than 13 years of teaching experience and served many academic institutions. She is an Active Researcher who has supervised many B.Tech. Projects and MCA ,M.tech. dissertations and also contributed 12 research papers in various national & international conferences. Her areas of interest are Information System, ERP .

Dr. Himanshu Aggarwal, is Professor (Reader) in Computer Engineering at University College of Engineering, Punjabi University, Patiala. He had completed his Bachelor's degree in Computer Science from Punjabi University Patiala in 1993. He did his M.E. in Computer Science in 1999 from Thapar Institute of Engineering & Technology, Patiala. He had completed his Ph.D. in Computer Engineering from Punjabi University Patiala in 2007.He has more than 18 years of teaching experience. He is an active researcher who has supervised 15 M.Tech. Dissertations and guiding Ph.D. to seven scholars and has contributed more than 40 articles in International and National Conferences and 22 papers in research Journals. Dr. Aggarwal is member of many professional societies such as ICGST, IAENG. His areas of interest are Information Systems, ERP and Parallel Computing. He is on the review and editorial boards of several refereed Research Journals.