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Model Driven Information System for Strategic Managers in Small and Medium Enterprise (SME)

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***Abstract* - The Small and Medium Enterprises(SME) are experiencing business failures in most of the developing countries. This research has been conducted to serve as a consultant in re-designing information system plan for strategic managers. Improved Strategic Information System Planning (SISP) is the critical issue that Information System Executives and (Chief Information Officer) CIOs are facing today. The reason for this being that Information System Planning (ISP), be it strategic or not aims at identifying the most appropriate target for automation and afterwards to schedule installation. It has a great potential to make a huge contribution to businesses and organizations. Multimillion corporations spend about 5% of their gross income yearly on information systems and their supports. They spend a significant part of these funds supporting their enterprise databases. This is a philosophy of database system applications that enable corporations to research the past business processes, control the present, and plan for the future. A well developed ISP or SISP as the case may be will definitely help an organization to reach and actualize its goals since it will significantly impact on their strategies. However, failure to carefully carry out SISP can result to waste of expensive IS resources and lost opportunities**.

INTRODUCTION

Information management is getting daily more difficult and more important. With daily changes in technology one may be tempted to say, "Why bother trying to cope with these rapid changes"? But the truth remains that survival of modern businesses depends on technology. Therefore, the survival which means life or death of an organization is dependent on an effective planning of the organization's information systems, especially those that are strategic. Not minding the costly nature of information systems and even though most chief information officers (CIOs) can specify exactly how much money is being spent for hardware, software, and staff, the CIOs cannot however state with any degree of certainty why one system is being done this year versus next, why it is being done ahead of another, or finally, why it is being done at all. The fact is that designers do not see the benefits of rearranging Information systems development schedule and this is because, many enterprises do have a model-based information system development environment.

Background Studies

Not much has been written on Information System Plan/Planning. A few texts will simply define and give vague notions of Strategic information Planning. The reason for this may be because, there is no specific approach or method of information planning that can be term the best approach or method. The fact that many enterprises do not have model-based information systems development environments that allow system designers to see the benefits of rearranging an information systems development schedule has also affected many enterprises' business processes and eventually led to many business failures. As a result, it becomes difficult to answer the following questions:

- If an information system is purchased versus developed, what effect will there be on the overall schedule
- At what point does it pay to hire an abnormal quantity of contract staff to advance a schedule?
- What is the long term benefit from 4GL versus 3GL?
- Is it better to generate 3GL than to generate or to use a 4GL?
- What are the real costs of distributed software development over centralized development?

Not being able to answer these questions after applying or transforming them to other business components like manufacturing, distribution, marketing, accounting and research can cost a unit's manager his or her job. The answers to the above questions are very important. They need to be answered immediately, in a cost effective form that can be modeled and changed to respond to the unfolding realities of our modern world. The earlier practice in many big organizations was that they have a vague notion of the names of their existing information systems and the ones still under development, if the need arises for them to know any of these, they will simply convene a meeting of a few critical individuals who will then take inventory, confirm interactions and update accomplishment schedules. This is an ad hoc ISP. Such information systems plan could scale through just because, such firms have all their design centralized in perhaps one mainframe server, budgets are always increasing, schedules slipping and also, because information may not yet have been a critical edge then. Eras have past and business is really different in today's world. Budgets are decreasing, and slipped schedules are being cited as preventing business alternatives. New computing environment with

different operating systems, improved DBMSs, better development tools, telecommunications and network technologies (LAN, WAN, Intranet, Internet, Extra-net, Wireless and Fiber solutions), as well as advanced distributed hardware and software are now available. Rather than having centralized, long-range planning and management activities that address these problems, today's business units are using readily available tools to design and build ad hoc stop-gap solutions. These ad hoc systems do not only interconnect, support common semantics, or provide synchronized views of critical corporate policy, but are soon to form an almost impossible to comprehend confusion of systems and data from which systems order and semantic harmony must spring. Although the computing landscape becomes profoundly different and more difficult to comprehend, the need for just the right- and correct-information at just the right time is escalating because, "late or wrong information is worse than no information". There are a variety of approaches employed to resolve the paradox of information system planning though there is no best way to it. Information system planning (ISP) is an important part of Information system management (ISM). Some organizations apply more than one method or use different tools trying to achieve this.

METHODOLOGY

Types of information System planning

There are different types of IS planning corresponding to the different management levels of an organization. See Table below.

Horizon	**Focus**	**Issues**	**Primary responsibility**
3-5 Years	Strategic	Vision, Architecture, Business goals	Senior management CIO
1-2 Years	Tactical	Resource Allocation, Project Selection	Middle Managers IS Line Partners Steering Committee
6 Months – 1 Year	Operational/ supervisory	Project Management, Meeting Time and Budget Targets	IS professionals Line Managers Partners

Types of information System planning.

In this research, we concentrate planning information system for strategic managers who are faced with long term impact on the industry's growth and failures and in this strategic managers of SME. Strategic system planning deals with Planning for the use of Information systems and technology for strategic purposes. Strategic system planning is not an easy deal. It is difficult for some fundamental reasons. The major ones include; Top managers see strategic business goals as extremely sensitive. But strategic system plan must support and be aligned with business goals. The CIO, who is often not felt as a full top management member is left out of the inner circle which develop these plans thus making planning more difficult. Planning with a rapidly changing technology can be very difficult. The days where annual planning cycle takes a few months are gone. Now, the planning process forms a best available vision of the future on which to base current decisions. The technology has to be monitored to see if any changes will occur and ready to make adjustments if they do. A shift in emphases from project selection to portfolio development affects planning. A more sophisticated form of planning is required because projects are to be evaluated on more than their individual merits. Developing an industries infrastructure is extremely difficult since it involves huge capital. Infrastructural developments when needed, is often done collectively, the challenge becomes developing improved applications that improves over time. For example, if the CIO as part of infrastructural development advises management to change from a peer – to- peer to client server architecture and fails due to fund, the planning process become more difficult. It is easier to do something alone than getting a coalition to

do it. System planning as we seen earlier involves the CIO, CEO and other top manager as such making it difficult to achieve. A variety of other planning issues abound. Some of these may be the tension of deciding the approach to adopt. Information systems managers need a model of their information systems environment. A model that is malleable. As new requirements are discovered, budgets modified, new hardware/software introduced, this model must be such that it can reconstitute the information systems plan in a timely and efficient manner.

A quality ISP must exhibit five distinct characteristics before it is useful. These five are presented in the table that follows.

Characteristic	Description
Timely	The ISP must be timely. An ISP that is created long after it is needed is useless. In almost all cases, it makes no sense to take longer to plan work than to perform the work planned.
Useable	The ISP must be useable. It must be so for all the projects as well as for each project. The ISP should exist in sections that once adopted can be parceled out to project managers and immediately started.
Maintainable	The ISP must be maintainable. New business opportunities, new computers, business mergers, etc. all affect the ISP. The ISP must support quick changes to the estimates, technologies employed, and possibly even to the fundamental project sequences. Once these changes are accomplished, the new ISP should be just a few computer program executions away.
Quality	While the ISP must be a quality product, no ISP is ever perfect on the first try. As the ISP is executed, the metrics employed to derive the individual project estimates become refined as a consequence of new hardware technologies, code generators, techniques, or faster working staff. As these changes occur, their effects should be installable into the data that supports ISP computation. In short, the ISP is a living document. It should be updated with every technology event, and certainly no less often than quarterly.
Reproducible	The ISP must be reproducible. This implies that when its development activities are performed by any other staff, the ISP produced should essentially be the same. The ISP should not significantly vary by staff assigned.

Characteristics of a Quality ISP

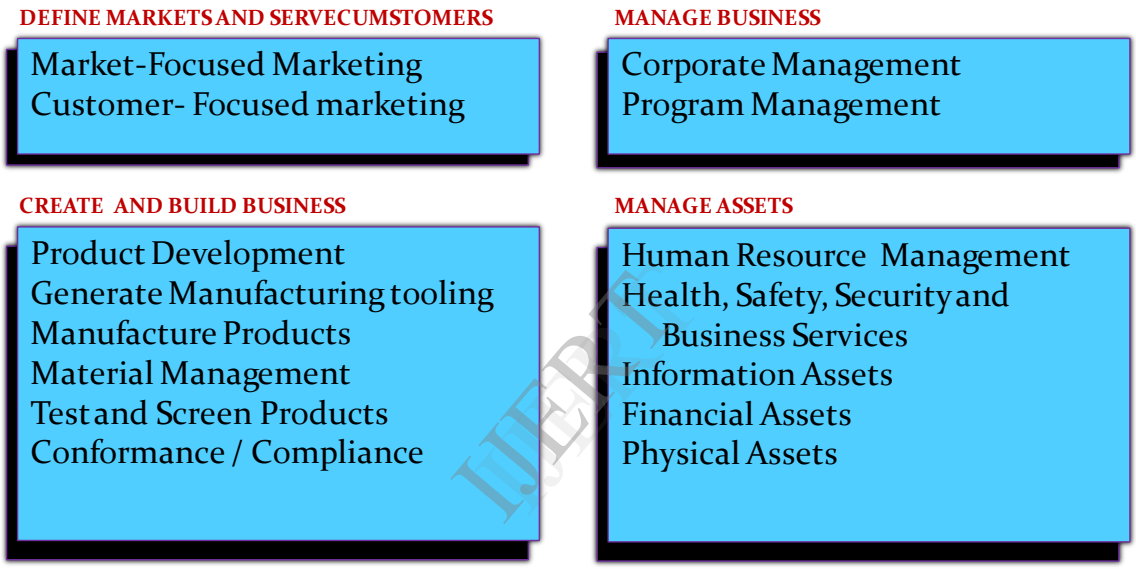
INFORMATION SYSTEM PLANNING DESIGN

Whenever a proposal for the development of an ISP is created, it must be assessed against these five characteristics. If any fail or not addressed in an optimum way, the entire set of funds for the development of an ISP is risked. A variety of other planning issues abound. Some of these may be the tension of deciding the approach to adopt. Having shown the difficulties and the importance of ISP, it becomes very valuable to have a methodology or framework of developing an ISP. Over the years a number of approaches have been developed to help system managers do a better planning. Seven different approaches exist, with different views of information system planning. Some see ISP as the assimilation of organization's IT needs, other methods concentrate on defining information needs, while the rest discuss categorizing application systems. The seven planning approaches are: Stages of Growth, Critical Success Factors, Investment strategy, The Scenario Approach to Planning, Linkage Analysis Planning, Creative Problem-Solving Approaches and Enterprise Planning Of these seven different framework/approaches and tools for ISP, we are going to apply Enterprise Planning Approach for the re-designing of Information System Plan for SME strategic management. I choose this approach because, I have earlier stated that one of the problems of enterprises including SME which happens to be our case study is the absence of a model-based information systems development environments that allow system designers to see the benefits of rearranging an information systems development schedules. Enterprise modeling involves focusing on at the enterprise level by combining different techniques and approaches which is more or less like using a general planning technique. The issues to be addressed in SME's case study are important to virtually all business today. A redesign of the SME enterprise model will position it to address four important issues: Reshaping business process through IT, Aligning IS and corporate goals, Instituting cross-functional systems and Utilizing data

Redesigning the ISP Using Enterprise Modeling Methodology

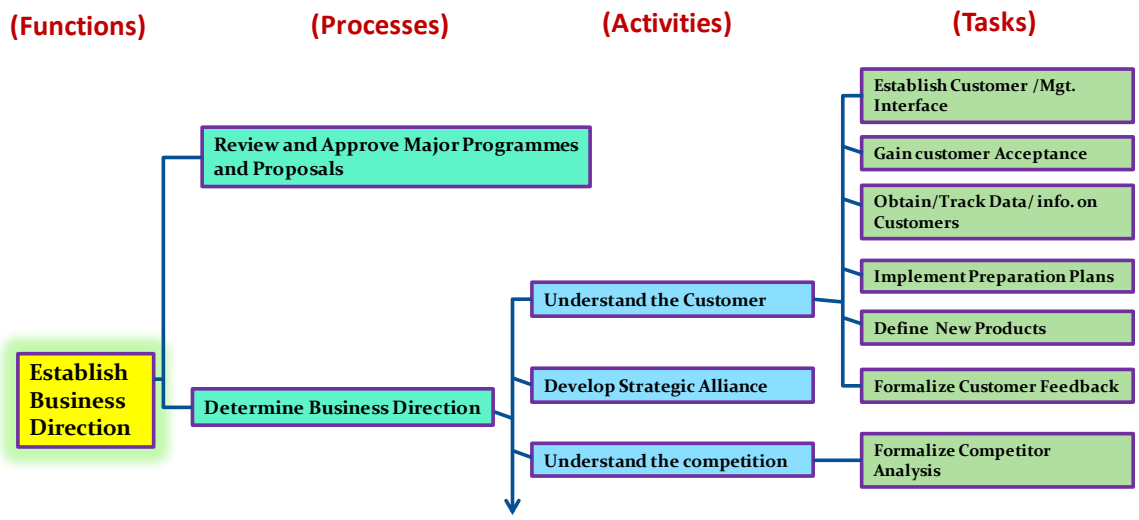
The technology will focus on target business process rather than data. This will imply subdividing the enterprise into functional units by seven levels of business hierarchy.

With the business processes understood, the methodology will call for understanding and documenting the target process interrelationships. Following this, the implementation view point will be linked to the process by mapping the processes to information systems and then defining the interrelationships between systems via target system architecture. Finally, identifying and ranking the differences between the target model and current environment. This step will indentify the environmental changed required for industry XYZ to reengineer its business. Involves focusing on at the enterprise level by combining different techniques and approaches which is more or less like using a general planning technique. The issues to be addressed in SME's failure case are important to virtually all business today. The reengineering work would be performed by various teams specified in the diagram above. To choose these teams, MIS will collaborate with the industry's vice president of operations to prototype a new methodology and functionally decompose the company's overall business into major enterprise and business segments as show in the figure below. About six employees have to be integrated into the teams by the senior management. Team members represented in diverse cross-sections so that all management levels will be included. The teams will have to meet four times and taking different steps in each of the meetings.



Decomposed company's overall business into four major segment

The Hoshin methodology (a Japanese business improvement technique would be adopted to help produce more effective result). The business segment teams resulting from the decomposition of the overall enterprise will have to identify their target business activities and group them according to their natural relationships to each other. Here applying the Hoshin planning affinity diagram which is an excellent tool would be of great help. This process will allow each member to participate equally and be able to create Business Process Heading for each group. The bases of the next step would be formed by the result of this first step. During this second meeting, each team should refine the business processes catalogued in the resultant affinity diagram of step 1. this meeting will involve a brainstorming session and will require the teams to arrange business activities into a tree diagram for each business function. This process will complement the affinity process by identifying missing or misplaced business activities.



Tree diagram for SME establish business directions" function of the corporate management business segment

The aim of this third session is for each segment team to identify the information flow between the segment's varied business processes as well as to other business segments. By this meeting the business segment teams will apply the Hoshin planning matrix to map the business process to the various systems that may support them. Completing the planning design process, the generated affinity and tree diagrams for each segment which would be derived from a completed process knowledge base represents the ideal systems architecture to meet SME needs. While these steps are applied, the following criteria would guide each team's recommendations for the ISP. Company's goals that will be met, Magnitude of problems that will be solved, Integration advantages, Logical sequence of changes, and Benefits that will received

RESULTS

Implementing this enterprise model at SME will dramatically change the way SME plans for process and system changes. The model will provide the foundation for building Long-range MIS plans and will facilitate alignment of the MIS department (the Strategic Managers) with SME needs. This new focus will eventually maximize the return on its IT investment and provide for the managers a concise, timely and accurate information to support executive management decision making. The model will also enhance team work, among cross-functional teams, communication and mutual understanding. Understanding a company's business processes and capability is the first step to achieve customers satisfaction. This will definitely provide tangible paybacks. In summary, any technique employed to achieve an ISP must be accomplishable with less than 3% of the IT budget. Additionally, it must be timely, useable, maintainable, able to be iterated into a quality product, and reproducible. IT organizations, once they have completed their initial set of databases and business information systems will find themselves transformed from a project to a release environment. SISP's target is to provide an Improved Business Process and an Improved business Communication under Approved Database Technologies, Approved Process technologies and Approved Interface Technologies. The continuous flow environment then becomes the only viable alternative for moving the enterprise forward. It is precisely because of the release environment that enterprise-wide information systems plans that can be created, evolved, and maintained are essential.

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