Keywords: IS/IT Planning and Alignment, Market Push-Pull Approach, Organization Value Proposition, Strategic Organization Performance, Value Proposition

INTRODUCTION

In the present day dynamic and intense competition, service oriented architecture and lean manufacturing has taken off as an important platform to reposition the organization. As evidenced by a McKinsey survey of CIO agenda for 2007 a trend of migration towards service oriented architectures and lean manufacturing which embraces a global standard for interactions with both internal and external partners (Akella et al., 2006) was identified. These interactions of the inter and intra partnerships were also defined by Viswanathan’s (2006) white paper that recommended the need of a move towards a single plan that is truly cross-functional with a multi-dimensional process that includes all elements of demand, supply and financial analysis in relation to the business planned goals and strategies with technology as the enabler of matching the market and the firm interactions. The multi-dimensional processes interlinking all internal and external players’ emphasis on inter-disciplinary internal players of marketing, sales, finance and operations to manage the processes and increased collaborations with customers and support them with the right metrics is an imperative. LaValle and Scheld’s (2004), “2005 CRM Done Right Executive Decision Maker” research and IBM’s
advocacy in the customer focused enterprise (Hefferman & LaValle, 2006) discussing these interplays and inter linkages in support of the above is evidenced by:

- Decision makers’ emphasis on delivering on promises and improving the customer experience with 30% agreeing that ensuring promises and improving total customer experience are top concerns.
- Most companies having shortcomings in understanding their customer experience with 26% being superficial and 53% having generalized understanding.
- Marketplace leaders seeing real returns with 79% of consumers committing to a deeper product or service relationship with a brand after a satisfying experience due to the focus on the customers. 74% of the customer experiences are in the tactile/operational aspects that emphasized on the physical qualities of the interactions like consistency, availability or convenience. Only 17% focused on the emotive aspects that are more intangible and subjective like trustworthiness, genuine or emphatic actions.

In a Special Issue on “Impact of Information Systems on Market Structure and Function: Developing and Testing Theories”, Clemons, Kauffman, and Dewan (2008), reflected on the motivation to innovate, look for new and interesting ways to inform managerial decision making in various contexts. The leverage of new uses of technology has challenged some of the fundamentals and beliefs of the management scientists and business professionals which are reshaping the market space. The trend of information technology in playing a key role in the creation and exploitation of opportunities for innovative competitive strategy (Clemons, Kauffman, & Weber, 2009) is to bring together and narrow the gap and the buyer-seller relationship. Basically, market space is about the extent to which products are customized to meet the needs and desires of a firm’s customers (Clemons, 2008; Mithas et al., 2007; Weber, 2008). In an interview with Erik Brynjolfsson of MIT (Hopkins, 2010), he noted that technology advances are not just innovations in itself but also a process enabler for innovations. The real power is in the combination of the new innovation processes of measurement, experimentation, sharing and replications in a sequence, and the use of analytics brings about faster cycle time, productivity and higher metabolism for information processing.

The focus on the interplays of the internal and external players and inter linkages to meet the customers’ requirements defined the trend of the firm leaning heavily towards customer focus (Hefferman & LaValle, 2006; LaValle & Scheld, 2004), customer orientation (Kohli & Jaworski, 1990; Deshpandé & Webster, 1998; Narver & Slater, 1990; Deshpandé et al., 1993). The key issue is whether the traditional approach to IS/IT development and deployment (Lederer & Gardiner, 1992; Lederer & Salmena, 1996; Rogerson & Fidler, 1994; Gliedman & Brown, 2004; Burn, 1991; Martin, 1989; Premkumar & King, 1994; Lau & Pun, 2000) as discussed in the literature is still a valid approach.

Akella et al. (2006) and Viswanathan (2006) noted that interactions of internal and external partners are cross-functional with a multi-dimensional process aiming at ownership of a more dominating presence of the market space. The issue would be whether the firm is properly aligned with the customer’s focus and whether the IS/IT resources are actually well positioned to create and deliver on the value proposed. Based on this, the objective of this paper is to explore a market driven IS/IT planning model that reconciles the market’s focus with the firm’s push of its product and service offer that creates and delivers on the customer value proposition through the deployment of the IS/IT as enablers that are aligned with the cross-functional and multi-dimensional aims. This is important as the organization is an organic interaction and requires an inter-play of all functional aspects of its operational systems and sub-systems to achieve the same goals. This paper will look at the interplay of the internal and external forces by developing
a customer driven approach towards a customer driven IS/IT Planning Model that reconciles the enabling technology with that of the customer focus and needs.

**Information Systems and Information Technology Planning Literature**

The following sections will discuss the main IS/IT Planning literature, and customer focus literature and tries to build a linkage across the two major set of literature in the later sections. In the literature of Lederer and Gardiner (1992), Lederer and Salmena (1996) and Rogerson and Fidler (1994), the success of an organization depends heavily on the total strategic planning of the information system, technically called the SISP (Strategic Information System Planning) of which the 7 main constructs are:

- The external environment;
- The internal environment;
- The planning resources;
- The planning processes;
- The information plan;
- The implementation of the information plan;
- The alignment of the information plan with the organization’s business plan.

Based on these constructs and corporate development methodologies of Burn (1991); Martin (1989); Premkumar and King (1994); Lau and Pun (2000), 3 key questions need to be answered when developing the SISP as follows: 1) how to make a stable SIS in the face of changing needs; 2) defining a strategic plan for design and development; and 3) evaluating the impact of the SIS on sustaining competitiveness with a model that emphasized on determining the strategic prerequisites and strategic directions.

Gliedman and Brown (2004) identified 4 steps of aligning the business and Information Technology plan as: Gather relevant business factors; Gather relevant factors; Determine the key value proposition for the overall IT portfolio; and Prioritize. Similarly, Williams (1997) identified the 4 aspects of planning as:

- Identifying the strategic objectives;
- Identifying the information systems to support them;
- Analyzing, in detail, the information systems requirements;
- Allocating resources and budgets to schedule projects.

A more recent framework calls for the use of the IT strategy maps for aligning IT and business strategies as adapted from the Balanced Scorecard of Kaplan and Norton (Symons, 2005). This means that a management information system presupposes modeling the entire management processes and activities to create and deliver on the value proposition thereby tailoring all the components of information technology to meet the needs of the organization (Kettunen & Kantola, 2005).

**Information Systems (IS) and Information definition**

Duff and Assad (1980) provided a traditionally adequate definition of IS as “a collection of people, procedures, a base of data and (sometimes) hardware and software that collects, processes, stores and communicates data for transaction processing at operational level and information to support management decision making”. Even though Salton (1975) argued that a computer system can be an information retrieval system, a question-answering system, a database system, a management information system and a decision support system, this paper takes only the MIS stance that highlighted the 3 roles of IS as automate, informate and transformate (Schein, 1992; Zuboff, 1988).

Argris (1991) defined MIS as “a system using formalized procedures to provide management at all levels in all functions with appropriate information based on data from both internal and external sources, to enable them to make timely and effective decisions for
planning, directing and controlling the activities for which they are responsible”. It will be noted that the emphasis was on “all functions” as a system as noted by Kempner (1976) of the organization as a pattern of ways engaging in a complexity of tasks, inter-relating to each other in the conscious and systematic establishment and accomplishment of mutually agreed upon purposes. The fact that the data is from “internal and external sources” means that these internal environmental requirements should be aligned with the external requirements to reach a mutually acceptable arrangement. In reaching this arrangement, Adeoti-Adekeye (1997) noted that the problems facing a successful MIS are a composite of organizational, behavioral and technical issues and key barriers of non-integrated applications and internal politics.

Clemons (2008) also noted that information availability has increased consumers’ informedness, the degree to which they know what is available in the marketplace, with precisely which attributes and at precisely what price and this informedness has altered the demand side of market behavior. The study of Dedrick, Xu, and Zhu (2008) supports Clemons’ (2008) study of the buyer-supplier system integration that showed positive relationship between number of suppliers and electronic procurement for custom goods is negatively moderated by deeper buyer–supplier system integration. This implies that such integration can help buyers obtain better “fit” for their customized requirements, an alternative to increasing fit by employing more suppliers as proposed in the extant literature. Sunil, Rahul, and Tridas (2009) developed a game-theoretic duopoly model to analyze the competitive interaction of information personalization and product differentiation. Their findings showed that both firms have an incentive to personalize their products in equilibrium when the costs of providing quality and the costs of product misfits are low. It also showed that one firm’s personalization strategy does not necessarily guarantee a higher profit than the other firm, only a higher profit than the alternative of both firms not personalizing. These extant research and trend practically do support the contention of developing an IS meeting customers’ needs as proposed in this paper.

The MIS as a system is to generate information and it is Zorkoczy’s (1981) definition of information, “as the meaning that a human expresses, or extracts from representations of facts and ideas by means of known conventions of the representation used”, that is used in this paper.

Performance Management of the IS/IT

It is inevitable that all firms have to assess whether the investments are beneficial to the firm and help the firm achieve its stated goals and objectives that result in an enviable and coveted competitive position that it aims to stake out in the industry. As the IS/IT is a key enabler that generates both tangible and intangible benefits of allowing the firm to access information to make decisions, affecting its efficiency in its resources allocation and uses through cost reductions (Dirks, 1994), the determination of the measures is important and should be measured.

The present literature focus in the IS frameworks is on the combination of hardware, software, communication networks, transformational or transactional applications measures (Weill & Broadbent, 2000). As stated by the American Productivity & Quality Center (APQC, 2007) “Traditional benchmarking in IT has been around technology silos such as desktop, mainframe, operating systems, and networking”. They still lean towards the hard measures as indicated in the quantitative IT measures of the Open Standards Benchmarking Collaborative Database of APQC (2007) with emphasis on the IT functions and processes in terms of costs, productivity, efficiency, and cycle time. The main benchmarks are:

- Manage the business of IT;
- Develop and manage the IT customer relationships;
- Develop and manage business resiliency and risk;
• Manage enterprise information;
• Develop and maintain IT solutions;
• Deploy IT resources;
• Deliver and support IT services;
• Manage IT knowledge.

These benchmarks cover the productivity aspects of the IT but not the real “soft” measures of capacity and capability which are critical to the success of IS/IT. It should be recognized that success in IS/IT is in the utilization that falls on the competency aspects of the human capital, information capital and organization capital as opposed to “having” the resources in the functions and processes.

The main questions of “measuring the value of IT” and “evaluating IS performance” have been dealt with extensively in Kueng et al. (2000) that compared current value with historical values. Heo and Han (2003) used a contingent evaluation approach to evaluate the impact of IS on Business Performance. Ives et al. (1988) looked at IS effectiveness and satisfaction while Ranganathan and Kannabiran (2004) touched on IS effectiveness and satisfaction, the IS role and overall business performance. But based on the literature above, it appeared that the “systems” approach of inter-linking the functional aspects of the organization to meet the market needs should be addressed by identifying what and how the functional areas relate to each other to create and deliver on the market value. The main soft measures of the capability and capacity of the utilization of IS/IT and meeting market needs is still in the early stages of being determined.

Rationale of Market and Firm Reconciliation

(a) Market Pull

The marketing concept could be traced back to the early works of Drucker (1954), Felton (1959), Keith (1960), Hise (1965), Levitt (1969), Barksdale and Darden (1971), McNamara (1972), and Kotler (1977) that believed a corporate state of mind and a fundamental business philosophy guiding and coordinating the operations of the entire organization. The inherent concepts marked the beginning of market orientation focused on the customer with products or services offered based on an understanding of customer preferences and business activities organized to create customer satisfaction and loyalty by satisfying their needs. Kohli and Jaworski (1990) conceptualized market orientation as “the organization-wide generation of market intelligence pertaining to current and future needs, dissemination of the market intelligence across departments, and organization-wide responsiveness to it”. These distinct customer-focused culture (Deshpandé & Webster, 1998; Narver & Slater, 1990; Deshpandé et al., 1993) have three fundamental components: customer orientation, competitor orientation, and inter-functional coordination that are not exclusive of all other stakeholders such as owners, managers, and employees. The customers’ needs are driven by their inherent needs. The consumption of the products and services are the benefits or value derived from the consumption. This consumption is subject to the customers’ willingness to pay for the perceived value or customer delivered value (Kotler, 1999), or customer benefits (Kotler, 2001) or customer value (Gale, 1994), that the customers deem appropriate to satisfy their needs. If the perceived value does not match with their needs, the search for a substitute will be initiated. Conlon (2006) quoted Chip Bell, author of several best-selling books on customer service, which stated that in delivering great customer experience, it is not just about meeting customer’s needs and expectations, but about meeting their hopes and aspirations based on engagement (listen to understand), enlistment (make the customers feel like partners), enlightenment (integrate service and learning), empowerment (help customers feel confident and secure), enchantment (create a magical experience), entrustment (affirm that there is trust in the relationship), and endearment (connect with passion).
(b) Customer Value Proposition

The key to being customer driven is to understand the components of the value sought. Some of the main definitions are:

Kotler (1999): Customer Delivered Value is Total Customer Value – Total Customer Cost whereby TCV is a function of \( \{ \text{Product Value, Service Value, Personnel Value, Image Value} \} \) and TCC is a function of \( \{ \text{Monetary Cost, Time Cost, Energy Cost, Psychic Cost, and Opportunity Cost} \} \).

Kotler (2003): included the relationship dimension in the original equation as: Customer benefit = \( f(v, b, r, c, t) \) whereby \( v \) is Value of Market value, \( b \) is Value of Brand, \( r \) is Value of Relationship, \( c \) is Cost of Market Offering and \( t \) is cost of time.


The components of the value equation are ultimately the decision to consume culminating in the value derived. This means that all the organizational systems must be aligned towards the maximization of the value at the minimal cost. The firm must define what its value proposition to the customer is. Kaplan and Norton (1996, 2001, 2004) and Treacy and Wiersema (1995), identified 4 sets of value that an organization can propose to the customers as different value proposition has different customer objectives as shown in Figure 1.

Since there are 4 sets of value propositions, for each of the value proposition and its corresponding objectives, the emphasis on the different components of the value equation is different. If an organization chooses Product leadership, it must excel in product quality and maintain its minimal industry standard in the other components of service quality, image and relationship. This would mean that the firm must excel (has distinctive competency over its nearest competitor) in the operation management of: Flexible robust processes; Supply capacity for rapid growth; Rapid introduction of new products; and In-line experimentation and Improvement as defined in Figure 2. At the same time, the firm must also maintain the minimal industry standards of flexibility, service, partnership and brand through its customer management of customer selection, acquisition, retention and growth (Figure 3), as they should be aligned based on the value proposed.

Figure 1. Customer objectives for different value propositions

<table>
<thead>
<tr>
<th>Best Total Cost</th>
<th>Product Leader</th>
<th>Complete Customer Solution</th>
<th>System Lock-in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offer Products and Services That Are Consistent, Timely, and Low-Cost</td>
<td>Products and Services That Expand Existing Performance Boundaries into the Highly Desirable</td>
<td>Provide the Best Total Solution to Our Customers</td>
<td>High Switching Costs to End-Use Customers</td>
</tr>
<tr>
<td>Lowest-Cost Supplier</td>
<td>High-Performance Products: Speed, Size, Accuracy, Weight</td>
<td>Quality of Solutions Provided</td>
<td>Offer Broad Selection of Industrial and Consumer Goods</td>
</tr>
<tr>
<td>Consistently High Quality</td>
<td>First to Market</td>
<td>Number of Products Delivered per Customer</td>
<td>Provide a Whole-Used Solution</td>
</tr>
<tr>
<td>Speedily Purchased</td>
<td>Promote New Market Segments</td>
<td>Customer Retention</td>
<td>Provide in-Use Solutions to a Whole-Used Solution</td>
</tr>
<tr>
<td>Appropriate Selection</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A case study of Motorola (Gupta, 2004) in the early 90’s shows that they were the best in product leadership through near perfect defect free product as the leading proponent of its Six Sigma imperatives. But they lost sight of market needs, and they lost out to Nokia’s more innovative products with Nokia gaining more that 35% global market shares dominance of the mobile phones. In late 2004, Nokia lost 3% of its global market shares to the Korean's Samsung brand that was trendier and in keeping with and meeting customers’ needs. In its achievement, Nokia innovativeness lagged in meeting the customers’ needs as was the case of Motorola in the 90’s. But in the late 2005, both Motorola and Nokia unleashed completely new series more attuned to the customer needs but they could not keep up with needed innovations to meet customers’ value needs and requirements and this had affected their standing as of 2010. This emphasized the need that in excelling in a staked out value proposition on which the firm must excel; it cannot afford to ignore or under-perform in the other components of the value equation, whereby it must maintain the industry benchmark to sustain its competitiveness.

What and how the firm identifies the value proposition are dependent on the firm’s market research system and market intelligence system to survey the competitors’ value offers leading to the economies of knowledge through data-mining technologies that culminate in the market wisdom. This is the ultimate competent curiosity that is an inquisitiveness about happenings in its markets that are of current and future importance, coupled with the ability to satisfy that curiosity with timely, relevant, reliable, accurate and cost-effective information and competent wisdom that concerns the ability to translate information into effective action by doing the right thing (EFFECTIVE) and doing it right (EFFICIENCY) as propounded by Barabba and Zaltman (1991). The imperative is market wisdom of customers’ needs.

Figure 2. Strategy map template for product leadership

Figure 3. Leader and growth strategies for customer management

<table>
<thead>
<tr>
<th>Financial Perspective</th>
<th>Productivity Strategy</th>
<th>Long-Term Shareholder Value</th>
<th>Growth Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve Sales Productivity</td>
<td>Expand Revenue Opportunities</td>
<td>Enhance Customer Value</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customers Perspective</th>
<th>Customer Value Proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>Quality</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal Perspective</th>
<th>Customer Value Proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding segments</td>
<td>Communicate value proposition</td>
</tr>
<tr>
<td>Screen unprofitable customers</td>
<td>Customize mass marketing</td>
</tr>
<tr>
<td>Target high-value customers</td>
<td>Acquire/covert leads</td>
</tr>
<tr>
<td>Manage the brand</td>
<td>Develop dealer networks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human Capital</th>
<th>Information Capital</th>
<th>Organization Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market research</td>
<td>Customer database</td>
<td>Customer-focused culture</td>
</tr>
<tr>
<td>Profitability analysis</td>
<td>Customer analytics</td>
<td>Personal goal alignment</td>
</tr>
<tr>
<td>Marketing communication</td>
<td>E-polling/sampling</td>
<td>Best-practice sharing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer Intention</th>
<th>Customer Growth</th>
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</thead>
<tbody>
<tr>
<td>Call center protocols</td>
<td>Cross-selling</td>
</tr>
<tr>
<td>Product line knowledge</td>
<td>Solution selling</td>
</tr>
<tr>
<td>Product line knowledge</td>
<td>Partnering/integrated management</td>
</tr>
<tr>
<td>Problem resolution</td>
<td>Customer education</td>
</tr>
<tr>
<td>Customer feedback</td>
<td></td>
</tr>
</tbody>
</table>


(c) Firm Push

The firm’s strategic position in the market industry is defined in the organization’s vision (what it wants to be), its mission (what it can be based on its capabilities and capacity), its organization’s goals and objectives that are translated into operational marketing goals and objectives, and its strategies to achieve what it wants to offer and is willing to offer. This calls for the market’s needs to be reconciled with the firm’s needs as the firm should clearly define its position that it wants to stake out. The organization’s reconciliation of the market’s pull and the firm’s push is the bottom line of the market orientation of the organization which is the firm’s aims for profit rather than sales volume as the motivation behind its marketing activities (Barksdale & Darden, 1971). The firm’s competitive strategy is defined by the value it intends to propose to the customer. If it chooses to use Product Leadership as the strategic theme, its operational template would be similar to that shown in Figure 2.

According to Kaplan and Norton (1996, 2001, 2004), the Product Leadership value proposition’s objective is “Products and Services that expand existing performance boundaries into the highly desirable” by excelling in being the first to the market with a high performance product that outperforms its nearest competitors or reaching new market segment. In terms of its service quality, image and relationships, it must not under-perform but should maintain a close parity with the industry standards as defined by the buying criteria of the market.

What is important is the imperative of the internal processes being able to create and deliver on the product leadership value as proposed. The internal processes of operation management, customer management, innovation management and regulatory and social management actually constitute the value chain activities that add value to the final product or service offer. The strategic cost component
of each activity is used as an indicator of the overall cost that contributes to the overall value equation. Pepper and Rogers’s white paper (2006) emphasized the imperative of striking a balance between cost-efficiency (lower-cost to serve) and customer effectiveness (a satisfying customer experience) through: considering all the economics; treating customer differently; letting the technology do the work and turning self-service into a customer insight machine. As shown in Figure 2, different value propositions will require different composition of key activities. With the processes and its activities and sub-activities defined based on the value proposition, the firm’s capital assets can be aligned with the internal processes as shown in Figure 3. The internal perspective of customer management has 4 main sub-activities of selection, acquisition, retention and growth and Figure 3 shows the inter-relationships required by the firm in managing its customers.

What is important is that different activities will need different type of human capital competency, information needs and organizational systems. Once these are identified, the 3 sets of intangible capital assets of human capital, information capital and organization capital are inter-dependent as they are inter-twined together to use the processes and its activities to create and deliver on the value proposed to the market. It must be noted that these 3 sets of intangible capitals form the foundation of achievement of the market position as envisioned and propounded in Teay (2007) as they form the capacity and capability of the organization that must be managed to implement the market strategies successfully to achieve its market position.

The crux is the alignment of the capital assets of the firms used in the processes to create and deliver value as proposed to the market. The cause-effects linkages should be strategically mapped out and everyone in the organization should know what and how to contribute to the final product or service value as demanded by the market. This highlights the key link of the reconciliation of the firm’s push with the market’s pulls that brings about a mutually amicable and satisfactory exchange between the firm and the market as shown in Figure 4.

**Market and Customer Driven IT Planning Model: An Alternative**

(a) Market Pull Imperatives

In planning for an IT system, Leek (1997) recommended a top-down holistic view of the IT functions as “supplying” to the “demands” of management with a cycle of activities of the business strategy influencing the information systems function. To better understand the planning and management of the IS, Williams (1997), contended that there are 3 information systems culture: Innovator – actively pursue IS development and not regard cost as an obstacle; Follower – concentrate on efficiency of the system with tight cost control; and Dinosaur – try to save costs with minimal investment and develop IS based on a specific competitive strategy. This culture, the business life cycle and management

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*Figure 4. Reconciliation of the market pull and firm push*
level (strategic, tactical and operational) will interact to form complex decision parameters in the design of the information systems.

For the new age information and market driven economy, being a follower and a dinosaur could lead to the consequences of market share deterioration and losing out on future customer support, satisfaction and loyalty. Based on the issues identified and the rationale of the reconciliation of the market pull and the firm push, this paper will propose an IT planning model that also takes into consideration the power and effect of the customer on the design and deployment of the IS/IT to ensure that the IS/IT as enablers are used effectively to create and deliver on the value as needed by the market.

These calls for the market pull equation and the firm push equation to be balanced and equated is shown in Figure 5. The common ground is found in the value proposition of the firm to the market that results in the customer value to meet and satisfy needs. First and foremost, customer needs must be defined through researching and understanding of the benefits or value that the customers seek in the consumption of the product/service offered. This will result in the Step 1 of the market pull equation which is defining and understanding what the customers want and is willing to pay for. In Step 2, the market pull is operationalized by the Gale (1994) equation of $Customer\ Value = f(Product\ Quality,\ Service\ Quality,\ Relationship,\ Image)/Cost$. The sub-components of the value are broken down into various aspects that can be traced back to the firm’s operational processes (its value chain) that create and deliver on those sub-components of the value equation.

Case Study Implication 1

In developing the E-QMS, key stakeholders of university (in market terms – the university is a fully fledged service organization whereby the creation and delivery and consumption of the intensive, interactive and intangible service elements of teaching, learning, research and community services) were identified. The needs of the primary stakeholder of the students and the secondary stakeholders of parents, alumni, employment market and the government forces (the Ministry of Higher Education and the NCAAA). Government regulations and market research identified the generic needs for education quality to build the “total student” who is intellectually, physically, emotionally, ethically and spiritually sound. This is created and delivered through “education excellence” that became the aligned theme of the business and IT strategies of the institution. This constitutes Step 1 of the market pull equation for the institution.

In Step 2, the benefits that the stakeholders required of “education excellence” can only be created if the institution identified the components of the value proposition that it intends to offer to the stakeholders. “Education excellence” would be the differentiating product leadership value to be proposed. The education product quality component is a composite of: quality student, quality and innovative instructions through a qualified and competent group.
of instructors within the quality infrastructure and service that constitutes the service quality component of the environment conducive for teaching-learning. On the image component, the half century old “brand” of the institution was an established icon in the educational systems in the schools and universities arena and is ranked in the THE QS Times and Shanghai Jiatong Rankings. On the cost to the buyer, the institution’s costs of: price, search, time, energy, opportunity and psychic costs were irrelevant as education at all level is government funded. Overall, the value proposition to the stakeholders had consistently led to it being a first choice for a program of study in the higher education sector in the Kingdom.

(b) Firm Push Imperatives

On the firm push equation, the firm would have defined its reason for existence through its strategic perspectives of its firm’s vision, firm and market mission, its goals and objectives and its strategies that represents the “what and how to do” of achieving its staked out market position in the industry.

After more than 52 years in existence, the theory and practice of the management systems in the institution were disparate as it has been following the public enterprise model which is bureaucratic and hierarchical. The existing governance was revamped in 2009 when it began its new strategic drive as directed in its

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Figure 5. Market-driven IT planning model
2030 Strategic Plan. Figure 6 showed that in practice, the key basic systems of planning, quality assurance and its information systems were not aligned as should be in Figure 7.

To ensure that its firm push is reconciled with the market pull, Step 1 of Firm Push undertaken by the institution was to take a step back to use its existing vision and mission to redefine its 20 Year Strategic Plan 2010 - 2030 that defined 6 building blocks reflecting six strategic themes to achieve its strategic direction of education excellence as shown in the following Figure 8.

Based on its redefined strategic building blocks, the institution had clearly defined what it wants to offer and is willing to offer which is “education excellence” which is aligned with the market pull’s requirement of quality education of its primary and secondary stakeholders. In Step 2, in defining its firm’s push, the institution had laid down a strong strategic direction to all the colleges and administrative units that must align their strategic plan with that of the institution.

In Step 3, the institution’s design of the market driven IT planning model of the university management to achieve its strategic theme of “education excellence” is the product leadership value proposition with two of the most basic strategies being the productivity strategy and the revenue growth strategy. The productivity strategy was aimed at the consolidation of resources through its synergy across the different schools. These are aimed at achieving cost effectiveness and improvement of the core and support processes as shown later in the redesigned statistics, information and documents (SID) collation and consolidation of data and information to support faculty teaching-learning-research, community service, counseling of the students and planning and management of the schools and curriculum.

**Case Study Implications 3**

In Step 4, based on the requirements of the external audit by NCAAA, the institution developed an integrated performance management system to ensure that all the key processes are aligned together to achieve the value proposition of the institution. The outcome is the Integrated QMIPS (Quality Management, Information and Planning Systems) that is developed to ensure that the output of one system becomes the input to the other systems. To achieve the strategic direction of managing academic qual-

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*Figure 6. University management in practice*
ity and research achievement and creating and strengthening the teaching-learning processes, the 3 core systems of the QMIPS (Teay, 2007) developed are:

- **QMS (Quality Management System Model)**: This system forms the core of the quality management system of the institution based on the 11 sets of Standards and 58 sets of criteria of NCAA Standards and assessment criteria. In order to address the NCAA accreditation requirements, the university set up its own IQA (Internal Quality Assurance) system using the NCAA requirement as the blueprint, but added its own 22 generic and college sets of KPI (Key Performance Indicators) and its own assessment approach adapted from the Baldrige Model of the US for organizational excellence.

- **IMS (Information Management System)**: The IMS forms the core of the information and statistics management system of the university to ensure that the audit and assessment affecting the planning and decision making of the units are supported by an evidence-based mechanism. The units can retrieve the rich database of the university ICT system to serve the needs of all the
internal and external stakeholders through a consolidated set of data and evidence as processed by the E-QMS. The data set constitutes the SID (Statistics, Information and Documents) which is the core of the fact based and evidenced based quality assurance system established as the IQA.

- **PMS (Planning Management System):** The PMS forms the core of the planning system of the university. The main objective is to ensure that all the 5 main management reports to be generated by the E-QMS are streamlined, are coherent, are consistent and are aligned with each other. It also aims at ensuring that planning at all levels is based on concrete data and evidence.

The key linkages as shown in Figure 9 (Integrated Curriculum QMIPS) and Figure 10 (school or institution Integrated QMIPS) are via the key management reports for the curriculum is: The Curriculum Annual Report (C-AR); The Curriculum Self-Assessment Report (C-SAR); The Curriculum Standards and Key Performance Indicators Report (C-SKPIR); The Curriculum Internal Audit and Assessment Report (C-IAAR); and The Curriculum One-Year Plan and Budget (C-OYPB). The curriculum integrated reports will be the key input to the College and Institution’s main management reports of: The College or Institutional Annual Report (C/I-AR); The College or Institutional Self-Assessment Report (C/I-SAR); The College or Institutional Standards and Key Performance Indicators Report (C/I-SKPIR); The College or Institutional Internal Audit and Assessment Report (C/I-IAAR); and The College or Institutional One-Year Plan and Budget (C/I-OYPB) in Figure 10.

**Case Study Implications 4**

In Step 5, the Strategic Skills and Competency and Performance Metrics must be defined. In the mainstream strategic management literature (Thomson & Strickland, 2004; Johnson & Scholes, 2003; Prahalad & Hamel, 1999) to name a few, the edge to competitive advantage is the competency profile of the organization in terms of readiness (Kaplan & Norton, 2004). This competency is normally human based and is not on having the resources.

In the case study, in line with the strategic direction of valuing people and creating a high performing organization, the main capital and competencies identified for Step 5 are:

- **Human Capital:** This comprises the knowledge, skills and values of the academic and administrative staffs in the creation of educational value to the stakeholders through the use of the information capital within the context of the organizational capital of structure, systems, styles, values and culture.

- **Information Capital:** This comprises the E-QMS systems, networks and databases that are horizontally and vertically integrated to support empowerment of the academic and administrative personnel. A key competitive edge is the technology capabilities (Pramongkit & Teay, 2002) of the human sophistication in identifying, interpretation and integration of information into knowledge and market wisdom leading to competent curiosity and competent wisdom of the institution (Barabba & Zaltman, 1991). The use of the data and information supported by institutional research is based on the human capability in the analysis, synthesis, interpretation and usage of information that brings about the learning aspects of continuous improvements and innovations.

- **Organization Capital:** This comprises the leadership, teamwork, alignment and culture and all service support systems. This forms the operating core for all the other aspects to function in an integrated total open system. This in fact represents all the organizational infrastructure, systems, structure, governance, support systems of IT, finance and human resource sub-systems.
Alignment

The alignment of the Strategic Management Support Systems and Performance Metrics are the imperatives of successful IS/IT implementation and alignment to the business systems. The concepts of alignment are addressed in the “enterprise architecture” (Shupe & Behling, 2006) which comprises: the business architecture (business strategies, processes and functional requirements), the information architecture (defines the information entity independent of the IT view for management and performing operations), the application architecture (describes applications to support the business and allows efficient management of information entities) and the technical architecture (the actual technology used). In preparation for the development of the technology strategy, Shupe and Behling (2006) also emphasized that there must be committed executive-level involvement, structured decision making process and an effective model for organization-wide communication. This enterprise architecture will lead to the ERP (Enterprise Resource Planning) of the firm.

Case Study Implications 5

To address the development of the E-QMS and the repositioning of its existing disparate and stand-alone islands of information systems, the core and support processes were redesigned with the redesigned information architecture of the institution as shown in Figure 11. This in effect emphasized the key to the reconciliation of the market pull and firm push efforts towards a strategic partnership for education excellence. The key problem of the consolidation and integration of the data and information was eradicated with the use of the E-QMS as the integrating component from the data collation and input through the consolidated data warehouse to generate the data, evidence, statistics and reports through the OLAP (On-line Analytical Processing). The output is aimed at supporting the use of the information by all internal stakeholders for planning and management of the teaching-learning-research, advising, faculty-student and program administration at the individual faculty, curriculum and school level.
For the external stakeholders, especially, the student, staff, administrative resources and curriculum reports are generated for the Ministry of Higher Education twice per academic year, and the Self-Assessment Report to the Ministry of Higher Education and NCAAA on an annual basis. The whole focus is that all these reporting systems feed from one reporting system into another to the different information users as shown in Figure 12. The public has an overall view only aspect of the main statistics.

Traditionally for the firm, in the hierarchical and functional or departmental structure, the following computer-based information systems exist independent of each other and underlies a political domain in itself.

- Strategic Information System
- Strategic Evaluation and Control System
- Strategic Innovation and Change system
- Strategic Human Resource System
- Strategic Financial and Accounting System

In the information age, in addition to the main information architecture as described above, and to ensure the cause-effect linkages and inter-dependencies, management of the resources’ efficiency and effectiveness, the following strategic sub-systems were identified as shown in Figure 13.

Kaplan and Norton’s (2004) strategic mapping highlighted the main components of competency readiness as the Human Capital (skills, knowledge and values), Information Capital (QA-MIS system, Network, Database and Technology Capabilities) and Organization Capital (Culture, Leadership, Teamwork and Alignment). They form the base competencies foundation of the institution. This is encapsulated in the Strategic Human Resource and Strategic Information System. The Strategic Evaluation and Control System is the base for the quality audit assessment and assurance as defined in the QMIPS (Teay, 2005). The Strategic Innovation and Change system is the
innovation management for innovative curriculum and the Strategic Financial and Accounting System underpins the financial perspective of the Kaplan and Norton Framework.

**Institution ERP Systems Alignment**

In the normal firm environment, it will take the form of the ERP system which is a business management system that comprises integrated sets of comprehensive software, which can be used, when successfully implemented, to manage and integrate all the business functions within an organization. These sets usually include a set of mature business applications and tools for financial and cost accounting, sales and distribution, materials management, human resource, production planning and computer integrated manufacturing, supply chain, and customer information (Boykin, 2001; Chen, 2001; Yen et al., 2002). These packages have the ability to facilitate the flow of information between all supply chain processes (internal and external) in an organization (Al-Mashari & Zairi, 2000a).

Rosemann (1999), Gable (1998) and Watson and Schneider (1999) defined an ERP system as an integrated customizable, standard application software which includes integrated business solutions. These seek to integrate the complete range of business processes and functions in order to present a holistic view of the business core processes (e.g., production planning and control, warehouse management) and the main administrative functions (e.g., accounting, human resource management) of an enterprise that handles the majority of an enterprise’s system requirements in all

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Functional areas of finance, human resources, manufacturing, sales, and marketing. It has a software architecture that facilitates the flow of information among all functions within an enterprise. The software component of the ERP model is the component that is most visible to the users and is thus seen as the ERP product.

**Case Study Implications 7**

Some of the generic ERP modules (all of which are captured in the strategic support system of the case study) to achieve the managing of the resources and stakeholders-university engagement efficiently and effectively are listed below:

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(1) **Finance**: The finance module is usually the backbone of the ERP system. It includes concepts such as the general ledger, accounts receivable, accounts payable, fixed assets and inventory control under the Office of Financial Affairs of the institution.

(2) **Human resources (HR)**: HR under the Office of Human Resource Management forms an integral part of an ERP system. HR administration automates personnel management processes, including payroll, recruitment, and business travel and vacation allotments. It focuses on the automation of HR tasks inclusive of the qualitative aspects of development of human capabilities and capacities. The focus of the administration function is to empower academic and administrative staffs to manage their own employment and development terms and conditions. Routine tasks like the allocation of leave days to a staff can be predetermined and assigned to a staff. The payroll is usually integrated with the finance module and handles all the accounting issues and preparation of cheques related to staffs’ salaries, wages and bonuses.

(3) **Supply chain management (SCM)**: SCM is the oversight of materials, information and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer (Alexandrou, 2002). SCM involves coordinating and integrating these flows both within and among partners of the institution.
   a. SCM flows in an institution can be divided into three main flows:
      i. the product (students) flow;
      ii. the information flow (curricular and teaching instructions); and
      iii. the finances flow.
   b. The product flow includes the movement of goods (in this case the students and faculty) from a supplier to a customer, as well as any customer returns or service needs (undergoing and passing the 4 to 5 years program). The information flow involves transmitting orders (teaching-learning) and updating the status of delivery (status of academic performance). The financial flow consists of credit terms, payment schedules, and consignment and title ownership arrangements (of the payment of all students’ and personnel dues).

(4) **Supplier relationship management (SRM)**: With an increasing reliance on contractors and suppliers (adjunct faculty and strategic collaboration with other institutions and service suppliers) for material, logistics and teaching-learning capacity, the ability to manage these relationships has become critical. To maximize profitability, the institution must be able to select the right suppliers quickly, establish strategic relationships and effectively collaborate with them as they help meet the institution’s business goals. SRM describes the practices needed to establish the business rules for extended interaction with the suppliers of products and services to achieve the total teaching-learning environment. SRM enables the institution and their suppliers to collaborate on strategic sourcing and procurement, while managing the overall process from an enterprise-wide perspective (Ganeshan & Harrison, 1995).

(5) **Customer relationship management (CRM)**: CRM is a term for methodologies, software and usually internet capabilities that help an enterprise manage customer relationships (in this case the student relationships as the primary stakeholder and the parents, alumni, employment market, community and government agencies and strategic partners as secondary stakeholders) in an organized and efficient manner (Lalakota & Robinson, 1999). An enterprise builds a database about its customers. This database (for the planning, administration and management of the programs, schools and relationships) describes relationships in sufficient detail so that management and customer and support service representatives (staff, faculty and counselors) can
access information, match students’ needs with product (study plans) and know what the student has achieved (assessment).

6. **Business intelligence (BI):** BI applications (for the school and university administrators) are decision support tools that enable real-time, interactive access, analysis and manipulation of mission-critical corporate (university, school and socio-cultural trends) information (Cherry Tree & Co., 2002). Users are able to access and leverage vast amounts of information to analyze relationships and understand trends that ultimately support the university business models and its decisions. These tools prevent the potential loss of knowledge within the institution that results from massive information accumulation that is not readily accessible or in usable form.

**Implementation**

The traditional approach to IT implementation had focused on the hardware, software and people approach of which this paper would propose that the use of the management of technology approach is more concrete as it identifies the key capacities and capabilities needed to implement IT systems successfully. Badawy, (1998) suggested that the management of technology is the practice of integrating technology with business strategy. The U.S. National Research Council (1987) definition is, “The management of technology links engineering, science and management disciplines to plan, develop and implement technological capability to shape and accomplish the strategic and operational objectives of the organization”, whereby the unit of analysis is the technological capabilities of the portfolio of technologies on the firm.

The major dimensions of Technology Components (T COMPS) (Sharif, 1995) are:

1. **TECHNOWARE:** Object-embodied physical facilities (tools, equipment, machinery, structure) → amplify human powers and controls transformation processes.

2. **HUMANWARE:** Person-embodied human abilities (skills, craftsmanship, expertise, dexterity and creativity) → degree of human sophistication increases the level of competence defined in terms of knowledge, skill, values, productivity orientation, achievement orientation, creativity orientation, and motivation.

3. **INFORWARE:** Record-embodied documented knowledge (facts, formulae, design parameters, specification, manuals, theories) → enables quicker learning and acquisition of knowledge in terms of time and resources through the tacit (individual that is human-based) and explicit (public that is organization based) knowledge.

4. **ORGAWARE:** Institution-embodied organizational frameworks (methods, techniques, organizational frameworks and management practices) → to achieve coordination of activities and resources utilization towards achieving desired results.

In the implementation of the aligned IS/IT systems with the market needs, two types of capacity need (Teay, 2007) to be defined are:

- Personal capacity of the academic and administrative staffs which is the nuts and bolts of capacity building covering the skills, knowledge, experience, personality and the ability not only to do something but also over a period of time to build up a reservoir of knowledge, experience and expertise that determines present and ongoing performance;

- Non-personal capacity or the administrative capacity provides the context (in essence the values, beliefs and ideals) in which personal capacity is developed as they work in the organizational setting which influence their mind-sets.

Weill, Subramani, and Broadbent (2002) also found that different strategic agility required distinct patterns of IT infrastructure capability that must be understood to derive
performance and advantage. This research identified seventy services divided into ten capability clusters:

- Channel-management services,
- Security and risk-management services,
- Communication services,
- Data-management services,
- Application-infrastructure services,
- IT-facilities-management services,
- IT-management services,
- IT-architecture-and-standards services,
- IT-education services,
- IT Research and Development services

that must be identified and managed in this institution.

Case Study Implications 8

Within the IT technoware context, a key Information Capacity is managing relationships as no individual or organization is able to achieve all the aims alone due to the volume of knowledge created leading to “cooperativity” (skills, attitudes and organizational culture and willingness to learn and share) across individuals and organization to make things happen. Individual and organizational ICT skills, awareness, readiness and capacity are the basic requirements and mechanisms to seamlessly tie together the relationships and the process to create and deliver on the value by schools and service support units at all levels of management as the institution’s vision, mission and strategic goals and objectives are cascaded down to the school, program and individual level.

In the humanware’s human capacity and capabilities context of the academic and administrative staffs, the capabilities competency clusters (Thorton and Byham, 1982) can be categorized as: Intellectual – strategic perspective, analysis and judgment; Interpersonal – persuasiveness, decisiveness; Adaptability – resilience; Results orientation – initiative, business senses with 5 sets of skills and competencies profile Houtzagers, (1999), of: Professional knowledge, Customer Orientation, Business Awareness, Leadership and Planning and Organizing.

From the Inforware context, creating an information system without understanding what the knowledge professionals need or how they relate to others in the communities or the form of level of details they need does little to leveraging the knowledge leading to an information junkyard. This was the scenario before 2010 when the E-QMS was being built as there was “Many Nets” not integrated nor linked for access to consolidated data for the institution communities’ utilization. To leverage knowledge, thinking of the information is needed, and the challenge lies not only in the technical side but also the social, management and personal aspects of the academic and administrative staffs. Kane et al., (2006) identified knowledge as being classified into 2 groups of:

- Personal/Tacit—which are expertise, know-how that are manifested through action, acquired through practice and difficult to transfer based on personal beliefs, values, subjective insights or emotions that are contained in the container (technically the human’s head) and is difficult to share.
- Public/Explicit – which are the rationalization of information that can be stored, codified and transmitted and can be articulated as facts represented in the form of documents, designs, patents, trademarks, business plans, formal language that are objective and rational and are about the container or embodiment of knowledge of the academic and administrative staffs.

In the Orgaware capacity and capability development aspects they would include: Skill enhancement – general education, on-the-job-training and professional deepening in crosscutting skills such as business, analysis and interpretation and IT; Organization strengthening – covering the process of institutional development or institution building implying an infrastructure mentality; Procedural improvements and Management – covering general functions changes or systems reforms that are
Compatibility of the fit between the IS/IT architecture with the institution organization structure, with an emphasis on the interfaces between the institution and its stakeholders that might call for different structure depending on its “strategic fit with the university business strategies”.

Impact

What is important in the linkages of the processes and the strategic systems components identified is the rationale that:

- Management of the resources and its achievements and impacts using the Open Standards Benchmarking Collaborative Database for Information Technology of the APQC (American Productivity & Quality Center) (APQC, 2007) must be measured through the performance metrics that are inherent in all the systems.
- There is a cause effect linkage of all the systems and their implicit performance metrics as recommended in the Balanced Scorecard (Kaplan & Norton, 1996) should be developed, stated clearly and measured.
- It is the summation of the total and synergistic outcome that is more important than the individual system outcome.

IMPLICATIONS AND CONCLUSION

There are many existing models that looked at the design and development and implementation of the IS/IT systems to be aligned with the business needs, but the key issues would lie in 2 key areas:

- Whether the planned systems meet the real needs of the market in terms of its value proposition,
- Whether in the implementation, the alignment of the synergies of all the interactions and inter-dependencies are integrative to create and meet the market needs.

Based on this contention, the market-driven IS/IT planning model takes into account:

- The identification of the real market/customer needs by identifying the value needed to satisfy its needs,
- The identification of the customer value equation or the components of the value to be proposed in terms of the product quality, service quality, image, relationships and cost that culminates in the market pull equation,
- The firm push equation to create and deliver on all components of the value that it decides to propose to the customer with the value proposed as the key integrative agent to ensure that all parts of the value are catered to by all the processes,
- The internal processes are aligned to create and deliver on the value as a “cause-effect” linkage in an integrative rather than independent processes and systems with the IS/IT as the key enabler,
- The capacity and capabilities are identified as they are the key competencies needed for the success of the internal processes and that clearly define the human, information and organization capital needed for the success of the implementation of the aligned business and IS/IT strategies of the firm.
- All the tangible and intangible metrics must be developed and measured using a balanced approach as recommended in the Balance Scorecard.

In conclusion, the proposed model looks at the intricate aspects of the alignments of the strategic organization capital assets to achieve and sustain the competitiveness of the firm through its market pull value proposition as compared to the existing models that merely look at the design and development of the IS/IT from the technology perspectives. The existing models are good in the planning aspects that downplay the importance or overlook the implementation side of the systems which is the crux and critical areas that need to be identified and managed and constitute the dynamics.
of successful implementation. This proposed model deals not only with the planning aspects but also looks at the implementation aspect from an integrative approach.

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