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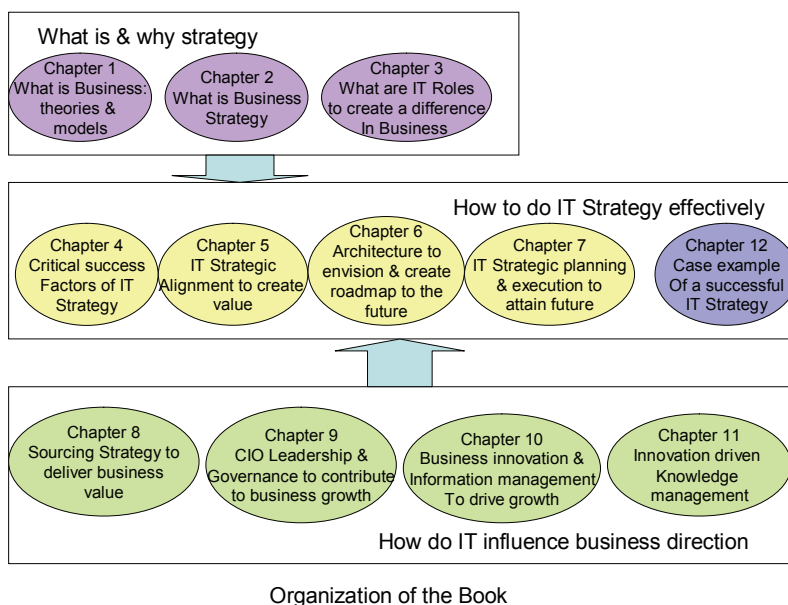Knowledge
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A METHOD TO SUCCESSFUL IT STRATEGY CREATION AND IMPLEMENTATION

Information technology is a means to the business end. IT is a tool designed to perform a business task within an overall business context. Thus, IT creates value only when it meets the business needs. A successful IT strategy must, therefore, align with the business, fully, from strategy setting, planning to detailed programs execution and delivery. The goal of IT strategy is to help business create and implement the unique competitive position to deliver value to customers and the firm. An effective IT strategy therefore starts with an in-depth understanding of the firm's business, mission, vision, strategic goals, and positioning in the competitive market environment. It must analyze the firm's business model, value configuration, and core business processes required for differentiation. Naturally, IT orga-

nizations should also possess in-depth knowledge of the ways in which IT can add value to the firm's business. From these insights the business-aligned IT strategy is developed, together with the requisite future target enterprise and technology architectures. The target enterprise architecture encapsulates the strategic direction and vision espoused by business and IT strategies. Architecture gap between the current and the target architectures defines the macrolevel business and information systems capabilities gap that needs to be closed in order to sustain the firm's competitive positioning for growth. The enterprise architecture thus serves as an important strategic planning tool. It plots the logical steps over a period necessary to evolve the current architecture and business environment towards the business vision. Enterprise architecture identifies the requisite strategic business programs which are prioritized and selected for implementation using IT program/project portfolio management principles, in line with business strategy and priorities. An end-to-end business–IT alignment from strategy to implementation and benefits realization is validated using a requirements traceability method. The IT strategy must also define the requisite core competency and sourcing strategies, as well as the organizational model and culture for successful execution. It incorporates and applies the IT governance as part of corporate governance for business programs prioritization and for governing disciplined programs execution to deliver the planned business outcomes. IT organizations are increasingly being expected by business to not only provide excellent service delivery but also contribute to business innovation. Indeed, business is beginning to look to chief information officers as a new source of business model innovation. Underpinning innovation is knowledge. IT strategy must therefore also encompass the need for innovation and knowledge management. IT strategy best practice is integral to IT management best practice. It requires leadership and strong disciplines in integrative and holistic management of business, people, process, and systems.

MOTIVATION, OBJECTIVE, BACKGROUND, AND TARGET AUDIENCE OF THIS BOOK

Information technology strategy is clearly a critical business discipline, which ensures IT delivers value to business. A well-crafted and executed IT strategy will deliver not only effective business operations but also competitively differentiated, innovative products, and services for the firm. Yet many business and government enterprises have found their IT organizations are, due to poor strategy and execution, either, misaligned with the business strategies or, even worse, so dysfunctional that business value is actually destroyed instead of being added by IT. With business investing close to $800 billion in IT in 2002 in United States alone (Jeffery & Leliveld, 2004), successful IT strategy and execution is undoubtedly crucial for firms aiming to achieve superior business performance.

The objective of this book is to explain the principles and methodologies for crafting and executing a successful business-aligned IT strategy, an integrated end-to-end process from business strategy to value delivery. A case example is provided to illustrate the key IT strategy and management concepts. It describes the strong disciplines required in integrative and holistic management of business, people, process, and systems for IT strategy and management best practice.

This is a practice-based textbook, derived from over 10 years of practical business experience in the subject area. To infuse academic rigor, we incorporate contemporary management

and information system theories and research literature to help structure and explain the fundamentals of IT strategy and management practices. IT strategy is a business management discipline. The book is therefore business-oriented. It describes information technology strategy and management best practices from the business standpoint—step-by-step from basic models of firms to strategy management practices to business innovation practices.

The book has evolved from a current IT strategy course given to Master of Business (IT Management) program at University of Technology Sydney, where the enrolled students are mostly professional IT and business managers. It has also evolved from IT management courses taught at Fudan University (Shanghai), Nanyang University (Singapore), Norwegian School of Management (Norway), and Arab Academy (Egypt). The book will therefore be useful to all business and IT schools where MIS courses are taught, particularly to the graduate students. In addition, practicing business and IT managers responsible for their firms' IT services, from all industries, will find this book useful in their work.

Students and practitioners of IT management need to acquire a broad and deep body of knowledge to be proficient in IT strategy and management practices. The book provides the requisite body of knowledge. It is condensed below to give the readers a preview of the overarching concepts, principles, theories, methods, and the interrelationships of IT management practices that they need to master to become an effective IT manager and leader.

Body of Knowledge for Successful IT Strategy

Strategy is about creating a competitively differentiated position to win customers in the marketplace. Firms leverage their resources and the ways they conduct business (activity system or business model) to create the differentiated position (Porter, 1985; Priem & Butler, 2001). Two complementary theories of firm are commonly used to study business strategy: resource-based theory and activity-based theory.

Resource-based theory stipulates that the firm's performance and strategic advantage is differentiated by the internal resources and capabilities it possesses, rather than the external opportunities and threats dictated by the industry conditions (Barney, 2001; Hitt et al., 2001; Loewendahl, 2000; Priem & Butler, 2001). The theory holds that, in order to generate a sustainable competitive advantage, the firm's resources must provide economic value and must be unique, inimitable, nonsubstitutable, and not readily obtainable in factor markets. Thus, IT resources that are inimitable and valuable can be rent yielding. In particular, it is the unique combination of sophisticated IT infrastructure and skilled human resources (core competences) of the enterprise creating the differentiated customer value that is inimitable and valuable (Ravichandran & Lertwongsatien, 2005).

Activity-based theory of firm conceives the firm as a bundle of activities, as distinct from a bundle of resources in the resource-based theory (Sheehan, 2002). The activity-based model studies the firm's production function in value creation, transforming inputs to end products. It focuses on the flows of resources (but not the differences in stocks of resources) through a system of activities in creating economic value. From the activity-based theory, firms can configure its activities to create value, known as value configuration. Understanding the properties of value configuration is important as IT is inherently suitable as an aid to automation, coordination, and control of the activities within the configuration. Three types of value configuration can be used to model the firm: value chain (Porter, 1985), value shop, and value network (Stabell & Fjeldstad, 1998). Value chain is a firm that has a series or chain of primary activities comprising inbound logistics, production, outbound logistics, market-

ing and sales, and service. Economic value is created via efficient production of goods and services through this chain (Porter, 1985). This primary chain of activities is supported by secondary activities comprising infrastructure, human resources, technology development, and procurement. While value chain is modeled after manufacturing-based firms (fixed set of activities to produce standard products), it is less suited to modeling knowledge-intensive service firms (variable set of activities to produce customized solutions). This type of firms can be modeled by value shop (Stabell & Fjeldstad, 1998). Value shop is a firm that creates value by solving unique problems for customers and clients. In the value shop, activities are scheduled and resources are applied in a fashion that is dimensioned and appropriate to the needs of the client's problem. A value shop is characterized by five primary activities: problem finding and acquisition (by working with the client), problem solving, choice, execution, and control and evaluation (of how well the solution solves the problem). Control and evaluation feeds back to the problem finding in two ways: (a) solution is inadequate and problem-solving phase restarts anew, (b) solution is successful and the client may extend the problem scope and a new problem-solving phase starts. A value network is a firm that creates value by connecting clients and customers that are, or want to be, dependent on each other (Stabell & Fjeldstad, 1998). These companies distribute information, money, products, and services. While activities in both value chain and value shop are done sequentially, activities in value networks occur in parallel. The value is enhanced by "network effect"—the more the number and combination of customers and access points in the network, the more valuable the network is to the customers. The value network (firm) admits customers that complement each other, and establishes, monitors, and terminates direct and indirect relationships between customers. Examples of value network firms include telecommunication companies and financial institutions. Value networks perform three activities: (a) development of customer network through marketing and recruiting of new customers, (b) development of new services and improvement of existing services, and (c) development of infrastructure so that customer services can be provided more efficiently and effectively.

A related concept to value configuration is the business model of firm, which is also closely related the firm's business strategy. Business models explain how firms work; they identify who the customers are and define how the pieces of a business fit together as a system to create value to the customers at appropriate price so profit can be made (Magretta, 2002). Business model can be viewed as comprising three components: the offering, the unique configuration of activities and organization, and the (particularly rare and inimitable) resources. IT can be designed to contribute to the uniqueness of each of these three components (Hedman & Kalling, 2002). Business models consist of nine basic building blocks; they get implemented by translating the model into concrete elements such as a business structure (organizational model), business processes (workflow), and infrastructure and systems (Osterwalder & Pigneur, 2005). Business models are subject to change. Firms use the basic constructs of business models to analyze the impact of external forces to define how their business models (and thus IT environments) should change to sustain their competitive advantages. Four business model change approaches (realization, extension, renewal, and journey) can be adopted, depending on the firm's business strategy (Linder & Cantrell, 2000). Business models were popularized by the dot.com era. Numerous IT-enabled e-business models have been proposed, based on the firms' specific e-strategies. The basic principles of business model, which aims to profit from delivering highly valuable differentiated services to customers, must be adhered to by e-business models. It requires development of a sound e-strategy focused on value delivery to the customers. E-business

can be classified into eight atomic e-business models (Weill & Vitale, 2002). These e-business models explain the roles, relationships among the firms' consumers, allies, suppliers, and identifies the major flows of products, information, and money, together with the price and benefits to the participants. The Hayes and Finnegan (2005) framework (encompassing economic control, supply chain integration, functional integration, innovation, and sourcing) can be used for determining a firm's appropriate e-business model.

Business-aligned IT strategy is developed in accordance with Porter's (1985) business strategy principles. Business strategy with a clear goal and a "continuity of direction" must be first defined. The strategy must have a unique value proposition supported by a distinctive value configuration. The strategy must also define how all the elements (resources and activities) of what the firm does fit together and reinforce each other. This usually involves making trade-offs. Corporate strategy shapes business and IT strategies, so different corporate roles must be understood. Firm uses strategic management discipline to formulate its strategic position, make strategic choices for the future, turn the strategy into action, and realize the benefits (Johnson & Scholes, 2002). Translating strategy into actions require strategic planning skills. Strategic planning is the process of deciding on the projects/programs that the organization will undertake and the appropriate amount of resources that will be allocated to each program over the next several years. Strategic planning practice performance can be measured from the perspectives of cost leadership, differentiation, focus, and intensity (Nayyar, 1993). Formal systematic strategic planning process has been found to be beneficial and it defines the key elements of strategic plan (Grant, 2003).

Resource-based strategy leverages the firm's unique resources and capabilities as a platform across many markets and products (Barney, 2001). Activity-based strategy allows the firm to gain a profitable position by configuring its activities using activity-based drivers such as scale, a unique configuration which is difficult for rivals to copy. In comparing the two strategies, resources are similar to drivers and capabilities to activities (Sheehan, 2002).

IT strategy and management must conform to the prevailing business/IT ethics. Business ethics can be studied via stakeholder theory, which is a theory of organizational management and ethics. Indeed all theories of strategic management have some moral content, though it is often implicit. Moral content in this case means that the subject matter of the theories are inherently moral topics (i.e., they are not amoral). Stakeholder theory is distinct because it addresses morals and values explicitly as a central feature of managing organizations. The ends of cooperative activity and the means of achieving these ends are critically examined in stakeholder theory in a way that they are not in many theories of strategic management (Phillips et al., 2003). Use of stakeholder theory in IT strategy research is a still subject for further study. In an IT strategy context, a stakeholder theory approach will describe the relationship as a nexus of cooperative and competitive interests possessing intrinsic value. IT strategy should ensure the design and use of information technology to be transparent and open to ongoing scrutiny by stakeholders such that the values of ethics are upheld, always. This is assured through diligent application of IT governance by business enterprises.

Competitive business strategy formulation requires competitive strategic analysis. Eight popular methods of strategy analysis are available: SWOT analysis, X-model, business direction, market strategy, competitive forces, product portfolio analysis, environmental analysis, and knowledge analysis. From analysis of each method, a strategic change can be determined and the corresponding IT system can be identified.

Internet technology will enable the reconfiguration of existing industries that had been constrained by high costs for communicating, gathering information, or accomplishing

transactions. Internet-driven business strategy, known as e-strategy, has created successful new-generation companies such as eBay, Google, Amazon, and Yahoo. Differentiation is more sustainable than cost leadership strategy for e-business firms. In particular, an e-strategy will be able to achieve superior, sustainable performance through an "integrated strategy" discipline which strives to achieve *both* cost leadership and differentiation strategic positioning (Kim et al., 2004). E-strategy is also being adopted by traditional companies, such as GE and News Limited. E-strategy is developed through gaining insights on 10 fundamental properties of Internet, which include (Afuah & Tucci, 2003): mediating technology, universality, network externalities, distribution channel, time moderator, information asymmetry shrinker, infinite virtual capacity, low cost standard, creative destroyer, and transaction cost reducer. In-depth understanding of Internet capabilities in reshaping business models will give IT managers ability to influence business strategy to take advantage of, and incorporate, Internet into the business and IT strategies to keep firms competitive, adaptive, and responsive to changing market and external environments.

Alignment between business strategy and IT strategy is widely believed to improve business performance (Sabherwal & Chan, 2001). Elemental IT strategy comprises the business strategic direction and strategy outline, the enterprise architecture and attendant applications and technology infrastructure platforms, the requisite resources and capabilities (competence), and the organization model and management control (governance). Strategic management must be cognizant of the tightly coupled interrelationship between task, technology, structure, and people, which must be managed holistically to ensure strategic fit (Gottschalk, 2005).

Moreover, IT managers must anlyze and understand how IT can add value to firms organizationally. There are nine available models:

- **Model 1:** Benefits analysis identifies IT contributions to: rationalization benefits (personnel cost savings); control benefits (decision support); organizational benefits (team effectiveness and agility); and market benefits (revenue improvement).

- **Model 2:** Stages of IT organizational growth analysis identify the growing maturity of the firm's use of IT over the years, from data processing (for efficiency) to management information system (for effectiveness) to strategic information system (for competitiveness). Alternatively, the Nolan (1979) model of IT maturity growth can be used, which comprises: stage 1 – initiation (functional cost reduction), stage 2 – contagion (raid increase in all application areas), stage 3 – control (upgrade documentation, simplifying existing applications), stage 4 – integration (restructuring existing applications in a systems architecture), stage 5 – data (restructuring existing applications in a data architecture), stage 6 – architecture (application integration supporting information flows), stage 7 – (interorganizational) integration (intra and interorganizational communication), stage 8 – growth (systems connecting business with vendors and customers), stage 9 – reaction (extended infrastructure to support tailor-made applications).

- **Model 3:** Analysis of IT usage in management activities in a hierarchy of operational, tactical, and strategic management to identify the IT contributions.

- **Model 4:** Analysis of IT in business processes – business processes are activities organized, coordinated, resourced, and focused to produce goods and services of value to receivers and customers. They may appear in an intra or interorganization context.

IT adds value by automating and simplifying workflow for the repetitive manual processes.

- **Model 5:** Analysis of IT support for value configuration – IT value add is similar to Method 4, and other benefits are described in Chapter 1.

- **Method 6:** Analysis of IT value add via the King and Teo (1997) model of strategic integration – IT role in firm increases nonstrategic to competitively strategic as the firm matures from stage 1 – administrative integration (separate business and IT strategic planning) to stage 4 – full integration (joint development of business and IT strategies – dynamic strategic alignment). IT role can be analyzed in detail using ten benchmarks including, for example, role of IT function, primary role of IT executives, and performance criteria for the IT function.

- **Method 7:** Analysis of IT support for knowledge management – IT support is analyzed by a matrix of tasks (distribute knowledge, share knowledge, capture knowledge, and apply knowledge) and levels (end-user tools, who knows what, what they know, and what they think).

- **Model 8:** Analysis of IT support in e-business maturity growth – this analysis uses the Earl's six-stage e-business maturity model to show the increasing sophistication of IT and value add as the firm matures from stage 1 – external communication, through internal communication, e-commerce, e-business, e-enterprise to stage 6 – transformation.

- **Model 9:** Analysis of IT-enabled business transformation – as the name implies IT plays a critical role in this model. IT role and business influence increases as the firm evolves from level 1 – information technology efficiency, through information systems integration, business process change to level 4 – business design change.

Strategic alignment of IT to business is both a top management concern and also an important attribute of effective CIOs. A successful IT strategy must align with the business, fully, from strategy setting, planning to detailed programs execution, and delivery. The King and Teo (1997) model of strategic integration and the Luftman et al. (2004) strategic alignment model have been used in the end-to-end analysis. A fundamental principle common to all the critical success factors is "business and IT acting as one." This requires each IT task to be aligned with and justified by the business function it is designed to contribute, by which the business value is assessed. A basic requirement for success is that IT must be regarded as being part of the business, devoid of the us vs. them chasm (separating IT from the business) found in most traditional organizations where IT is viewed as a subservient role performing basically a back office function. This means the IT organization must, at a minimum, be at the sequential integration stage (2) of the King and Teo (1997) model. At this level, IT strategy and resources support and align with the business strategy, and IT executive proactively validates with the business executive to ensure the IT strategy does align with and implement the business strategy. Business and IT act as one behaviorally and organizationally via IT governance. IT governance ensures IT is "doing the right thing" to assure strategic alignment, "doing the thing right" to assure architecture compliance, and "getting it done well and realizing the benefits" to assure program portfolio management compliance (ITGI, 2006). The Y model for strategic management (Gottschalk, 2006) and the principles of corporate strategy can be used to analyze strategic planning alignment.

The Y model analyzes the gap between the desired and current business situation to identify the needs for change. The strategic plan is developed and implemented to fulfill the needs. The business and IT strategic plans comprise four key deliverables: enterprise architecture, portfolio management and program plans, core competencies, and sourcing strategy. Two critical disciplines for strategic program delivery are program portfolio management and program management. The former prioritizes and selects programs for implementation based on risk/return profiles and alignment with business strategy. The latter focuses on diligent, disciplined execution of the selected programs to budget and plan. Business benefits realization must be monitored against business (case) plan following completion of program implementation, using post implementation review process. With IT and business acting as one, IT strategy will be successful when business and IT alignment is validated in each phase of the end-to-end strategic management life cycle, namely:

- Direction setting – IT strategy is defined in line with and documented as part of the corporate strategy;

- Planning – the IT strategic plans clearly correspond to the respective business strategic plans and the business outcomes expcted of the IT plans are clearly described and justified in the business plans;

- Execution – each of the business programs constructed from the business and IT plans will have a business owner supported by a professional IT program manager responsible for on time and on budget delivery of the program, with the program outcomes (functionalities and benefits) clearly specified in business terms as targeted in the business plan;

- Outcomes – upon successful delivery of the program, each program is audited at selected milestones to ensure the intended business objectives and benefits are consistently delivered in accordance with the program's business case.

The critical organizational requirement of business and IT acting as one is founded on the rigor and discipline of IT governance.

IT managers need to recognize several critical conditions or factors for strategic alignment success, namely: shared method for business and IT strategic planning, process for stakeholder participation (shared domain knowledge between business and IT), and program management implementation to deliver stated benefits, top management involvement and support, clear business direction, business before technology, and communication and coordination (Earl, 1993; Reich et al., 2000). Strategic alignment has two dimensions: strategic fit of internal intangible assets with externally customer-focused strategy and functional integration between business and IT domains (Henderson & Venkatraman, 1993). Strategic alignment is a process of continuous adaptation due to changing external market and technology environments. A nonlinear adaptation using complex theory model is necessary to account for the co-evolution (Benbya & McKelvery, 2006). IT strategic alignment with a cost-reduction strategy is more able to deliver immediate tangible benefits to firms than a revenue-growth strategy; and profitability is shown to be higher when both business and IT strategies are rated high (Oh & Pinsonneault, 2007). An organization's strategic alignment maturity can be assessed by six criteria (Luftman et al., 2004): communication, competency/value measurement, governance, partnership, scope and architecture, and skills. The

model is useful for assessing strategic alignment in each of the abovementioned four phases of strategic management life cycle.

The successful execution of IT strategy, both the implementation of the resulting strategic programs and the support and maintenance of the evolving enterprise IT environment, depends on IT strategic resources, especially IT people. Moreover, business performance and differentiation is determined by the firm's ability to configure internal and external strategic resources and capabilities, including IT resources and capabilities. According to resource-based theory of firm, unique combination of IT resources by themselves, or more likely, with other enterprise resources, which create significant value and are costly to imitate, will offer firm sustainable competitive advantage. In particular, six attributes of IT resources must be managed effectively in order to obtain competitive advantage: valuable, rare, exploitable, inimitable, nonsubstitutable, combinable, and immobile. Further, embedding IT within areas of the firm's core competency makes IT assets inimitable (Richardson & Lertwongsatien, 2005). This is explained by the difficulty for rivals to create similar bundles of complementary IT and organizational assets and, at the same time, understand the contributions of IT assets to firm performance.

Global companies and globalization of IT services require effective global IT management practice. Global IT management needs to balance the business needs of global (corporate) and local (business unit) organizations. This can be achieved by coordinating global IT functions (strategy, architecture, standards, and control) with local IT functions (local planning, integration of new applications, and operating the infrastructure and applications) in line with corporate strategy (Barton, 2003). Group CIO and IT leadership team need to effectively manage the natural tension arisen from three forces shaping global IT management: pooling of IT services, (selective) outsourcing of services, and dispersion of IT roles to business (Barton, 2003). The critical success factor is an effective IT governance to ensure business-IT alignment globally and locally.

Kaplan and Norton's (2004) strategy map accounts for Henderson and Venkatraman's (1993) strategic fit and functional integration dimensions in a series of cause–effect traceable relationships. Strategy map is an instructive tool for demonstrating strategic alignment.

Case examples of IT strategy development and implementation experiences of two Australian companies, a leading bank (CIO, 2003), and a leading retailer (Australian IT, 2005–2008), have been used to exemplify a practical application of basic concepts of business–IT alignment and the four-stage IT strategy management process. The retailer example highlights the business outcomes of a strategy-execution journey (reported over three-year duration) of IT-enabled strategic business transformation, which results in contribution of multibillion dollars of IT business value to the company's bottom line and gives it the distinct competitive advantage.

Enterprise architecture is a critical management tool for linking business and IT strategies to their disciplined execution (James et al., 2005). Enterprise architecture encapsulates the essence of business and IT strategies (Ross–Weill–Robertson, 2006). It provides structure, discipline, and a platform for articulating the firm's strategic imperatives in an integrative and holistic manner, functionally analogous to the working of a real-life enterprise. By adopting standardized terminology and definitions, business and IT stakeholders will be able to agree on the purpose, scope, content, and shape of the architecture. Thus, enterprise architecture serves as an integrator and translator of critical business and IT concepts by which business and IT stakeholders can assure strategic alignment across multiple perspectives. Much work has been expended on the principles and methods for developing business-aligned enterprise

architecture to guide the development of IT solutions to implement the business strategy (Zachman, Spewak, TOGAF, Ross-Weill-Robertson, Gartner, RM-ODP, POSIX, OMG, eTOM). Enterprise architecture essentially is a formal description of the enterprise business context, including the business strategy, and the supporting information system architecture which aligns with the business context. It comprises of four interrelated viewpoints, each representing the perspective of a type of enterprise stakeholders, namely: business architecture, information architecture, application architecture, and technology architecture. Business architecture defines the firm's overarching business strategy, business model, organizational model, and underpinning core business processes. Information (or data) architecture defines the information value-chain model and information (data) entities which support the business functions defined in the business architecture (Spewak, 1992). Application architecture defines the business functional systems of the enterprise; they interact with each other in accordance with the predefined business processes (business architecture) consuming and producing business information elements defined by the information architecture (Spewak, 1992). Technology architecture defines the infrastructure platforms and distribution which support the applications, data, and business functions of the respective application, information, and business architectures (Spewak, 1992; TOGAF, 2007).

Enterprise architecture provides an integrative insight on the enterprise strategy, its environmental (market and technology) trends, the target future business state, and the principles and guidance to get there. It defines the firm's target future state architecture model for the business and information systems. It prescribes the principles of architecture solution design of information systems to ensure compliance with business strategic requirements and systems operational integrity requirements such as scalable performance, agility to adapt to business change, security, and manageability. The gap of current and target architecture defines the scope of business and systems changes required and the migration steps over a period to achieve the business strategy and vision. The gap is translated into an integrated IT strategic plan (road map) of business programs. Implementation of the IT strategic roadmap allows enterprise to close the gap and attain the target future business state. Enterprise architecture guides the development and implementation of these programs, in line with the business priorities, to ensure reliable delivery of the desired business outcomes stipulated in the business/IT strategy. Architecture governance as part of IT governance ensures architecture solutions for system development will comply with the enterprise architecture principles and guidance. Architecture governance ensures ("IT do the right thing" so that) business solutions will not only deliver the expected value (as stipulated in the business case), but also ensure they will integrate into the target enterprise system designed to give the firm the competitive advantage. Enterprise architecture, therefore, is a critical business tool for managing and implementing business changes, attaining business agility and strategic alignment.

Strategic planning and program implementation is performed systematically and diligently via the traditional Y model, specifically the stages 4 (seek for alternative actions), 5 (select actions and make an action plan), 6 (implement plan and describe results), and 7 (evaluate results). However, apart from disciplined program management, success also depends on skillful management of potential barriers to implementation. An important issue relates to human factor of change management. First, there is the need for business and IT professionals acting as one to ensure strategic alignment. Then, there is the human nature to resist change across both IT and business/user communities. Strategy implementation must manage the human factor, including engagement, consultation, communication, education,

training, and commitment, as a key project deliverable from strategy creation to benefits realization.

An alternative, advanced, strategic planning practice is via enterprise architecture. The business and systems (architecture) gap needs to be decomposed into logical work packages for staged implementation as part of strategy execution (Spewak, 1992). Execution is the most critical part of strategic management; only by diligent and disciplined execution will the value of strategy be materialized. The architecture gap analysis offers systemic and integrative assessment of the business—business operating model, value configuration, core business processes, domain by domain from customer front-end to back-end supply chain and partners network, together with systems architectural changes—required to realize the business strategy. Gap analysis is performed on every viewpoint of the enterpise architecture. The scope and extent of architecture change required constitutes the overall scope of the strategic programs that need to be defined and developed to deliver the objectives of the business strategy. These programs will be prioritized by IT governance using IT portfolio management principles. Their implementations in time sequence will define the migration path of the current enterprise architecture towards the target future state architecture. The critical success factors for enterprise architecture and strategic planning are: executive management commitment and strong project leadership skills (Spewak, 1992). A key benefit of architecture approach is that the architecture solution design for each strategic program will be guided by the enterprise architecture principles and architecture direction. This is what the IT Governance Institute calls "doing the thing right" governance (ITGI, 2006).

The architecture-driven strategic plan will guide which projects to select, which to continue, and which to decommission. Selection implies judicious resource allocation including technology assets, business processes, human resources and competencies, and potentially customer and partner resources. Program/project selection requires financial investment, thus judicious consideration of risk/return and cost of each IT program/project proposal. The process for selecting the "right" IT projects to invest in is called IT portfolio management (ITPM). It unites business and IT executives to work together to make the "right" strategic decision. Thus ITPM provides a sound business communication tool for business and IT executives to jointly manage the execution of the mutually aligned business and IT strategies. It focuses on more on value maximization and cost optimization, rather than solely on cost reduction (Cameron, 2006; Jeffery & Leliveld, 2004; Luftman et al., 2004; Weill & Aral, 2006). IT portfolio is a categorized set of assets (the outputs) and investments (the inputs). A three-category approach is commonly used: operate the business, grow the business, and transform the business (Cameron, 2006). Another well known approach categorizes IT investment portfolio into four classes (Weill & Aral, 2006): *Infrastructure* asset provides shared services to be used by multiple applications to allow for future business growth as well as cost reduction through standardization, rationalization, and consolidation. *Transactional* asset is for efficiency improvement and cost reduction through automation of repetitive business processes. *Informational* asset is for business intelligence, accounting, reporting, strategic decision support, compliance, and communication. *Strategic* asset is for developing new products and services or business processes to enter new markets and gain strategic competitive advantage. Typical IT portfolio mix ranges for an average firm are: operate-the-business (50–80%), grow-the-business (10–35%), transform-the-business (0–25%) (Cameron, 2006). Alternatively, the average portfolio mix could be: 46% infrastructure, 26% transactional, 17% informational, and 11% on strategic applications (Weill & Aral, 2006). The optimal portfolio mix varies according to the firm's value discipline strategy: product leadership, customer intimacy, or operational excellence (Marchand et al., 2001).

Despite the critical importance of ITPM to business value creation, Jeffery and Leliveld (2004) found in a survey of 130 Fortune 1000 CIOs in 2003 that only 89% were aware of ITPM, and 65% believed ITPM produces business value. The reason for this patchy ITPM performance is due to the CIOs' different levels of ITPM practice maturity. For example, 4.5% of the respondents are at the lowest—*ad hoc*—level of maturity; 24.5% at the second—*defined*—level of maturity; 54% at the third—*managed*—level; and 17% at the most mature—*synchronous*—level (Jeffery & Leliveld, 2004). Some of the barriers to ITPM success are the same as poor strategic alignment skills, such as difficulty of quantifying business value, poor communication between IT and business, IT staff's lack of business skills, and business executives' lack of understanding of and low respect for IT. A sensible solution to the barriers could be *staged implementation* with a clear *roadmap* for capability upgrade, supported by extensive training and education programs. Most importantly IT organizations should involve (engage) and inform business people continuously, from the beginning (Jeffery & Leliveld, 2004). To maximize IT value, firm needs to define, under IT governance, its target future IT portfolio mix; to understand its IT asset class performance and benchmarks; to re-weigh and balance, transparently, the portfolio for strategic alignment and risk-return profile; to incorporate the IT portfolio approach into the IT governance framework; and to learn from post-implementation reviews and formal training (Weill & Aral, 2006). ITPM is an advanced management practice, typically taken by firms with higher maturity in IT management practice. Its adoption by firms is recommended to maximize business return on IT investments. To put IT portfolio management into practice firms require three key components: ITPM framework and standardized process; tools for "what-if" analysis of IT project portfolio; and a common business taxonomy for communication and governance[1] (Maizlish & Handler, 2005).

Strategic alignment of IT resources is achieved through CIO aligning IT strategy and the requisite resources to (particularly the core competencies of) business strategy. CIO and IT become enablers of corporate and business strategies when IT resources become a corporate strategic resource. Attainment and sustenance of this status requires ongoing proactive business engagement supported by disciplined application of human resource management best practice. This practice is also illustrated by the case example of a leading Asia Pacific regional corporation CLP Group's IT strategy formulation and execution, described in detail at the end of the book—specifically, the formulation and execution CLP's IT organization capital strategy.

IT sourcing is concerned with judicious deployment of internal and external IT resources to fulfill business objectives. IT managers must analyze the sourcing opportunities (Lacity & Willcocks, 1998) and threats (Barthelemy, 2003b) from the ways in which the IT functions are organized (Agarwal & Sambamurty, 2002) and define up-front the desirable performance objectives (Domberger et al, 2000). Sourcing strategy is produced as a result of analysis of business strategy (and, where available, past experience) and attendant requirements for strategic resources. Sourcing strategy serves as the logic underlying the firm's outsourcing decisions – such as degree of integration (selective or comprehensive outsourcing), allocation of control (fees for service or partnership), or contract performance periods. Outsourcing success can be measured by: strategic competence, cost efficiency and technology catalysis (Lee et al 2004). Empirical evidence shows that carefully crafted IT sourcing strategies result in more successful IT outsourcing and increase the overall performance of the firm (Barthélemy, 2003a). Outsourcing success can be measured from business and user perspective (Lee & Kim, 1999). The former is motivated by the promise of strategic, economic and technological benefits, while the latter is by the quality of offered services.

Underpinning the move toward outsourcing has been a confluence of structural and theoretical changes in the nature of business and organizations dating back approximately two decades. Theorists have suggested that the changing nature of competition has resulted from two factors: (a) globalization of commerce engendering worldwide competition, and (b) technology developments that have changed basic business processes related to time and distance. Globalization and technology have placed enormous pressure on firms to cut costs and improve efficiency in the interests of self-preservation (Clott, 2004).

Kaiser and Hawk (2004) argue that there is currently an evolution of offshore software development from outsourcing to cosourcing. Five recommendations are obtained, from the experience of a financial institution, for others on structuring offshore outsourcing relationships: (1) understand where cosourcing is applicable, (2) define and develop the appropriate in-house IT competencies, (3) build trust but avoid building a binding relationship, (4) foster mutual understanding of ethnic and corporate cultures, and (5) map out a progression to cosourcing.

More and more firms are adopting a new practice known as transformational outsourcing to facilitate rapid organizational change, launch new strategies and to reshape company boundaries – a form of business model innovation (Linder & Cantrell 2000). While this requires senior executive leadership, dramatic organizational performance improvements have been reported by many firms. To help firms assess what to outsource and how to succeed in an outsourcing arrangement, eleven theories concerned with outsourcing can be used (Gottschalk and Solli-Sæther 2006). The theories are: core competencies, resource-based, transactional cost, contractual, neoclassical economic, partnership and alliance, relational exchange, and agency. In developing sourcing strategies, IT managers can leverage from the experiences of several alternatives for sourcing strategies reported by Schniederjans et al (2004), Lacity & Willcocks (2000b), Lacity et al (1996), Laudon & Laudon (2005), and Barthelemy & Geyer (2004), and from the case studies performed by Gottschalk & Solli-Sæther (2006).

Judicious resource allocation to strategic programs and initiatives is the key to successful strategy execution. A sound IT governance lead by a disciplined Chief Information Officer (CIO) is a necessary condition for successful IT strategy execution. IT governance defines the firm's decision rights and accountability framework to encourage the desirable behaviors in the management and use of IT (Weill and Ross 2004). Distinct from IT management which focuses on effective management of IT operations to deliver quality IT services, IT governance focuses on performing and transforming IT to meet present and future demands of the business and external customers (Grembergen et al 2004). IT governance includes enterprise architecture governance and IT portfolio management governance and outsourcing governance. Research has shown that IT governance has enabled top-performing firms to generate superior returns on their IT investments (Weill and Ross 2004). Outsourcing governance model consists of four elements: contracts, principles, resources, and activities. Governance issues for each element evolve with outsourcing lifecycle which comprises three stages: formation, operation and outcome – for instance, contracts are concerned with transactions at the formation stage but evolve to relationships and partnerships at the outcome stage. The eleven outsourcing theories can also help both the client company and the outsource vendor analyze how to be successful in the relationship (Gottschalk and Solli-Sæther 2006). IT governance demands strong IT leadership to ensure success. From IT governance standpoint, CIO plays an astute resource allocator and entrepreneurial roles (Useem and Harder 2000). Both roles require strong understanding of business and competitive markets to excel. Strong leadership also renders governance process more efficient and

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effective. From outsourcing standpoint, CIO needs to be skilled in strategic thinking, deal making, partnership governing and managing change (Useem and Harder 2000). In hyper-competitive markets, the 'new' CIO must excel in both business and technology capabilities, as well as being organizationally (some says politically) savvy. These capabilities allow the CIO to lead IT organizations towards high level of maturity in all core practices: business/IT strategic alignment, strategic integration, enterprise architecture, IT portfolio management, service management, knowledge management and business innovation. When IT organization becomes a highly recognized key contributor to business success, CIO's leadership standing will be such that business will be seeking his/her input for future growth strategy (Broadbent and Kitzis 2005). Influencing, shaping business expectations, conceiving and implementing business model innovation may become the new CIO's core focus. It may even pave the way for possible growth into becoming a future CEO!

Business innovation is an increasingly important discipline in which the CIO must become skillful. To contribute to company growth, CIOs must be skillful in product, service and process innovation. To help transform the business, CIOs must be capable of conceiving business concept/model innovation (Hamel 2000, IBM 2006) through creative use of disruptive technologies. IT organizations must be capable of investing resources in a portfolio of incremental innovations (product and service improvement) for incremental revenue growth, and higher risk radical or disruptive innovations (business model transformation) for dramatic profit growth. IT organizations must grasp the characteristics and scale of innovation. To become an innovator, IT must first win business trust and respect by becoming an excellent IT service provider with high quality and reliable service 7x24x365. Then, IT must improve its maturity to level 5 of IT-enabled transformation – business direction change (Venkatraman 1994). At this level, IT must have simultaneously attained level 5 of strategic alignment process – optimized process (Luftman et al 2004), where strategic integration is norm (King and Teo 1997), and level 4 of IT portfolio management – synchronized process (Jeffery and Leliveld 2004). At this level, too, IT and the firm must possess all three information capabilities of information behaviors and values, information management practice, and information technology practice (Marchand et al 2001); and, more importantly, be able to concurrently manage their interactions. For example, at this level of maturity, firm's knowledge workers will be proactive in sensing dynamic external market and technology environmental changes, and taking timely action on the new 'intelligence' to create an innovative response – be it a new product idea or strategy repositioning – which will strengthen the firm's competitive position. IT will add value in three ways: provide the IT infrastructure to streamline the innovation process (with environmental sensors, collaborative and knowledge management tools, and customer feedback loop), provide the IT solution for new product idea, and create the innovative idea as a result of detection of emerging market or technology environmental changes. This is the ultimate level of IT management excellence. To prepare for the journey of business innovation excellence, IT organizations must understand the conditions for and drivers of innovation, and investigate the issues surrounding innovation process, infrastructure and management measurement. An organization's innovation capability is shaped by the leadership agenda (Barsh et al 2007). CIOs must lead by example, and actively create and sustain an innovative IT climate (Watts & Henderson 2006) and the associated culture that encourages and promotes innovation across the whole IT organization.

A firm's innovation capabilities are underpinned by its knowledge and knowledge management capabilities – that is "ability to absorb and put to use new knowledge" (Adams et

al, 2006). Knowledge management contributes to value creation by enhancing: intellectual asset management, operational efficiency, customer and competitor intelligence, continuous improvement, organizational learning, product and service innovation and time to market (Metaxiotis and Psarras 2006). To leverage knowledge management for business innovation, IT leaders must understand the basic principles, theories and practices of knowledge management. Extending resource-based theory of firm to knowledge-based, the success of firms is not only based on the economics of the contracts it implements, but also on its heterogeneous stocks and flows of knowledge (Grover and Davenport 2001). Companies having superior knowledge are able to coordinate and combine their traditional resources and capabilities in new and distinctive ways, providing more value to their customers than can their competitors (Zack 1999). Knowledge, especially context-specific, tacit knowledge embedded in complex organizational routines and developed from experience, tends to be unique and difficult to imitate (Zack 1999). To gain a knowledge-based strategic advantage, firms need to understand the characteristics of knowledge. Knowledge is information combined with experience, context, interpretation, reflection, intuition and creativity. There are three categories of knowledge, with increasing level of sophistication: core (to stay in business), advanced (to remain competitively viable) and innovative (to lead entire industry) knowledge (Zack 1999). This strategic knowledge framework helps firms conduct strategic knowledge gap analysis to define their business and knowledge strategies. Knowledge management is a discipline focused on systematic and innovative methods, practices, and tools for managing the generation, acquisition, exchange, protection, distribution, and utilization of knowledge, intellectual capital and intangible assets (Montana 2000). There are three schools of knowledge management: the economic school, the organizational school, and the strategic school (Earl 2001). The economic school has a focus of income, where the aim is to exploit knowledge assets (i.e. incremental innovation). The organizational school has a focus of networks, where the aim is knowledge pooling (e.g. Socialization, Externalization, Combination, Internalization SECI process). The strategic school has a focus of competitive advantage, where the aim is to identify, exploit and explore knowledge capabilities (as the essence of the firm's strategy). Firms may choose a combination of principles from these schools to guide their knowledge management strategies. Commonly, from IT-enabling perspective, firms adopt a dual codification (automation) and personalization (people network) strategy, with one being more dominant than the other (typically 80/20 ratio) (Hansen et al 1999). Three variant strategies are identified for three different types of businesses: stock strategy for efficiency-driven business, flow strategy for experience-driven business, and growth strategy for expert-driven business (Hansen et al 1999). A Chief Knowledge Officer (CKO) is often appointed to lead corporate-wide knowledge management initiative in the organization. The CKO role is an important one for both operational and symbolic reasons (Grover & Davenport 2001). CKO is responsible for knowledge-based innovations in the firm. CKO evangelizes the business value of knowledge management to get the whole organization embrace sound knowledge management practice both operationally and behaviorally. CKO leads the development and implementation the organization's knowledge management strategy (to close the strategic knowledge gap) in line with business strategy. CKO needs to be an intrapreneur (Antoncic & Hisrich 2001), skilful in knowledge design (Davonport & Prusak 1998, Earl & Scott 1999) and knowledge architecture (Applehans et al. (1999).

Eleven distinct IT requirements of knowledge management emerge: interaction between information and knowledge; interaction between tacit and explicit knowledge; knowledge management strategy; combination of SECI process; explicit transfer of common knowledge;

link knowledge to uses; treat knowledge as an intellectual asset in the economic school; treat knowledge as mutual resource in the organizational school, treat knowledge as a strategy in the strategy school; value configuration determines knowledge needs in primary activities; and, incentive alignment (Alavi and Leidner 2001, Hansen et al 1999, Ba et al 2001).

The source of strategic advantage lies with the application of knowledge. IT can enhance the speed of knowledge integration and application by codifying and automating organizational routines. Workflow automation and rule based expert systems are example applications. IT can also facilitate each of the four knowledge processes of creation, storage and retrieval, transfer and application (Alavi and Leidner 2001). In short, IT can improve knowledge management to support business innovation for competitive advantage.

A case example of CLP Group, Hong Kong illustrates the enormous business value and competitive advantage that companies can expect to gain from meticulous formulation and execution of the business-aligned IT strategy. CLP's strategic alignment process adheres to the business and IT strategy concepts and principles and IT management best practices described in above. Using the Kaplan & Norton (2004) strategy map technique, the case example shows that CLP's IT strategy is aligned to the business strategy through three core strategic themes: regulatory and corporate governance compliance (part of CLP brand strategy), customer service differentiation, and IT organization capital alignment to contribute to business growth.

In summary, IT strategy and management best practices will not only deliver superior IT service performance to achieve operational excellence, but also business innovation to realize customer intimacy and product leadership strategies for long term growths. This requires CIO and IT organizations to have deep business knowledge, and to diligently plan, develop and manage their core competencies to attain, and with an organizational culture to match, over a period, a high level of maturity in a range of practices: service management, strategic alignment, enterprise architecture, IT portfolio management, IT governance, program management, outsourcing, IT-enabled business transformation, knowledge management and business innovation. Above all, CIOs need to create an innovative IT climate and trusting culture to help shape the business direction and contribute to business growth.

OVERVIEW OF CHAPTERS

The book is organized into three logical groups as shown in the figure below. Chapters I, II, and III form the group addressing "what is and why strategy." This group is targeted at students of IT strategy and management practices. IT practitioners may be able to skip it without loss of continuity.

Chapters IV, V, VI, VII, and XII form the group addressing "how to do IT strategy effectively." They form the basic and necessary knowledge base for successful IT strategy. In particular, Chapter XII is a case example of a successful IT strategy in practice. Both IT management practitioners and students are recommended to read these chapters.

Chapters VIII, IX, X, and XI form the group addressing "how do IT organizations influence business direction." This knowledge is required to help IT managers influence business direction and contribute to business growth. Both IT management practitioners and students are recommended to read these chapters. Overview of the chapters is as follows.

Chapter I introduces and explains the theories, basic principles, business models, and value configurations of firms with a view to identifying ways in which IT could play a role

and make a difference to firm's performance. A complementary set of theories pertaining to IT strategy are the resource-based theory and activity-based theory of firm.

Chapter II explains the principles of business and corporate strategy, strategic management, strategic planning, and the methods for strategy analysis.

Chapter III reviews the issue of alignment between business and IT strategies, and describes nine organizational analyses of how IT can add value to business

Chapter IV examines the critical success factors of IT strategy, holistically, across four phases of the strategic management life cycle from strategy formulation to planning to execution and to value delivery and monitoring end-to-end. It stipulates that IT and business must act as one in producing the corresponding business and IT strategy deliverables in each of these phases.

Strategic alignment, defined as the alignment of IT to business strategy, is the cornerstone of an effective IT strategy. Chapter V discusses in detail the principles of strategic alignment. It describes a method for achieving strategic alignment in each of four phases of IT strategy identified in Chapter IV. Two case examples (a bank and a retailer) companies are used to help illustrate the practical application of the strategy concepts.

A critical management tool for linking business and IT strategies to their disciplined execution is enterprise architecture. Enterprise architecture assures business and IT strategic alignment across all perspectives of business, information, application, and technology. Chapter VI reviews the principles and various well-known models of enterprise architecture. Enterprise architecture defines the firm's target future state architecture of the business and associated information systems as defined by its business/IT strategy. It identifies the gap of current architecture and prescribes the architecture principles for guiding the firm in migrating (strategy implementation/execution) towards that target future state, stage by stage.

The decomposition of the architecture gap into work packages for staged implementation is part of strategy execution. Chapter VII focuses on strategy execution, the most critical part of strategy management as the promised value of strategy can only be realized via diligent and disciplined execution. It reviews the basic models and practices of strategic program and portfolio planning and management. The portfolio of programs (each comprising projects of similar strategic theme) constitutes the evolutionary logical stages that the firm will invest in, at a desired risk/return ratio defined by portfolio and IT governance, to deliver the maximum business value while migrating towards the target enterprise architecture.

Business performance and differentiation is determined by the firm's ability to configure internal and external strategic resources and capabilities, including IT resources and capabilities. Chapter VIII reviews strategic IT resources and how they can be aligned to the organization's strategy and improve firm performance. In particular it discusses the transformational power and theories of sourcing strategy which allow firms to combine internal and external (outsourced) resources to obtain sustainable strategic advantage.

Judicious resource allocation to strategic programs and initiatives is the key to successful strategy execution. A sound IT governance lead by a disciplined chief information officer (CIO) is a necessary condition for successful IT strategy execution. This is the focus of Chapter IX. It describes the basic principles of IT governance, linking it to architecture and portfolio governance described in previous chapters and demonstrating its application to governing outsourcing relationships. It describes the CIO leadership behaviors required to lead and govern a modern business-savvy and mature IT organization.

Chapter X reviews an increasingly important discipline in which the CIO must become skillful—business innovation. To contribute to company growth, CIOs must be skillful in

product, service, and process innovation. To help transform the business, CIOs must be capable of conceiving business concept/model innovation through creative use of disruptive technologies. This chapter reviews how information and IT management practices can contribute to business innovation.

A firm's innovation capabilities are underpinned by its knowledge and knowledge management capabilities, that is, "ability to absorb and put to use new knowledge." Chapter XI reviews innovation-driven knowledge management practices. It reviews the characteristics of knowledge as a strategic resource and its relationship to strategy. The chapter describes in detail the various approaches to knowledge management and knowledge management strategy for value creation. It concludes by relating IT to supporting knowledge management to cover the full spectrum of IT management practices expected in running modern enterprises.

The book concludes by describing a case example of the business-aligned IT strategy of CLP Group, Hong Kong in Chapter XII. The case example illustrates a successful practical application of IT strategy principles and concepts, specifically strategy maps principles, described in previous chapters. Success is measured by the business value CLP has accrued through meticulous formulation and execution of its business-aligned IT strategy. It can therefore be used as a guiding example of "how to effectively develop and execute a business-aligned IT strategy."

ENDNOTE

[1] IT portfolio management governance is a subset of IT governance. Maizlish and Handler (Chapter 3, 2005) regard people and governance as the most important success factor of IT portfolio management best practice. They recommend (p91) adopting the CoBIT (Control Objectives for Information and Related Technology) framework for managing and controlling IT risks in line with business risks and objectives.