Preface

With the emergence of new technologies and due to the prevailing economic crisis, utilization of Information Technology (IT) has become indispensable for almost every organization. In this aspect, giving proper attention to the process of IT acquisition has become an important task of strategic decision makers in the organization. Further, due to the immense and inherent benefits, investments in IT acquisitions have grown significantly around the world. IT is also being considered as an important factor for all strategic decisions in most of the organizations today to meet the challenges of modern business and market. Emergence of IT components in the areas of resource planning, forecasting, and decision modeling has ensured the acceptability of IT as an infrastructure across various sectors including business, government, academia, and development. One of the major contributions of the IT-oriented services is towards formalization of processes, services, and establishing control and measurements of organizational performance. Along this discourse, IT-enabled Balanced Score Cards (BSC) and dash boards have led to wide acceptance of Enterprise Resource Planning (ERP).

However, due to strategic reasons and high investments in IT, organizations are now encouraged to measure and audit infrastructure created, services rendered, and the benefits accrued. This measurement includes all IT components like hardware, systems software, middleware, application software, user interfaces, networks, and communication systems. Quality models, standards, and various measurement systems have evolved to support this measurement.

IT acquisitions have brought in many improvements in organizations. However, there are many instances of post acquisition shocks in acquiring organizations do exist. IT acquisition failures are attributed to inadequate articulation of strategic needs, changes in the organizational priorities, and other influencing issues related to market. In many cases, failures are quite phenomenal in terms of return on investments, unrealistic service levels, poor usability, and inadequate User-Centered Designs (UCD). These failures have led to shorter lifecycles of IT infrastructures created. Another dimension that complicates the IT acquisition scenario is the release of continuous upgrades and updates in products and services. All these dimensions of performance measurements for IT acquisitions relate to organizational imperatives. IT acquisition generally includes strategizing, planning, acquiring and developing, deployment, and use of IT infrastructure. All these activities need a roadmap with clearly defined strategies and goals on a long-term basis.

Organizations today are mostly change oriented, and they face dynamic environment. Many organizations follow responsive strategies while some include preventive and proactive strategies of varying degree. In order to have continuity in business and stay competitive in the market (with market leadership as a long-term goal!) organizations strive for performance management and control over resources. However, establishing organization-wide standards for measurements and infusing controls in a transparent and
efficient manner is quite challenging. This is because organizations not only need to consider people, process, and technologies involved, but also manage culture, climate, and other related behavioral issues. BSC-based organizational performance measurement principles, software metrics and measurements, and various quality models have evolved for implementation of measurements and controls organization-wide. These approaches argue for understanding the interface between the organizational behaviour, systems approaches, and IT infrastructures created. This interface provides the scope for studying the importance of Information Systems (IS).

IS has emerged as a discipline that involves a deeper understanding on the organizational issues and maps them through a systems approach so that an IT plan could emerge for acquisition. Systems approach deals with strategies for alignment among the organization, its business processes, and the technology. This approach also provides insights to distinguish the routine and predictable performance and control management scenarios (systematic) in an organization from the unpredictable situations (systemic) which are often negotiated by the strategic decision makers. Thus, IS-centric study facilitates the process to understand the organization in a better manner, to allow the organization to strategically prepare itself for installing performance and measurement controls, and then direct the IT acquisition process.

Systems approach that has been used for studying organizational behaviour reveals that each organization displays unique strategies to have its business continuity. Due to this uniqueness, it is quite reasonable to study the systems well before embarking on the IT acquisition process for the particular organization. Besides, each organization has its own life cycles, including processes and products. These life cycles provide ample indications about the systemic and systematic behaviour of the organization. Study on these life cycles with IS perspectives provides the base and establishes a pattern for management of information, knowledge, and decision support mechanisms for effective deployment of IT-enabled services. An insight to this pattern helps identify common attributes across the spectrum and provides scope to apply best practices to conceptualize, develop, and implement common strategies for replication.

Various models have been developed to understand, analyze, and interpret organizational performance measurement patterns and acquisition of IT process with specific contributions to setting patterns and deploying desired infrastructures to enhance organizational performance. There are many models to recommend proper procedures and methods for evaluation of IT acquisition processes with IS perspectives. In models like Capability Maturity Model – Integrated (CMMI), International Standards Organization (ISO), and Strategic Alignment Model (SAM), some of these issues are addressed. CMMI outlines procedures to acquire products, systems, and services, and to manage the acquisition process. In the ISO models, process as well as product-specific acquisition principles are prescribed. In the SAM, though role of the acquiring organization is discussed, the importance of the various stakeholders in the acquisition process is weakly elaborated. However, most of these models recognize the necessity of a feasibility study, and proper approach to assess organizational needs leading to the determination of IT requirements. There is also a need for coordinated effort to align the organizational objectives with the systemic and systematic requirements of the organization and map them for implementation on a continuous basis. This alignment is dependent on the capabilities in the organization and is influenced by people, processes, and technologies.
ABOUT THE BOOK

This book is a reflection of our experiences in managing IT acquisition life cycles for over thirty years in the industry, government establishments, and academic institutions. In most of these organizations we worked with, it has been observed that IT acquisition has started by some champions that are leading the processes. In some cases, dire needs for managing volumes of transactions in functional areas like finance, accounting, costing, production, human resources, etc., led to introduction of IT infrastructure. In a few cases, IT vendors (manufacturers and service providers) showcase the products and services they offer with expected benefits and impress upon the procurement. However, in almost all these cases there was a lack of clear understanding about the organization holistically by the IT service providers and the people involved in IT acquisition processes. Each acquisition process was taken up as a project and it passed through an acquisition cycle having distinct stages, such as conceptualization, requirement determination, acquisition, and post acquisition. Each proposed project was evaluated through standard physical and financial parameters and was declared feasible. Most of these projects passed through the stages as defined above as per the policy of the acquiring organization. During feasibility assessment, the focus was on project proposed, assessment of hardware, software, funds, etc. However, in this process a few essential variables, which are very much related to the organization’s preparedness, were not considered. These factors attributed post acquisition shocks in many IT projects among these organizations. Furthermore, lack of this preparedness resulted in deploying IT-enabled services without providing better insights to performance and measurements in the organization. This also led to shorter life cycles of IT infrastructures deployed. In these cases, application software, databases, and other business intelligence tools underwent drastic changes frequently because of the dynamic requirements in the functional and strategic levels in the organization, thus resulting in elevated operational costs.

This experience provided us the motivation to examine the feasibility of assessing preparedness in the organization for IT acquisitions. It was apparent that there was a need to apply management principles for providing a systems approach to the organization before embarking on IT acquisitions. This systems approach aims to provide better insights to the organizational life cycles. Each organization displays its life cycle distinctly for its own life, organization structures, products, services, processes, and systems it handles. Overall, organizational life cycles are influenced by these individual life cycles. In order to have effective systems life cycles, it is essential that all these life cycles are studied in detail before IT acquisition is initiated and during subsequent stages of the IT acquisitions. Because of these complexities, it is pertinent to ensure that the life cycles of the organization, including the systems and IT, are well managed in an organization. This management needs preparedness to establish procedures for alignments among all the stated life cycles. Preparedness in these areas is expected to provide the impetus to establish systems in the organization and clarity in role management. Such clarity would support the organization in establishing organization-wide systems without least interference from the people who manage the roles. Well-articulated systems will also lead to areas of process improvements and value additions through IT interventions. Foremost, treating people and processes independently of the specified roles makes the systems more resilient. These features are part of enterprise IT acquisition process.

The book discusses various aspects of preparedness for the organization intending to acquire IT or wishes to assess preparedness at any stage of its life cycle. This book equips the readers with relevant inputs on the following issues to appreciate the preparedness of the organization in managing IT acquisitions:
• **Organizational Issues in IT Acquisitions**: It includes understanding the evolution, existence, life cycles, and continuity in organizations. This will provide the rationale behind establishing systems in organizations.

• **Understanding Systems in Organization**: This examines establishment of performance, control, and measurement systems in organizations. Organization’s preparedness in establishing systems is also discussed.

• **Understanding IT Issues in Organizations**: This relates to preparedness among the IT service providers (including IT department employees) to understand the organizational needs in each of the stages of IT acquisition life cycle. Evaluation of all IT components is considered important during each stage of acquisition. Preparedness in this area is expected to enhance the possibility of successful alignment between organizational priorities, systems, and the technology being used for value added services.

• Gather understanding on modeling process using Structural Equation Modelling (SEM) techniques and quantitative methods.

This book discusses various metrics used in each of the acquisition process. These metrics are related to organization, systems, and technologies as desirable for understanding the overall preparedness of the acquiring organization. A model is conceptualized, designed, and tested for its fitness to predict the organizational preparedness for IT acquisitions. Some cases are discussed to understand the applicability of the model. This book is expected to contribute to the overall preparedness exercise that an organization wishes to adopt during the IT acquisition life cycle. It aims to support the practitioners, researchers, users, and planners of IS engaged in the IT acquisition process. The book is expected to benefit the readers in evaluating overall organizational preparedness in acquiring and managing IT life cycles. The model developed can be used for predicting preparedness of the organization to meet the complexities in managing IT acquisition life cycles across all its stages. The reader will also benefit in evaluating strength and weakness in each of the acquisition stages of IT acquisition life cycle with a suggestion to improve upon.

**ORGANIZATION OF THE BOOK**

This book discusses two frontiers of IT acquisition management: one relates to “management in organizations” and the other covers “software engineering in computer science.” The motivation behind this discussion is to generate holistic “information generators” and “information users” in an enterprise environment and through their active collaboration. The main focus is on assessment of the preparedness of an organization to manage these “information generators” and “information users” and their role in IT acquisition processes. The book emphasizes the organizational preparedness that needs to be technology independent, even though substantial investments are to be made in terms of collaborating efforts of IT and non-IT human resources. This capability is expected to develop through a better climate, culture, and strategic choice made in the organization. It is believed that lack of such preparedness may affect the IT acquisition process. Thus, the book also discusses the stages of the IT acquisition process and the preparedness of the organization in each of the stages. Three stages of the IT acquisition life cycle in an organization are considered important, pre-acquisition, acquisition, and post-acquisition. In each of these stages, the organization needs to display specific preparedness traits to manage the IT infrastructures.
effectively. In each of these stages, understanding organization through sound management principles, understanding systems through appropriate IS, and software engineering approaches are essential features of the preparedness exercise. Organizing IT preparedness in all stages of the acquisition life cycle is an important aspect for consideration.

The book is organized in four sections. They include “Organizational Issues in IT Acquisition Preparedness,” “Technology Issues in IT Acquisition Preparedness,” “Modeling Process,” and “Application of the Model.” Section one includes two chapters to understand the organizational issues and rationale behind understanding the preparedness of IT acquiring organization. Chapter one discusses management of organizations, which includes the motivation for creation of organizations, the desire to exist in the market with a better life cycle, and the role of management to ensure organizational continuity. The objective of this chapter is to provide insights to understand the role of performance management, control systems, and their measurement to support organizational continuity. Organizational continuity is necessary because of its socio-economic and cultural contributions to foster prosperity.

In chapter two, performance management and control systems are discussed in order to establish system thinking in the organization. System thinking is considered contemporary because of the market dynamics and the need for change management in the organization. System thinking includes organizational issues defined through systematic and systemic behaviour, which are measured by standard metrics. It is thus necessary for the IT acquiring organization to translate its preparedness for articulating appropriate performance and control systems. The role of scorecards and dashboards are discussed in this chapter to support the role of system thinking in managing organizations.

Section two deals technology issues in IT acquisition processes. It has three chapters. Chapter three discusses organizational, technological, and quality perspectives of IT acquisition preparedness. This chapter puts forward that preparedness of IT acquiring organization is quite important in terms of creating abilities to understand the process for integration of IT components with information systems, to manage acquiring process, and assess users’ requirements and their preparedness to accept the computer-based information system.

Chapter four includes discussion on associated models for understanding various IT acquisition approaches, understanding organizational issues, capturing and analyzing user behaviour, analyzing usability of the IT resources in order to appreciate the acquisition holistically. These models include pre-acquisition-oriented quality and post-acquisition acceptance. This chapter focuses on three stages of the IT acquisition life cycle and discusses pay-off strategies of IT investments.

Chapter five focuses on IT acquisition life cycle and a possible approach in modeling the preparedness across all the stages. This chapter discusses strategic alignment exercises for the IT acquisition organization and conceptualizes the need for establishing a framework for assessment of organizational preparedness. The chapter is built on the strengths of various life cycle approaches discussed in previous chapters and reflects their behaviour in the assessment framework. The framework also included strengths of various model for assessment of quality and user capabilities.

Section three includes discussion on the modeling exercise and techniques adopted. This section has four chapters. Chapter six discusses modeling of IT acquisition process, measurement of the model fitness and its validation including the use of appropriate statistical methods with the perspective of measurement and architectures. Furthermore, the developed model is supported with suitably formulated hypotheses and enumerated variables to support the measurements of the output of the model with a formal proven method.
Chapter seven is devoted for discussing the validation process and its rationale. The readers will get the insights to the way the model is subjected to various parameters of validation notwithstanding their exposure to various techniques used in software engineering process assessments. Various metrics used in the model are presented and discussed. Formulation of hypotheses to justify and establish relationships among metrics and related variables are part of this chapter. This chapter discusses the role of influencers for the model and the way they are organized with the architectural imperatives (interchangeably the term variables are used for influencers). These influencers are placed in three tiers in order to showcase the hierarchical and architectural layering of the management control systems in the organization through systems thinking.

In chapters eight and nine, validation processes for Tiers-I and II are presented for preparing the base for fitness assessment of the model. Chapter eight illustrates the validation of Tier-I variables. Methods used for understanding questions, variables, and especially reliability of questions are discussed. Reliability of questions and multidimensionality of questions are tested for validation of Tier-I variables for further use.

Chapter nine discusses the validation processes for Tier-II. In this chapter, all the null hypotheses are tested with the help of dummy variables, since unequal sample sizes are dealt with in addition to the fact that the sample respondents are in distinct groups with specific deliverables.

In chapter ten, fitness of the model is discussed with various hypotheses formulated. This chapter discusses all the thirteen organizations that participated in this process and shared their data to test the model.

Advancing towards the final stage, section four is devoted to applying the model through an analytical framework. It has two chapters. Chapter eleven discusses the framework for analyses and application of the model, and two cases are presented with detailed organizational behaviour with specific references to their IT acquisition process and the consequences. The model is applied to showcase the observed weaknesses and strengths that the IT acquisition process has developed in the organization.

Chapter twelve includes methods to apply the model in the software engineering process modeling exercises. In particular, the Systems Development Life Cycle (SDLC) model is chosen as an example to map to the model developed and represent them in UML and SPEM languages. The UML-driven model presented in this chapter explains an approach to understanding the capabilities of IT users and non-IT users to collaborate. However, future work may include planning of capability thresholds, examining the capability parameters, and preparing a decision tree to track incapability and address it at the organizational level.