Preface

The evaluation of IT and its business value are recently the subject of many academic and business discussions. Investments in IT are growing extensively, and business managers worry about the fact that the benefits of IT investments might not be as high as expected. This phenomenon is often called the Investment Paradox or the IT Black Hole: large sums are invested in IT that seem to be swallowed by a large black hole without rendering many returns. Getting value from IT and the evaluation of IT will be the concern of this book.

This book, *Information Technology Evaluation Methods and Management,* brings together seventeen papers on IT evaluation written by academics and practitioners from different countries including Australia, Belgium, Canada, the Netherlands, South Africa, the United Kingdom, and the United States.

Potential contributors were reached through a Call for Chapters issued on the Web and distributed at the 1999 International Resources Management Association (IRMA) Conference in Hershey (US) and at the 1999 International Symposium on the IT Balanced Scorecard in Antwerp (Belgium). Presenters with interesting papers on IT evaluation at the 2000 edition of both conferences were invited to expand their paper into a chapter and submit it for this book.

The authors of the different chapters have been included in the review process and have reviewed and critiqued the manuscripts of their colleague-authors. I wish to thank the contributors to this book for submitting their chapter(s) and for assisting me in the review process as well.

The different contributions in this book discuss, besides the more traditional methods that focus on financial measures such as the return on investment, a number of alternative evaluation methods and the recent introduced measurement and management system, and the IT balanced scorecard.

The book is divided into five parts and seventeen chapters:

Part I: Benefits Management introduces new approaches to benefits realization through information technology and consists of three chapters:

Chapter 1: A Review of IS/IT Investment Evaluation and Benefits Management Issues, Problems, and Processes (Graham Pervan, Curtin University of Technology, Australia). Problems in managing and realizing IT investments include measurement problems, lack of pressure to measure, cost of post-implementation reviews, poor IS/IT adoption practices, and organizational culture. Unfortunately, some managers see IT as a technical issue, seek financial bottom-line justifications, and see functionality as a benefit in itself. It is important to recognize that financially-orientated measures such as NPV and ROI are useful but largely ignore intangible benefits. In this chapter, different approaches

to benefits management are discussed including Cranfield's Process Model of Benefits Management, the Active Benefit Realization approach, and DMR's Benefit Realization Model. The application of structure and discipline to the process, through models such as these, will improve the measurement of IS/IT benefits in organizations and lead to more effective investment of organizations' scarce resources in key elements of information systems and technology.

Chapter 2: The Benefits Realization Approach – Leveraging the Potential Value of Information Technology (John Thorp, DMR Consulting, Canada). As we enter the so-called "New Economy", the question that is increasingly being asked is whether the investments in information technology are providing the greatest possible value. This is not a technology issue, it is a business issue. If organizations are to realize the full potential of the latest wave of e-Business applications, they must approach the implementation of such applications differently than they have in the past. In this chapter, a new approach to the management of IT investments, a Benefits Realization Approach is introduced. Benefits realization requires a new mind-set, one that is focused on business results but that recognizes that IT alone cannot deliver these results. The elements of the proposed DMR Benefits Realization approach include: (1) moving beyond stand-alone IT project management to business program management; (2) proactively managing change as an integral part of business programs; (3) shifting from free-for-all competition for resources to a disciplined portfolio management approach; and (4) adopting a full cycle governance view of managing projects, programs and portfolios, with clear accountability and effective measurement.

Chapter 3: The IT Evaluation and Benefits Management Life Cycle (Judy McKay & Peter Marshall). This chapter describes and analyses a framework to achieve adequate linkage between IS/IT planning, evaluation of investments on an ongoing basis, and also active realization of benefits to the organization over time. This framework is called the IT Evaluation and Benefits Life Cycle, and shows how to integrate planning, evaluation and benefits activities. It is argued that this mix of planning, evaluation and benefits management is vital, as each of these components adopts a somewhat different (albeit important) focus on the other. The position adopted in this chapter reflects the authors' belief in a need to meld or simultaneously juggle these three perspectives if more effective utilization of the IT resource is to occur.

Part II: IT Evaluation Research and Methods reviews the current research in the evaluation of information systems and the methodologies for IT investment evaluation. This part consists of two chapters:

Chapter 4: A Review of Research Issues in Evaluation of Information Systems (Vassilis Serafeimidis, University of Surrey, UK). Information systems evaluation is an important element of information systems governance and management. Therefore, the academic literature is not short of publications in the area. This chapter critically discusses a variety of views of information systems evaluation that have appeared in the literature during the last ten years. The chapter aims at providing a comprehensive classification and discussion of the theoretical and practical developments in the field. The analysis is based on a conceptual framework deriving from a definitional approach to evaluation. Each area of evaluation will be investigated across: purpose/reasons (Why?), the subject (What?), the criteria/measurement (Which Aspects?), the time frame (When?), the people (Who?), and the methodologies/tools (How?). The framework considers the socio-technical nature of information systems and the multidimensional character of evaluation. Three streams of evaluation research are discussed: the traditional technical/functional, economic/financial

and a number of interpretive alternatives (e.g. flexible non-bureaucratic, contemporary meta-methodologies) which attempt to propose answers to the various criticisms of the rational/positivistic streams.

Chapter 5: Methodologies for IT Investment Evaluation: A Review and Assessment (Egon Berghout & Theo-Jan Renkema, Delft University of Technology). The contribution of this chapter is twofold. First, the different concepts that are used in IT evaluation are discussed and more narrowly defined. When speaking about IT investments, concepts are used that originate from different disciplines. In many cases there is not much agreement on the precise meaning of the different concepts used. However, a common language is a prerequisite for the successful communication between the different organizational stakeholders in evaluation. In addition to this, the chapter reviews the current methods and puts them into a frame of reference. All too often new methods and guidelines for investment are introduced, without building on the extensive body of knowledge that is already incorporated in the available methods. Four basic approaches are discerned: the financial approach, the multi criteria approach, the ratio approach and the portfolio approach. These approaches are subsequently compared and the chapter concludes with suggestions on how to improve evaluation practice and recommendations for future research.

Part III: Alternative Ways of Traditional IT Evaluation focuses on nontraditional IT evaluation approaches such as evaluation procedures taking into account organizational properties, the evaluation of IS quality, the evaluation of evolutionary systems, and the evaluation by comparing with a framework of informatization levels. This part consists of four chapters:

Chapter 6: The Institutional Dimensions of Information Systems Evaluation (Vassilis Serafeimidis, University of Surrey, UK). Information systems evaluation is a highly complex, in conceptual and operational terms, social process. The academic research has focused, primarily, on methodological guidelines and formal evaluation procedures ignoring its organisational nature. This chapter adopts a highly interpretative approach and explores a number of organisational properties which play a key role in IS evaluation. The aim of the chapter is to increase the management awareness in terms of the organisational properties affected by IS evaluation and lead to its successful integration with other IT and business management processes. The chapter discusses the evaluation stakeholders analysis, their evaluation (cognitive) schemas and the most common (evaluation related) organisational roles (the strategist for evaluation and the evaluator). Those entities are used as foundation stones to identify one of the four possible evaluation orientations (control, social learning, sense making and exploratory) and lead to practical actions which will facilitate the successful management integration.

Chapter 7: Evaluating IS Quality: Exploration of the Role of Expectations on Stakeholder's Evaluation (Carla Wilkin, Rodney Carr & Bill Hewett, Deakin University, Australia). With organizations so reliant on information systems to perform day-to-day activities, the quality of such systems can impact significant on organizational performance. One way to determine the quality of performance of such systems is to evaluate stakeholder end user opinions. This chapter used a new configuration of the IS Success Model as the theoretical framework for appraisal of IS Quality, through evaluation by stakeholder and users. The related empirical study tested the relevance of a marketing premise to information systems, namely that evaluation of quality is best determined by understanding stakeholders' perceptions and expectations for such performance. This trial sought to determine whether quality of information systems is better measured by the disconfirmation between

stakeholders' perceptions and expectations of performance, or by the evaluation only of such perceptions. The results confirm that there are differences using the two approaches. In particular, the results of this study suggest the relevance of measuring expectations. Some implications of these results are discussed.

Chapter 8: Evaluating Evolutionary Information Systems: A Post-modernist Perspective (Nandish Patel, Brunel University, UK). Information technology and information systems that are intertwined with business processes and that are subjected to continuous business change are characterized as evolutionary information systems. Such systems pose a new challenge in the field of systems evaluation. The development and use of evolutionary information systems in business organizations is traditionally subjected to objective measures of evaluation. In this chapter, issues in evaluating information technology and information systems based on business processes in modern organizations are examined using a post-modernist perspective that takes into consideration subjective factors of users and their process-based organizations. Subjective interpretation, situation, and the context of information system use are key subjective factors that are proposed in a post-modernist framework for evaluating evolutionary information systems. Heideggar's ontological consideration of human Dasein (being) form the philosophical basis of the proposed framework. Practical issues in information technology and information systems evaluation such as systems requirements, systems functionality, and system adaptability are discussed in the context of the proposed post-modernist approach.

Chapter 9: A Framework to Evaluate the Informatization Level (Soo Kyoung Lim, University of Wisconsin-Madison, USA). A rapid development of information and communication technologies followed by economical change, cultural innovation and organizational reformation; this phenomenon has been referred as Informatization. Informatization is considered as one of the important success factors for economical growth. Since the middle of 1990, performance-based management has put emphasis on the IT investment. In this respect, evaluation of an organization's informatization level is an important managerial concern. In this chapter, as reviewing various evaluation models and frameworks, meaningful indexes that can represent informatization are provided, and an evaluation model with a new and different approach is introduced.

Part IV: Evaluation of New Technologies covers the evaluation of Enterprise Resource Planning projects, and an evaluation approach to strategic electronic commerce decisions. This Part IV consists of three chapters:

Chapter 10: Using Cost-Benefit Analysis for Enterprise Resource Planning Project Evaluation: A Case for Including Intangibles (Kenneth Murphy & Steven Simon) This chapter demonstrates how cost-benefit analysis can be applied to large-scale Enterprise Resource planning (ERP) projects, and that these project justification techniques can incorporate intangible benefits with ERP systems. A brief review of the standard cost benefit analysis techniques for ex-ante project evaluation is followed by an in-depth discussion of intangibles that focuses on those factors that may be involved in justifying technology investments. Detailed information on the business case utilized by a large computer manufacturer in their decision to implement SAP system R/3 is presented. The organization under study utilized standard cost-benefit techniques including the tangible factors of productivity increases, and decreases in inventory and IT operations expense to build their case. This company significantly strengthened their position by including intangibles, e.g. user satisfaction in the cost-benefit analysis framework.

Chapter 11: Evaluating the Management of Enterprise Systems with the Balanced

Scorecard (Michael Rosemann, Queensland University of Technology, Australia). In this chapter, the balanced scorecard, a framework originally developed in order to structure the performance measurement for an enterprise or a department, is used for the evaluation of the implementation of Enterprise Resource Planning (ERP) systems. By adapting the balanced scorecard and adding a new fifth project perspective, a comprehensive evaluation of ERP software is achieved and an alternative IT evaluation approach is introduced. This approach supports the time consuming implementation of ERP systems and their benefits realization stage.

Chapter 12: A balanced Analytic Approach to Strategic Electronic Commerce Decisions: A Framework of the Evaluation Method (Mahesh Raisinghani, University of Dallas, USA). This chapter presents a comprehensive model for optimal electronic commerce strategy and extends the relatively novel Analytic Network Process (ANP) approach to solving quantitative and qualitative complex decisions in electronic strategy. A systematic framework for the identification, classification and evaluation of electronic commerce strategy using the Internet as an information, communication, distribution, or transaction channel that is interdependent with generic business strategies is proposed. The proposed methodology could help researches and practitioners understand the relation between the benefits organizations seek from an information technology and the strategies they attempt to accomplish with the technology.

Part V: IT Evaluation Through the Balanced Scorecard, rounds out this book on IT evaluation by covering the fairly new IT evaluation approach of the IT balanced scorecard and presents case studies on this issue. This part consists of five chapters:

Chapter 13: Information Technology Governance through the Balanced Scorecard (Wim Van Grembergen and Ronald Saull, University of Antwerp, Belgium). In this chapter the balanced scorecard (BSC), initially developed by Kaplan and Norton, is applied to information technology. A generic IT BSC with a user orientation perspective, an operational excellence perspective, a business contribution perspective, and a future orientation perspective is proposed. Its relationship with the business balanced scorecard is established and it is shown how a cascade or waterfall of balanced scorecards can support the IT governance process and its related business/IT alignment process. Further, the development and implementation of an IT BSC is discussed and an IT BSC Maturity Model is introduced. The chapter concludes with the findings of a real-life case. The main conclusions of the case are that the development of a balanced scorecard for information technology is an evolutionary project and that to be successful one needs a formal project organization.

Chapter 14: Using a Balanced Scorecard Framework to Leverage the Value Delivered by IS (Bram Meyerson, Quantimetrics, South Africa). In this chapter a commercial methodology is described that can be used to assess the value that a typical IS group delivers to its business partners. The proposed approaches are based on research conducted by Computer Sciences Corporation and QuantiMetrics and are also based on practical application by QuantiMetrics. The chapter focuses on a balanced scorecard framework for an IT organization and describes a number of assessment techniques in each domain of the scorecard. These assessments include IS expenditure alignment, IS and business alignment, IS process assessment, IS capability assessment, IS and business partnership and satisfaction assessments. The assessments have enabled both IS executives and senior management to measure where their organizations stand in relation to the growing convergence between business strategy and IT.

Chapter 15: Management of Large Balanced Scorecard Implementations: The Case of a Major Insurance Company (Peter Verleun, Egon Berghout, Roel van Rijnbach, & Maarten Looijen, Delft University of Technology). In this chapter, established information resource management theory is applied to improve the development and maintenance of large balanced scorecard implementations. The balanced scorecard has proved to be an effective tool for measuring business and IT performance. Maintaining a business-wide balanced scorecard measurement system over a long period implies, however, many risks. An example of such a risk is the excessive growth of scorecards as well as scorecard metrics, resulting in massive data warehouses and difficulties with the interpretation of data. This is particularly the case in large organizations. The proposed balanced scorecard management framework is in this chapter illustrated with the experience gathered from the company-wide balanced scorecard implementation within a large insurance company in the Netherlands.

Chapter 16: Integrating the Balanced Scorecard and Software Measurement Frameworks (Nancy Eickelmann, NASA, USA). Process improvement approaches such as Total Quality Management, the Capability Maturity Model and ISO-9000 share a customer focus towards measurable business process improvements that promise cost reductions and cycle time improvements. Unfortunately, these approaches are frequently not linked to the organization's high-level strategic goals. In this chapter, the balanced scorecard is introduced as a provider of a necessary structure to evaluate quantitative and qualitative information with respect to the organization's strategic vision and goals. There are two categories of measures in the balanced scorecard: the leading indicators or performance drivers and the lagging indicators or outcome measures. The performance drivers enable the organization to achieve short-term operational improvements while the outcome measures provide objective evidence of whether strategic objectives are achieved. The two measures must be used in conjunction with one another to link measurement throughout the organization thus giving visibility into the organizations' progress in achieving strategic goals through process improvement.

Chapter 17: A Comparative Analysis of the Balanced Scorecard as Applied in Government and Industry Organizations (Nancy Eickelmann, NASA, USA). This chapter provides a comparison of two case studies regarding the use of the balanced scorecard framework. The application of the balanced scorecard is evaluated for a Fortune 500 IT organization and a government organization. Both organizations have a business focus of software development. The balanced scorecard framework is applied and reviewed in both contexts to provide insight into unique organizational characteristics for government and contract software environments. How the balanced scorecard is applied in an industry context and a government context is described and contrasted. An analysis of key differences among financial perspectives, customer perspectives, internal business process perspectives, and learning and growth perspectives for both areas is conducted. A unifying thread of the study is to evaluate the use of measurement for the operational, managerial, and strategic purposes of an organization. The case studies provide additional insight to applying the balanced scorecard in a software development intensive environment.

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