

# Preface

Small and Medium-Sized Enterprises (SMEs) constitute nowadays a major business sector all over the world, covering a wide spectrum of industries. The number of SMEs far exceeds the number of large and very large organisations. SMEs contribute strongly to the GDP and even more to the growth in employment of most countries. In Europe, two-thirds of all new jobs are created by SMEs and more than 99 % of all enterprises are SMEs (Commission 2011a; Commission 2011b). Even today, the U.S. economy is by no means dominated by giant corporations. More than 99 % of all independent enterprises employ fewer than 500 employees (SBA 2011). These SMEs account for 52 % of all U.S. workers. Similar numbers can be found for other developed as well as for developing countries all over the globe. SMEs contribute disproportionately to innovation, generating 13 times as many patents per employee as large companies do (Horn et al. 2012).

Contradictorily, many SMEs struggle to survive and grow and they display limited productivity. In spite of being a key economic contributor in many countries, SMEs suffer from various challenges, often inherent, often induced by social, economic, geographical or cultural grounds or other reasons beyond their control. Although there are quite some factors contributing to low SME survival rates, one crucial factor that has been singled out is the (lack of) successful adoption and use of Information Technologies (IT). IT can be seen as an enabler for business growth, effective competition, and innovation in SMEs (Higon 2012; Levy et al. 2005). However, when it comes to IT adoption and use, SMEs are not the best pupils in class as many studies have shown (Antlova 2009; Arbore et al. 2006; Sharma 2009; Wielicki et al. 2010). SMEs often express a reluctant vision to IT adoption which is mainly based on a lack of managerial IT capabilities. This is due to organisational immaturity and results in an asymmetric relationship with IT suppliers dominating the arena (Devos et al. 2012). SMEs are vulnerable organisations with a shortage of expertise, resources and managerial maturity (Welsh et al. 1981).

On the other hand we see that in the field of IS research most empirical work is conducted in large organisations and SMEs are often left on their own (Devos 2011). The reasons for this are manifold. Some scholars do not always believe that SMEs constitute a different unit of analysis for IS research. There is still much debate going on in that domain. Research has revealed that the success of bringing

IT into organisations is positively related to organisation size (Eindor et al. 1978). Although it is very cumbersome to clearly define what constitutes IT success, it was shown that success of bringing, for instance, ERP into organisations supports the size hypothesis (Ifinedo 2007; Mabert et al. 2003). There is also the problem of defining what constitutes an SME. In Europe SMEs are defined as companies with less than 250 employees, but in the U.S. SMEs are defined as companies with up to 500 employees (Commission 2003).

However in view of the current economic turbulence, it has never been more important to focus on the collection of scientific knowledge on SMEs in relation to IT/IS, since it is on the back of these organisations that innovation, growth and potential recovery will be realised. To stimulate the IS research in SMEs we decided to bring various works of scholars and practitioners together in a contributed volume. There are two dimensions in every contributed chapter: an IT/IS phenomenon and an SME environment. Both dimensions are intertwined, but in their concerted action a unique subfield of IS research is created.

This volume is divided into six part, which cover various aspects of IS research in SMEs. In all chapters the unit of analysis is the SME. The first part, “IT Governance”, contains three chapters presenting various aspects of governance and management in SMEs. The first chapter, “[Governance of IT in Small and Medium-Sized Enterprises](#)” by Erik Guldentops addresses the enterprise governance of IT as the responsibility of the top layer of an entity to ensure IT is effective and efficient and provides value to the enterprise while keeping risks to an acceptable level. Enterprise governance of IT focuses on IT Value and IT Risk and consists of practices, organisational structures and relationships between executive and management. In SMEs however, these structures and relationships very often rest in one person, the owner/entrepreneur. The biggest value and risk challenge for SMEs is the acquisition of automated solutions because they often do not have sufficient capabilities to deal with it, they do not occur often and represent a relatively large risk. To address this, a set of acquisition guidelines is proposed. Finally, four management practices that resulted from recent pragmatic research are proposed for SME leadership to consider. This exertion is of high relevance since it is based on a long and intense work on IT Governance within the COBIT framework. The COBIT framework helps managers deal with enterprise governance of IT.

The second chapter, “[Business Process Management in Small Business: A Case Study](#)”, by Ian Dallas and Moe T. Wynn brings a case study of a BPM initiative to develop process infrastructure in an establishing small business. It explores whether mainstream BPM tools, techniques and technologies can be applied in a small business setting. The chapter provides a background to the case organisation, outlines the activities undertaken in the BPM initiative and distils key observations drawn from participation in the initiative and consultation with stakeholders. Based on case study experiences, a number of implications are identified for further consideration by the BPM community as it continues to address the question of how it can become more widely adopted amongst SMEs.

In the third chapter, “[Information Technology \(IT\) Security in Small and Medium Enterprises](#)”, Michael W. Kimwele addresses the issue of IT security in SMEs. SMEs should embrace IT security in order to realise the benefits of IT without compromising the IT security status. Much like any other business asset, information is an asset that needs to be strategically managed and protected. It is therefore imperative that SMEs understand the value of information contained within their business systems and have a framework for assessing and implementing IT security. To address challenges faced by SMEs, this research establishes an Information Technology (IT) framework that can allow SMEs implement cost effective security measures. The framework is likely to assist SME stakeholders measure the effectiveness of their security enhancing mechanisms.

The second part, “Adoption and Use” consists of five chapters. In the fourth chapter, “[Enterprise Architecture for Small and Medium-Sized Enterprises: A Starting Point for Bridging EA to SMEs, Based on Adoption Models](#)”, by Maxime Bernaert, Geert Poels, Monique Snoeck and Manu De Backer investigate why Enterprise Architecture (EA) is not yet adopted by SMEs, despite the benefits EA can offer. This chapter offers a starting point for EA technique developers to really adapt EA techniques to an SME context. Research steps are given to start developing EA techniques, as well as a starting point for a metamodel based on only four concepts, because the characteristics of SMEs emphasise the need for simple EA techniques. These concepts refer to four dimensions that are present in a broad spectrum of EA techniques.

The fifth chapter entitled, “[Assessment of Information Technology Use in Small and Medium-Sized Enterprises: Empirical Investigation in Five Cases](#)”, by Emre Sezgin and Sevgi Özkan presents an exploratory study with the practice of a new model for assessment of IT use in SMEs, which is called ITMEM: Information Technology Management Enhancement Model. This model aims to enhance IT management and processes within five domains (Identification, Selection, Acquisition, Exploitation and Protection) which brings together the organisational use of IT in a coherent whole. The results presented that practicing assessment in companies is encouraging in terms of IT use by employees and increasing quality of business processes. The reported findings would be a valuable asset for researchers who are developing a model, and for practitioners who are developing managerial implications on IT management and IT use in SMEs.

The sixth chapter, “[ICT Policy to Foster Interorganisational ICT Adoption by SMEs: The Netherlands Goes Digital Case](#)”, by Marijn G. A. Plomp, Ronald S. Batenburg and Pim den Hertog deals with a policy programme that a government set in place to improve SMEs on their adoption of ICT, particularly interorganisational ICT. Previous research provides unclear evidence on the effectiveness of these programmes. With this study the authors aim to provide new insight into the impact of such policy choices on ICT adoption. They assess a policy programme that ran in the Netherlands from 2002–2007. Participants are found to use significantly more interorganisational ICT and also more often find that ICT has enhanced their firm’s performance compared to the control group. However, pre-selection effects cannot be ruled out. Based on these results, the authors suggest

basic, awareness-focused policy programmes, as opposed to complex, government supported implementation processes.

In the seventh chapter of this part, “[Main factors for ICT Adoption in the Czech SMEs](#)”, Klara Antlova outlines the findings of a long-term survey among 30 small and medium enterprises (SMEs) in the Czech Republic and describe the important factors related to barriers to adoption of information technology and information systems. This qualitative survey of the examined companies was made by using multiple interviews, monitoring the attitudes of the management to the information and communication technology (ICT), using ICT as a competitive advantage, use of various types of applications and their impact on the organisation’s performance. It can be seen that managers or owners of SMEs are, however, often afraid of the organisational and financial demands of implementation of ICT. From the successfully growing companies the author analysed the importance of establishing business, information and knowledge strategy. Without the articulation of these strategies companies will, with difficulty, find their way in the current business environment. These three strategies have to be followed by other supporting strategies, i.e. marketing, finance and human resources.

The eighth and last chapter of this part, “[Adoption of Free/Open Source ERP Software by SMEs](#)”, by Constantinos J. Stefanou provides an insight into the adoption decision made by SMEs regarding FOS-ERP software. To remain competitive, SMEs find that they need to invest in information and communication technologies and especially in modern integrated business software. However, state-of-the-art propriety Enterprise Resource Planning (ERP) systems are not only too expensive but also too complex to install for the majority of SMEs. Viable alternative options, such as Free and Open Source ERP (FOS/ERP) software, are increasingly gaining attention by SMEs worldwide. The chapter aims at informing scholars, students, researcher managers of the issues and the risks involved and the factors influencing the decision of SMEs to adopt FOS-ERP software.

The third part, “Enterprise Applications” contains four chapters. The ninth chapter, “[Customer Relationship Management System. A Case Study on Small- and Medium-Sized Companies in North Germany](#)”, by Malte Menzel and Torsten Reiners focuses on Customer Relationship Management (CRM). CRM is a common tool in large enterprises; yet it seems not to be successful with small- and medium-sized enterprises (SME). The authors conducted a survey to analyse the state-of-the-art customer relationship management systems and the degree of pervasion in SME. The survey covers 253 SMEs from North Germany and evaluates the available systems, desired and actually delivered functionality, integration in the Information Technology landscape, client satisfaction, and arguments about benefits and drawbacks of current CRM-systems. The main contribution of the chapter is improving the awareness of the importance that CRM has specifically for SMEs and benefits which SMEs can gain using CRM.

The tenth chapter of this part, “[Empirical Study on Differences and Similarities in ERP Usage Among European SMEs](#)”, by Pedro Ruivo, Tiago Oliveira, Björn Johansson and Miguel Neto presents a cross-country European

empirical study. This chapter evaluates the determinants of enterprise resource planning (ERP) usage among SMEs. The authors empirically test six determinants (compatibility, complexity, efficiency, best-practices, training and competitive pressure) based on the diffusion of innovation (DOI) model to explain ERP actual usage across four European countries. They explore the differences and similarities in usage across Denmark, Portugal, Sweden and Spain. The cross-country analysis reveals that while for Portuguese and Swedish firms, SMEs system compatibility is an important facilitator for ERP usage, it is an inhibitor for Danish firms. Moreover, whereas system complexity is an important inhibitor for ERP usage in Portuguese and Danish firms, it is a facilitator for Spanish firms. Additionally, while for Portuguese, Danish and Swedish firms, transactional efficiency is significant, it is not so for Spanish firms. In addition, best-practices and competitive pressure are important determinants of ERP usage for all SMEs across all countries. Training is an important facilitator for Portuguese and Spanish SMEs. The main finding is that Portuguese and Spanish SMEs show different results despite the fact that they seem to be so similar and the same prevails among Danish and Swedish SMEs. The fact that this research is based on a large-scale survey across countries makes it important to understand the actual ERP usage among SMEs, alongside its value in adding an international dimension to the DOI literature.

The eleventh chapter of this part, “[ERP Implementation in an SME: A Failure Case](#)”, by Eli Hustad and Dag H. Olsen examines a failed ERP implementation in an SME. The improper handling of critical success factors (CSFs), particularly those relating to support from top management, project management and the use of consultants, led to severe problems. This placed stress on the organisation, caused employees to leave the company, workarounds and led to serious errors in the systems and a significant cost overrun. This chapter contributes to the literature on ERP implementation in SMEs. In particular, it contributes to our understanding of the socio-technical dynamics of ERP implementation projects. Failed ERP cases are little documented in the IS research literature and can yield insight into the complexity of ERP implementation projects and further our understanding of what may take place if CSFs are not handled properly.

The twelfth chapter of the part, “[Understand Marketing Information Systems from the Perspective of SMEs: Reviewing the Literature](#)”, by Canan Eryigit examines the existing literature on marketing information systems in SMEs for the period 2002–2012 in order to identify active research area, emerging topics and gaps in the literature. The author has encountered 48 empirical studies conducted on SMEs and investigated applications of information systems to marketing. The studies are categorised on the bases of journal, research area, publication year, country and research design. The categorisation leads to six main research areas namely adaption, competitive strategy, e-marketing, performance outcomes, customer relationship management and distribution strategy. Then, patterns in past research are identified and future research areas are provided.

Part 4 of this volume, “Capabilities and Knowledge” contains three chapters. The thirteenth chapter, “[The Ability of SMEs to Use Trust in Managing Offshore Activities](#)”, by Franz Josef Gellert and Hugo Velthuisen focuses on how

SMEs have found their way into multi-cultural relations to outsource or offshore their business processes. Relationships are built either from an economic or emotional point of view. Their study particularly focused on how SMEs owner/managers build, maintain and—when necessary—exit their relationships with other SMEs by using trust as a core element. The authors have chosen for a qualitative research strategy by conducting semi-structured interviews in The Netherlands, Germany, UK, Denmark and Sweden. The countries selected are representatives of the application of Northern-European and Anglo-Saxon business models. The results suggest that trust is of essence in the relationship building process and that the perception of trust needs to be understood and managed in multi-cultural relations by all parties involved. The can also conclude from their results that SMEs are intrinsically inclined to base their offshore activities on trust. For practical reasons, partners in relationships need to be educated and trained how to build trust in multi-cultural relations.

The fourteenth chapter, “[Exploring Knowledge Capabilities in SMEs: Cases in Five Irish Software SMEs](#)”, by Ciara Heavin and Frederic Adam explores how a knowledge management (KM) approach for SMEs differs from that implemented by a larger organisation. Unquestionably, KM has established considerable focus in multinational enterprises (MNEs) during the past decade, it is therefore imperative that policy makers engage SMEs in order to better comprehend the role of SMEs in the global economy. This chapter examines the knowledge capabilities in five Irish software SMEs with the objective of developing a greater understanding of an SMEs approach to KM and therefore developing an actionable way of assessing how important knowledge is managed, in this type of organisation. The transcripts derived from 28 interviews conducted were coded in order to identify the types of knowledge activities (KA) and modes of knowledge processing used to serve the knowledge needs of these organisations. While the total number of KAs varied from firm to firm, it was discovered that software SMEs are good at knowledge transfer activity. This finding is largely attributed to the size and the focused business objectives of these firms.

The fifteenth and last chapter of this part, “[Business Agility and Flexibility in Enterprise Service-based Information Systems: Application to PLM Systems](#)”, by Safa Hachani, Hervé Verjus and Lilia Gzara investigate how small industrial companies collaborating to develop new products need to implement the effective management of their product design processes (PDPs) and product information. PDPs are known for their changing, emergent and non-deterministic characteristics due to the business environment within which they are executed. Unfortunately, Product Lifecycle Management (PLM) systems, which are dedicated to support product design activities, are not as efficient as might be expected. PLM systems are based on workflow technology, which does not support PDPs agility. Process support flexibility requirements are necessary in order to facilitate coupling with the business reality. Furthermore, systems based on Service Oriented Architectures (SOA) have the inherent ability to evolve. The authors believe that SOA can promote the support of flexible PDPs. The aim of the work presented in this chapter is to propose an alternative approach for flexible product

design process support within PLM systems, by making profiles from SOA. The objective is to specify, design and implement PDPs in a flexible manner, in order to ensure that business changes can be rapidly made in PLM solutions. A generic services identification approach is proposed for architecting agile process-centred service-based information systems.

The fifth part of the book, “Innovation” consists of two chapters. The sixteenth chapter, “[Open Innovation in SMEs: Prospects and Challenges](#)”, by Hakikur Rahman and Isabel Ramos, describes how newly evolved technologies and multi-faceted researches along the setting of entrepreneurship development, philosophy, framework and business handling have been transformed from being traditional to innovative. Depending on the demand, diversity and nature of the transformation, innovation has been shifted from closed to open paradigm. Ranging from micro to small or, medium to corporate houses are being immensely benefited by the innovation techniques, especially utilising information and communication technologies (ICTs). However, the road to innovation, despite being seen or taken as a paradigm shift is not quite smooth and not even ready for many, particularly the SMEs who mainly deal with the clients at the outer peripheries of the social circle. This study synthesises issues of prospects and challenges in adopting open innovation for SMEs by carrying out a longitudinal literature review. Furthermore, the chapter provides a few research hints for researchers and research institutions.

The seventeenth chapter, “[Government Support to Information Systems Innovation in Small and Medium Enterprises](#)”, by Vega Arturo and Mike Chiasson investigates how SMEs need external assistance to accomplish their information systems initiatives. Governments have been addressing this by funding numerous programmes. The aim of the chapter is to understand these programmes. The findings indicate that programme workers tend to exert considerable discretion. This discretion appears to be the result of inadequate evaluation and auditing mechanisms, a probable collaboration of policy administrators, as well as broad and ambiguous policies. Apart from this, programmes tend to operate within problematic contexts. These contexts are composed of poor evaluation mechanisms, power of programmes over SMEs, scarcity of resources, low demand for programme services and alienation of workers. A relevant implication is that the improvement of contexts could also reduce discretion. However, the actors that could do this are located at diverse parts of the system. Therefore, the reform of programmes is a difficult task given the priorities and power of the participants. Finally, the chapter suggests that SME associations may represent a counteractive force to these policy influences in order to materialise policy reforms.

The last part of the book, “Internet and Internet-Related Technologies”, contains two chapters. The eighteenth chapter, “[Forums and Blogs and Wikis, Oh My!: An analysis of On-line Sources of Support for End-User Development](#)”, by Henri Korvela presents and argues a framework of four key factors: context, cooperation, interactivity, and immediacy that, it is argued, influence end-user developers’ ability to obtain/use development support. These four factors which were derived from an extensive literature review are used to analyse and compare the effectiveness of several existing support sources (mainly focusing on the on-



line versions) for end-user developers: personal contacts; help desks; trial and error several different knowledge repositories; virtual communities and Internet searches. Based on this analysis, tempered with the perceived needs of (mainly novice) developers from real-life situations, the chapter concludes that virtual communities is the most suitable support source (in the sense that it fulfils needs that developers may or may not beware of), especially for this category of end-user developers.

The last chapter of the book, “[Internet Technologies to Support SMEs’ Growth in New Markets](#)”, by Cerquitelli Tania, Chianese Stefano, Ferrero Merlino Chiara, Raimondi Francesca, Scapeccia Giuseppe, Spagnuolo Michele and Zolotukhina Irina analyses the existing Internet technologies that can support SMEs in their internationalisation process, emphasising the study of web-based platforms. The authors propose two classifications to categorise portals and websites based on the services provided. The aim of this study was to gather a list of current services offered online to ease SMEs’ internationalisation.

All 19 chapters of this book present a novel and innovative collection of work from various scholars presenting their recent research on IT and SMEs. The editors hope that this contributed volume will benefit both academics and practitioners. It is hoped by the editors that through this book, “Information Systems and Small and Medium-Sized Enterprises: State of art of IS research in SMEs”, both communities will find each other.

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