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THE IDENTIFICATION AND DEFINITION OF VALUE MANAGEMENT PRACTICES USED TO DEPLOY IS INVESTMENTS

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THE IDENTIFICATION AND DEFINITION OF VALUE MANAGEMENT PRACTICES USED TO DEPLOY IS INVESTMENTS

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Abstract

While many authors focus on the outcome of information systems (IS) investments, this paper explores management practices that support the deployment of IS investments so they can ultimately create value to the organisation. Such practices are defined as value management practices that facilitate the identification, creation, and capture of value in the deployment of IS investments. Very limited academic research has been oriented towards the identification of such value management practices. Moreover, the limited results are fragmented as many scholars investigate one single practice in isolation. Practitioner frameworks emerged in an attempt to integrate multiple value management practices, yet organisations still struggle with getting such practices and frameworks implemented and embedded into their organisations. In an attempt to contribute to the scarce literature, this research has executed a literature review and exploratory case study to identify and clearly define multiple individual value management practices. These findings are structured within the context of a conceptual framework that previously has been employed by IS scholars. As a result, the practices are categorised into structures, processes, and relational mechanisms and together constitute a new value management framework. In addition, this framework portrays the organisational level on which each value management practice can be operational, i.e. at individual IS investment level, portfolio level or enterprise level. By doing so, the value management framework creates a clear vision on the coherence and interrelationship of value management practices which might help organisations in the deployment and value creation of IS investments.

Keywords: Value management practices, IS investments, Literature review, Exploratory case study research, Grounded theory approach.

1 INTRODUCTION

Today, information systems play a central role in organisations as they are employed in the daily processes and routines as well as in the strategic decision-making affecting a large number of internal and external stakeholders (Peppard & Ward, 2005). This importance is evident from the continuous growth in global IS spending which has almost doubled during the last eight years (WITSA, 2008). Investments in IS can support strategic objectives such as organisational growth (Oh & Pinsonneault, 2007), and can positively impact the process performance (Ray et al., 2005) and organisational performance (Bharadwaj et al., 1999).

Despite the importance and increase in IS investments, the study field regarding value creation out of such investments has always been open to discussion as manifested by contradictory and contesting results (Oh & Pinsonneault, 2007; Sircar et al., 2000; Mukhopadhyay et al., 1995). A key focus of research has been the productivity paradox (Hitt & Brynjolfsson, 1996; Brynjolfsson, 1993), where no clear correlation could be found between IS spending and organisational performance. In the early twenty-first century, studies continued to challenge the value of IS (Lin & Shao, 2006; Carr, 2003). Yet the same period revealed findings illustrating a positive impact of IS investments on both financial and non-financial performance (Chari et al., 2008; Anderson et al., 2006). For instance, Chari et al. (2008) conclude that “increasing IS investments to accompany a firm’s overall diversification may be justified by the greater performance impact of such investments”.

According to Keyes-Pearce (2005), organisations can only obtain this positive impact if they introduce sound value management practices, defined as management practices that facilitate the identification, creation, and capture of value through the deployment of IS investments. For instance, as a value management practice to plan IS investments a business case can positively impact the organisational competitive advantage (Krell & Matook, 2009). Unfortunately, very limited academic research has been oriented towards the identification of such value management practices (Kyung et al., 2008). In addition, these limited results are fragmented as many scholars investigate one single practice in isolation (Maes et al., 2011). Practitioner frameworks emerged in an attempt to integrate multiple value management practices such as Val IT (ITGI, 2008) and the IT Capability Maturity Framework (Curley, 2009), yet organisations are unfamiliar or still struggle with getting such practices and frameworks implemented and embedded into their organisations (De Haes & Van Grembergen, 2009; Keyes-Pearce, 2005).

To meet these concerns, the present paper will develop a value management framework that facilitates the definition and integration of individual value management practices. To achieve this, we identify a list of value management practices that can be used in the deployment of IS investments. Furthermore, we define each individual value management practice and integrate these into a coherent value management framework. The framework itself will be developed based on management and IS literature. By doing so, the research contributes to literature with the definition and integration of fragmented individual value management practices. To practice, the individual practice definitions may give supplementary clarification to the emerged framework terminology. The value management framework makes an endeavour to logically present the mixture of value management practices and so to help organisations in the successful implementation of value management practices and the deployment of IS investments.

To achieve both objectives, this paper starts with the description of the conceptual framework through which the literature review and exploratory case study findings can be structured. Next, both research methodologies will be explained followed by a portrayal of the findings and individual value management practice definitions. These individual practices will then be integrated into one single value management framework. To end, this paper’s findings will be discussed and future research opportunities will be proposed.

2 CONCEPTUAL FRAMEWORK

The intent of a conceptual framework is to delineate a general or complex concept, to describe the concept’s various components and how they relate to one another (Miles & Huberman, 1994). In this paper, we describe a conceptual framework for value management and employ it to organise and synthesise the findings of a literature review and exploratory case study. Later in this paper, the conceptual framework is enriched with individual value management practices to create a coherent value management framework.

The foundations of our conceptual framework stem from the general management study field (De Wit & Meyer, 2005; Bartlett & Ghoshal, 1995), and has been adopted by IS scholars in the investigation of IT governance (De Haes & Van Grembergen, 2009; Peterson, 2004)¹. Their conceptual framework consists of three major components. *Structures* refer to the grouping of tasks and people into smaller groups (De Wit & Meyer, 2005) to formally connect business and IS stakeholders in daily and strategic processes (Peterson, 2004). *Processes* constitute the activities, procedures and routines to coordinate and monitor people within the organisation (De Haes & Van Grembergen, 2009; De Wit & Meyer, 2005). *Relational mechanisms* refer to practices to establish social interaction, active participation and collaboration among internal and external stakeholders through norms, values, and shared beliefs (Liu et al., 2009; De Haes & Van Grembergen, 2009; Peterson, 2004). As these mechanisms may also include the organisational culture (Powell & Dent-Micallef, 1997), the authors make the assumption that such social constructs can be manipulated and cultivated. According to Soh & Markus (1995), these three components also play a critical role in the value creation of IS investments which displays a link between the value management focus of this paper and the conceptual framework described above. Hence, we apply the conceptual framework to the notion of value management and its practices which stimulate the value creation out of IS investments.

Since the management of IS investments is executed throughout the organisation involving many different stakeholders (Peppard & Ward, 2005; Peterson, 2000), the value management practices that support this management should be implemented at multiple organisational levels. Therefore, we propose a cascaded approach consisting of three organisational levels on which the conceptual framework and its value management practices will operate. First, the organisation can only achieve value from IS investments when each is value-creating on the *individual level*. As argued by Melville et al. (2004) and Soh & Markus (1995), this requires a combination of IS and complementary organisational resources together with appropriate practices to guide the investment. Second, the organisation can create additional value if multiple IS investments are managed on a *portfolio level*. According to De Reyck et al. (2005), this integrating level is beneficial to maintain an inventory of individual investments, to consolidate their information, to manage investment interdependencies and to align investments to organisational objectives. Finally, the value created by the individual and portfolio level will only be value-creating on *enterprise level* if these IS investments are in line with its mission, vision, and strategy. Herein, the board of directors play a crucial role. They are accountable for aligning the business and IS strategy, setting the strategic direction, and reviewing the IS investment portfolio as well as facilitating the accommodating enterprise, business and technology architecture, technology infrastructure, and technology support (Nolan & McFarlan, 2005). It should be noted that most board of directors are not directly involved with IS and delegate these responsibilities to the executive management committee (Andriole, 2009).

In summary, we define value management practices as the organisational processes, structures, and relational mechanisms situated on individual, portfolio, and enterprise level that enable business and IS to understand, initiate, prioritise, deploy, manage, and evaluate IS investments and their outcomes, and to secure optimal value in the entire IS investment portfolio of the enterprise (Maes et al., 2011). This definition is represented by the conceptual framework as portrayed in Figure 1.

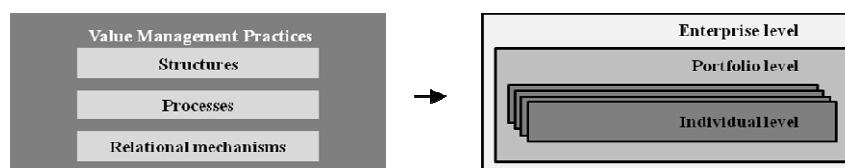


Figure 1. *Conceptual framework on value management organised by structures, processes, and relational mechanisms that operate on the enterprise, portfolio, and individual level.*

3 RESEARCH METHODOLOGY

In the execution of this research, both a literature review and exploratory case study has been utilised to identify and define individual value management practices. A comprehensive description of the literature

¹ The framework of De Haes & Van Grembergen (2009) and Peterson (2004) has been employed in the present paper because it is made up of three general yet comprehensive components. Whereas other frameworks such as the Weill & Ross model (2004) merely focus on a single aspect of IT governance (i.e. decision-making and accountabilities), the model used in this paper leaves enough flexibility to adapt the framework from IT governance to IT investments as a whole.

review process is desirable according to Vom Brocke et al. (2009), so readers can assess the review exhaustiveness and other scholars can more confidently (re)use its findings. Therefore, the literature review is discussed in line with Cooper's (1988) taxonomy using six constituent characteristics, consisting of (1) focus, (2) goal, (3) perspective, (4) organisation, (5) audience, and (6) coverage. In this paper, the literature review focuses on (1) academic and practitioners publications with the goal (2) to identify individual value management practices making use of a neutral perspective (3). Therefore, an exhaustive search (6) has been performed in multiple e-databases (EBSCO, JSTOR, WILEY, and ScienceDirect) for scholarly (peer) reviewed journal publications without any date range restriction mentioning "value management", "information systems" or "information technology" and "investment" in the 'full text'. Each publication has been evaluated and back- and forward searching was applied. This list of publications is completed with a search on google scholar for which we have considered using the same keywords as in the e-database search yielding over 2 500 results. However, for feasibility reasons different keywords were chosen with "IT value management" or "IS value management" producing approximately 200 publications. The literature findings are organised (4) through our conceptual framework and will be available to general and specialised scholars, and practitioners (5).

The exploratory case study has been performed at the Compressor Technique (CT) business area of the Swedish manufacturing multinational Atlas Copco. This organisation is active in an attractive sector for empirical research in the field of IS (Chiasson & Davidson, 2005; Peppard & Ward, 2004) and was chosen from within the network of the researchers for its assumed maturity in value management practices and its favourable geographical location nearby Antwerp in Belgium. It accounts for 51 per cent of Atlas Copco's total revenue of 6 billion euros and delivers the development, production, sales and services of air compressor equipment, and specialty rental services (Atlas Copco, 2009). To organise the case study, Eisenhardt's (1989) widely cited case study methodology has been used. This process includes eight steps: getting started, selecting cases, crafting instruments and protocols, entering the field, analyzing data, shaping hypotheses, unfolding literature, and reaching closure. Due to the explorative character of this study, the shaping of hypotheses-step is not implemented and is left for further research (Eisenhardt, 1989). In line with Yin (2005), triangulation is provided between data sources, data types, and interviewers. Moreover, to attain a balanced view within the case organisation, three senior business and four IS people were interviewed. All interviews were semi-structured and built around an initial set of questions delivering an interview protocol based on the literature review. Each interview was recorded with the interviewee's permission delivering 556 interview minutes and transcribed to support careful data analysis. The data analysis process is performed through the grounded theory approach of Corbin & Strauss (1990) and Charmaz (2006), which is widely believed to be a reliable methodology to investigate organisational phenomena, and is increasingly applied within IS research (Halaweh et al., 2008). The processes of data collection and analysis are interrelated and executed sequentially to capture all potentially relevant aspects. Hence, additional questions could be added to the interview protocol while proceeding the research. Concepts are the basic unit of analysis and are identified first in the data analysis process (open coding phase). Afterwards, all concepts evolve into categories and subcategories to provide more explanation on the relationship between concepts (axial coding phase). Both phases were structured through our conceptual framework. Last, theoretical categories are created from (sub)categories and one core category might be identified to explain all relating categories although this is not necessary and not always possible (selective coding). All three coding phases are executed using Atlas-TI software. Throughout the data analysis process, new data and concepts are continuously compared to guard against bias and increase consistency among findings (Corbin & Strauss, 1990; Charmaz, 2006).

4 IDENTIFICATION AND DEFINITION OF PRACTICES

The literature review and exploratory case study have been executed within the value management framework to identify and define value management practices. More precisely, this paper focuses on those value management practices that enable an organisation to effectively deploy IS investments and to secure optimal value in the entire IS investment portfolio of the enterprise. However, we recognise that many of these practices comprise other activities and responsibilities as well which can be used in the broader context of IT governance. In such a context, these practices support the alignment between business and IS strategy, the formulation of policies and procedures, the implementation of internal IS activities and applications, and the general organisation of the IS department to meet current and future demands of internal and external stakeholders (De Haes & Van Grembergen, 2009; Peterson, 2004; Weill & Broadbent, 1998). Therefore, a careful analysis is performed of such IT governance practices and only those practices

that fitted with the value management focus of this research are retained. This resulted in the elimination of several IT governance practices such as job-rotation, service level agreements, CIO reporting to CEO, and COSO/ERM (De Haes & Van Grembergen 2009).

Regarding the three components of the conceptual framework, considerable difference has been found in the number of value management practices per component. In total, eight structures and thirteen process practices have been identified compared to only four relational mechanisms. Such a variation might imply that the process practices have been investigated more intensively in contrast to the structures and relational mechanisms. De Haes & Van Grembergen (2008) confirm that “less-detailed knowledge and expertise is available on relational mechanisms which often have a more intangible and informal character.” However, Peterson (2000) argues that in today’s complex, uncertain, and dynamic environments the relational mechanisms category is very important.

The value management practice terminology used in IS literature is almost as diverse as the number of authors discussing these practices. In total, the literature review resulted in 54 differently named value management practices. The content and aim of each practice was analysed to identify duplicate practices resulting in the identification and categorisation of 25 unique practices. Most consistency in practice terminology was found in the process component with thirteen identified process practices out of nineteen practices that were originally found in literature. The structures and relational mechanisms components contain much more diversity in practice terminology with respectively eight structures out of nineteen and only four relational mechanisms out of the fourteen identified in literature. Again, these findings might imply that process practices are better investigated resulting in more practices with less diverse terminology. In contrast, structures and especially relational mechanisms show fewer practices with much more diversity in practice terminology. This observation might have multiple reasons as for instance the practice terminology can unreservedly be chosen by an author to be specifically aligned the research situation, purpose or scope. Another reason however, could be that the research on structures and relational mechanisms is less matured and that until today, scholars are still looking for a greater understanding and agreement on the purpose and terminology of these practices, which is in line with De Haes & Van Grembergen (2008). In conclusion, the integration of the literature review and case study findings have resulted in a clear definition for each value management practice as listed in Table 1. These can now be integrated into the conceptual framework.

5 VALUE MANAGEMENT FRAMEWORK

Most practices that are identified and defined in this research have been previously explored in IS literature, although not in an integrative way with a focus on value management. Hence, this research will develop a value management framework that facilitates the definition and integration of individual value management practices. The framework is shown in Figure 2 comprising all practices that are identified during this study and that are defined in Table 1. It presents structures (blue), processes (green), and relational mechanisms (red) together with the organisational level on which they can be implemented. By doing so, the framework creates a clear vision on the coherence and interrelationship of value management practices which might help organisations in the deployment and value creation of IS investments.

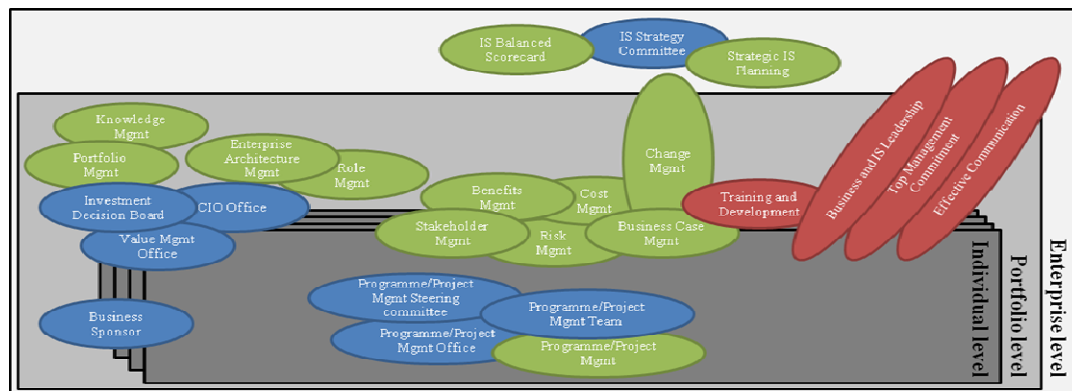


Figure 2. Value management framework with structures (blue), processes (green), and relational mechanisms (red) operating on three organisational levels.

Structures	Definition	References
IS Strategy Committee	A business decision making body positioned within the IS organisation and responsible to stimulate awareness amongst the board of directors and executive management committee on the potential value and viability of proven and emerging technologies, the measurement and delivery of business value out of IS investments, the sourcing and use of resources, and the management of risks. To carry out this responsibility, the committee should provide optimal resources to the management in relation to the organisational risk appetite, to assess the activities of the investment decision board, and to receive updates on both individual as the portfolio of IS investments.	ITGI (2003, 2008) Nolan & McFarlan (2005) Posthumusa & von Solms (2005) De Haes & Van Grembergen (2009)
Investment Decision Board	A business decision making body made up of business and IS executives that are accountable to the executive management committee for the value delivery across a portfolio of IS investments. Therefore, the Investment Decision Board assesses the business cases and their strategic fit to the IS strategy. After prioritisation, the winners are selected, a Business Sponsor is assigned and effective investment preparation, implementation and delivery is facilitated. Value measures should be defined to reassess the business case on a regular basis as well as after investment delivery. In general, the board is responsible to stimulate Top Management Commitment and Business/IS Leadership.	Kumar et al. (2008) Lockett et al. (2008) Thorp (2003) ITGI (2003, 2008) Karimi et al. (2000) Torkzadeh & Xia (1992) De Haes & Van Grembergen (2009)
CIO Office	An IT secretariat with experts that specify and communicate the context for IS investments. They seek for synergy and collaboration across business units with the definition of infrastructure standards, risk and security policies, roles and responsibilities, a strategic enterprise architecture, strategic sourcing, and service level agreements.	De Haes & Van Grembergen (2011) Bieberstein et al. (2005)
Value Management Office	A business secretariat with experts that are assigned to assist Business Sponsors with best practices in the identification and design of a business case, to support the Investment Decision Board in the evaluation of such business cases, and to track both the individual IS investments as well as the overall portfolio to act upon value opportunities.	ITGI (2008) Thorp (2003)
Programme/Project Management Office	A business secretariat with experts that provide a combination of managerial, administrative, consulting, and technical services to support the initiation, execution, and delivery of IS investment programmes or projects. Therefore, the office provides effective methodologies, standards and tools, helps with the set up of programme structures and processes, documents and assures meeting minutes and lessons learned, and facilitates training and development.	Arto et al. (2009) Pellegrinelli & Garagna (2009) ITGI (2008) Letavec (2006)
Programme/Project Management Steering Committee	A group of senior managers and experts that regularly review the activities of the Programme/Project Management Team together with the programme/project plan, scope, budget, status, and issues.	Lechler & Cohen (2009) Karimi et al. (2000) Torkzadeh & Xia (1992)
Programme/Project Management Team	A group of internal (and external) business and IS stakeholders that are concerned with the day-to-day organisation of an IS investment programme or project. Through the full economic life-cycle, their responsibility involves the management of scope, benefits, coordination, stakeholders, risks, time, lessons learned, issues, and overall quality on which should be reported regularly.	OGC (2010) Arto et al. (2009) Srivannaboon (2009) Labuschagne & Brent (2005) Lycett et al. (2004)
Business Sponsor	The highest accountable individual for the overall success of an IS investment. It is the business sponsor's responsibility to develop an initial investment proposal that meets the overall business objectives followed by a detailed business case to understand the full life-cycle value, to monitor and report on the programme's progress, and to administer the programme budget.	ITGI (2008) Pellegrinelli et al. (2007) Thorp (2003)
Processes	Definition	References
Strategic IS Planning	Identification of IS investment opportunities and alignment of these opportunities with IS strategy and objectives.	De Haes & Van Grembergen (2008) Grover & Segars (2004), Earl (1993)
IS Balanced Scorecard	A decision-making management process at enterprise and portfolio level that measures and evaluates IS investments from the business value, user orientation, internal process, and future readiness perspective.	Martinsons (1999) Van der Zee & De Jong (1999)
Portfolio Management	Supports the Investment Decision Board to manage assets that optimise the value creation from an IS investment portfolio. Therefore, it facilitates the business case management process, prioritises these in terms of strategic fit, value opportunity, and risk appetite, manages resources, benefits and risks during the initiation, execution, delivery and closing of investments, guards interdependencies and overlap between investments, terminates investments when necessary, and measures and monitors the overall portfolio performance to report on progress.	OGC (2010) Kumar et al. (2008) ITGI (2008) De Reyck et al. (2005)
Programme/Project Management	Supports the Programme/Project Management Team to manage the overall success of business and IS projects, and to assure value creation across projects that could not be realised when managed independently. Between the start and closing of a programme, individual projects should be initiated, prioritised (in line with programme strategy), managed and closed within the programme planning and objectives. Within the broader context of an investment programme, the project strategy is executed through a formal project life-cycle (idea generation, pre-feasibility, feasibility, development and execution, commissioning, launch, and post-implementation review). This involves the management of scope, benefits, coordination, stakeholders, risks, time, interdependencies, lessons learned, issues, and overall quality on which should be reported regularly.	OGC (2010) Arto et al. (2009) Srivannaboon (2009) ITGI (2008) Labuschagne & Brent (2005) Lycett et al. (2004)

Business Case Management	Guides the Business Sponsor to formally structure an initial investment opportunity that offers the Investment Decision Board a standardised business case to select and prioritise effectively, and that induces the Programme/Project Management Team in the active management of the business case during the entire investment life-cycle.	ITGI (2008) Pellegrinelli et al. (2007) Kohli & Deveraj (2004)
Benefits Management	Facilitates the identification, measurement, and (pro)active management of both intermediate and business benefits over the entire life-cycle of an IS investment. After identification, benefits should be structured within a benefits realisation plan that will be evaluated on benefits delivery performance and the establishment of future benefit opportunities.	De Haes & Van Grembergen (2009) ITGI (2008) Pellegrinelli et al. (2007) Ward & Daniel (2006)
Cost Management	Facilitates the identification, measurement, and (pro)active management of costs to ensure that an individual IS investment and the overall portfolio is executed within budget.	Schwalbe (2007)
Risk Management	Facilitates the identification, measurement, and (pro)active management of risks in order to reduce risks and manage the impact of risks both on individual level and portfolio level.	ITGI (2008) Pellegrinelli et al. (2007) Kumar (2002)
Enterprise Architecture Management	Facilitates the formulation and (pro)active management of a current and future transparent, agile but consistent business architecture, process architecture, IS application and integration architecture, software architecture and infrastructure architecture together with their interdependencies.	Winter & Fischer (2007) Tamm et al. (2011)
Knowledge Management	Supports the creation, sharing, and utilisation of knowledge acquired through the organisation and execution of IS investments.	ITGI (2008) Lee & Choi (2003)
Stakeholder Management	Facilitates the management and alignment of objectives, values, and expectations between different internal (and external) stakeholders on the basis of dialogue-based empowered relationships.	Pellegrinelli et al. (2007) Gottschalk & Solli-Sæther (2005) Wheeler & Sillanpää (1998)
Change Management	Employed to motivate change, to create a vision, to develop political support, to manage the transition, and to sustain momentum throughout the organisation.	Pellegrinelli (2002) Grover et al. (1995)
Role Management	Recommends clear role descriptions among internal (and external) business and IS people throughout the enterprise which are involved in the organisation of IS investments. The process should lead to a clear understanding of who is responsible, accountable, consulted, and informed according to the activities one performs.	ITGI (2008) Thorpe (2003)
Relational Mechanisms	Definition	References
Top Management Commitment	Constitutes the confidence, engagement, and commitment that the board of directors and executive management committee show in support of IS investments. This behaviour shapes a conducive environment that guarantees sufficient resources and dedicated attention towards IS investments, and that change is understood and accepted by the entire organisation.	Bernroider (2008) De Haes & Van Grembergen (2008) Marble (2003) Akkermans & van Helden (2002)
Business and IS Leadership	Represents the organisational competence exercised by business and IS people to be constantly aware of and open to new ideas, to be on the lookout for new opportunities that drive forward the organisation's business objectives, and to take action in close partnership. This capability builds on cooperative and interpersonal relationships outside of the traditional hierarchical structures.	Srivannaboon (2009) ITGI (2008) Pellegrinelli et al. (2007) Booth & Philip (2005)
Effective Communication	A responsibility of each business and IS decision-maker as well as for every internal (and external) stakeholder in order to inform employees on vision, mission, and strategic direction, to exchange and agree upon unambiguous goals and objectives, to balance and manage expectations, to assemble insights and potential issues, to promote the investment organisation, to update on investment progress, and to increase collaboration.	De Haes & Van Grembergen (2009) Pellegrinelli et al. (2007) Akkermans & van Helden (2002) Nah & Lau (2001) Kydd (1989)
Training and Development	Comprises skill development and expertise building of business and IS people to ensure that adequate and quality technical, business, personal, and managerial skills are available.	Dao et al. (2011) Peppard & Ward (2004)

Table 1. Value management practice definitions based on literature review and exploratory case study.

The practices presented in the value management framework are closely intertwined in support of the value creating objective of IS investment deployment. This value management objective begins at enterprise level with a clear IS strategy and vision on the IS investment context. This context is set by the IS strategy committee by means of both the IS balanced scorecard and strategic IS planning processes. It is of utmost importance that this committee communicates clearly on the established context and shows leadership and commitment to the execution of IS investments and the implementation of change throughout the organisation. At Atlas Copco, an internal communication platform “The Way We Do Things” describes the organisation’s mission, vision, and strategy and more detailed information on security policies, IS strategic sourcing, roles and responsibilities, board memberships, and general IS practices. Next to this general medium, the executive management organises yearly info sessions and spreads illustrative material (e.g. short movie, book) to communicate the vision and business strategy. A white paper on the future IS challenges (e.g. cloud, social networks) is distributed together with a magazine named ‘Innovation’ that promotes current and future IS investments to the organisational members.

The IS investment context is further concretised at portfolio level by the investment decision board utilising the portfolio management process to select and prioritise individual IS investments. When an overall prioritisation is missing, it can impact the investment portfolio and value creation. For instance, Atlas Copco’s IT demand manager acknowledges that *“it would be a challenge for IT demand to clarify the IS investment prioritisation to the IT supply organisation. Today, we do too little and can thus not clearly prioritise internal IS development activities either.”* Besides, this board should stimulate leadership and commitment to every IS investment through effective communication and the assignment of a Business Sponsor. Using the knowledge management process, lessons learned and detailed knowledge on IS investments can be integrated to find new investment opportunities. In these functions, the investment decision board is supported by two secretariat bodies. First, the CIO office stimulates synergies and collaboration between business units with the definition of infrastructure standards, risk, and security policies (risk management process), roles and responsibilities (role management process), a strategic enterprise architecture (enterprise architecture management process), strategic sourcing, and service level agreements. Possibly, these responsibilities can also be performed by additional bodies in support of the CIO office, but are not included in the list of value management practices of this paper. For instance, at Atlas Copco, a separate enterprise architecture council, service and operations council, and infrastructure council are set up to harmonise the IS organisation and IS investments. Second, the value management office helps in the search for and evaluation of potential IS investments by means of business cases. Moreover, this office provides aid to the business sponsor who is accountable to deliver a sound business case for an individual IS investment so investment capital can be acquired. In the case of Atlas Copco, this role is performed by a business unit president sponsoring the business units’ group of IS investments at portfolio level. The importance of a business case is reflected in one interviewee’s quote assuring that *“not a single project that is highly strategic is approved without a business case.”* Unfortunately, until today these business cases end up on a shelf after development and are not actively managed throughout the investment.

Once the investment decision board approves the individual IS investment, it is executed by the programme/project management team according the programme/project management process. It is the team’s responsibility to actively manage the IS investment benefits, costs, and risks by means of the business case management process which are regularly reviewed by the investment decision board. To accommodate change and guide the stakeholders, a dedicated change manager is part of the team which is assisted by a programme/project management office and controlled by a programme/ project management steering committee. At Atlas Copco, these structures incorporate external party members and communicate with internal experts and key users to support stakeholder management which is recognised by the vice-president IS/IT CT *“as a critical success factor of the IS investment.”* To successfully execute all these tasks, the internal communication platform offers instructions, guidelines, recommendations, tools, templates, and methodologies to execute IS investments. In addition, training and development is provided by all secretariat offices on portfolio and individual level. For instance, the business sponsor is trained how to develop a sound business case. Another example constitutes the unstructured IS leadership approach at Atlas Copco leading to internal and external development courses to increase the such leadership. The demand manager states that *“IS should not sit in their chair and wait until the business is telling them what to do”* yet today, a business person argues *“we do not possess this IS Leadership yet”*.

6 DISCUSSION AND FUTURE RESEARCH

Based on a literature review and exploratory case study, we were able to identify and clearly define twenty-five individual value management practices. Hence, the present study provides an answer to Kyung's et al. (2008) consideration that although the value of management practices in support of IS investments is evident, very limited studies have identified such value management practices in the past. Also, it contributes to the existing framework Val IT (ITGI, 2008). Val IT mentions several of the practices presented in this paper but it is merely focused on the process of executing and managing IS investments. Our framework contributes by defining each value management practice in relation to the organisational level and on the relationship between these practices. However, we also wish to acknowledge the potentially limited generalisability of the results as the literature findings are only explored within one organisation. Multiple factors such as the organisation size and structure, the type of industry and IT intensity may influence the decision-making on implementing value management practices.

The results suggest future improvements can still be made in the identification of value management practices. Especially, the small number of relational mechanisms found in this research is in line with De Haes & Van Grembergen (2008), even though it is argued that such social practices are of extreme importance in today's complex, uncertain, and dynamic environments. Second, Atlas Copco merged the responsibilities of the value management office and the programme/project management office into one secretariat body. This shows that each value management practice should not be implemented individually but opportunities can be found in the combination of multiple value management practices. Future research can address the specific research question on which practices could be merged and which not together with the (dis)advantages and value impact. Third, the case study results show that many IS responsibilities assigned to the board of directors are passed on to the executive management committee. As the low level of IT savviness by the board members may constitute only one reason (Nolan & McFarlan, 2005), this paper asks for a deeper understanding on this complex phenomenon and the potential multitude of reasons why this takes place in so many organisations, according to Andriole (2009). Fourth, both literature and the case study findings show that organisations still struggle with the implementation of value management practices delivering varied maturity. For instance, Pellegrinelli et al. (2007) argue that the business case management process is crucial in the representation of benefits, costs, and risks so the business sponsor clearly understands the IS investment characteristics. Moreover, it is used in the prioritisation of multiple IS investments and fulfils a central role in the IS investment value creation (ITGI, 2008). However, business cases at Atlas Copco as in many organisations (Franken et al., 2009) are put on a shelf after development and are of little significance during the continuation of IS investment deployment. Future research might help IS scholars to understand why such a contradictory phenomenon might take place. Last, further research can be oriented towards hypothesis building which completes the case study approach of Eisenhardt (1989).

To structure the view on value management, each individual practice has been categorised as a structure, process or relational mechanism according to a conceptual framework. The integration of these practices together with the specification of the organisational level on which the practice can be operational leads to a new coherent value management framework. The framework portrays some practices which are implemented at one specific organisational level whereas others span multiple levels in their operations. In particular, most relational mechanisms operate at all three levels, as the socialisation and integration of people through values and shared beliefs impact each organisational individual. Many practices operate at the intersection of the portfolio and individual level. This result is argumentative as individual IS investments are initiated and supported on the portfolio level. Moreover, one of the portfolio's main advantages can be found in the economies of scale and a more efficient management of resources, interdependencies, and so on. In addition, the number of practices per level is different too. More structures and processes are available on the individual and portfolio level and their number decreases significantly when looking at the enterprise level. The latter can only make use of one structure, three processes, and three relational mechanisms while the portfolio level exploits four structures, ten processes, and four relational mechanisms, and the individual level utilises seven structures, seven processes, and four relational mechanisms. However, all value management practices are closely intertwined as each practice functions in close relationship with one another in support of the value creating objective of IS investment deployment. The creation of a new value management framework gives satisfaction to the fragmented research on individual value management practices (Maes et al., 2011). Moreover, the framework makes an endeavour to logically present the mixture of value management practices and so to help organisations in the successful implementation of value management practices and the deployment of IS investments.

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