

Empirical Challenges in the Implementation of IT Portfolio Management: A Survey in Three Companies

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Abstract. The study explores the implementation challenges of Information Technology (IT) portfolio management in three companies. The portfolio approach to IT assets is significant for enabling organisations to make effective use of limited resources by prioritising IT initiatives and also for monitoring and evaluating their performance. In practice, the process facilitates the provision of necessary information for decision makers, allowing them to make rational decisions about IT investments. We found that there is a significant gap between IT portfolio management as discussed in the literature and its actual practice. The analysis showed that there was high flexibility when specifying IT projects, which caused companies to implement IT portfolios that were too broad. As a consequence, resources were not effectively utilised, and IT portfolio evaluations post implementation were rarely conducted. Our research contribution identifies important gaps to be filled in the literature and presents case studies related to IT portfolio management.

Keywords: IT portfolio management · IT governance · IT project portfolio

1 Introduction

Information Technology (IT) has, in many cases, proven to be a useful enabler in achieving the strategic mission of an organisation, though it is often constrained by various factors such as high costs. For companies, yearly increases in expenditure on IT shows a relationship between the strategic implementation of IT and the ability to achieve corporate objectives and goals [1]. Conversely, some studies have argued that the causal relationship between IT investments and business value has remained partially unexplained [2, 3]. The notion here is that large investments in IT do not guarantee long-term success, but rather appropriate governance of IT investments is crucial if an organisation is creating value through IT investments [4]. Applying appropriate governance to IT investments includes adopting suitable methods and practices for selecting and evaluating IT initiatives. Generally, IT constitutes a company's total investments in computing and communication technologies that facilitate information sharing and help to support a variety of business processes, such as R&D, in achieving its goals. Typically, companies have a dedicated or separate IT function that is responsible for acquiring IT products and services.

The decision to invest in any aspect of IT is often complex and multi-phased [5]. It consists of a series of actions, starting from the identification of a need (problem) and continuing until the investment is approved as an IT project [6]. The literature on IT investments emphasises basing investment decisions on correct, suitable and up-to-date information rather than on feelings and intuition [6, 7]. Given that there are few widely accepted methodologies directing IT investments in organisations, this raises the question of how to invest in IT wisely for optimum benefit. This study explores portfolio theory as a widely accepted methodology that has been adopted in the field of information systems [8].

IT Portfolio Management (ITPM), which has its roots in the modern portfolio theory of Markowitz, enables senior managers to make informed decisions about their investment alternatives [8]. We identified that a growing number of studies on IT portfolios have focused on theoretical issues related to portfolios, such as portfolio diversification, strategic alignment, portfolio synergies and models for portfolio selection. Thus, there is a need for studies that provide insight into ITPM implementation and adaptation in companies, which to date have been scarce [9]. The aim of this study is to fill this gap by investigating how ITPM practices have been implemented in three selected medium-sized companies. In addition, we present ITPM challenges as perceived by these companies, revealing a significant gap between the literature and empirical findings. The findings of our work were guided by the following research questions:

1. To what extent is IT portfolio management practised in the selected companies?
2. What are the perceived challenges of IT portfolio management in the selected companies?

This paper is organised as follows. Section 2 presents related work and an analysis framework for ITPM. The research approach of the study is presented in Section 3. In Section 4, the findings from the companies are presented followed by a discussion and conclusion in sections 5 and 6, respectively.

2 Related Work and Analysis Framework for ITPM

The literature on ITPM, and especially on IT project portfolios, is mostly studied in Information Systems (IS), project management and operational research [10]. ITPM has been described by Jeffery and Leliveld [11] as managing “a portfolio of assets similar to a financial portfolio and striving to improve the performance of the portfolio by balancing risk and return”. Although there is a significant difference between financial portfolios and IT portfolios, their purpose is to maximise the expected return of an investment at a minimum risk [10]. IT initiatives represent IT investment opportunities and assets composed of IT projects, IT infrastructure, IT application and IT services [12]. IT initiatives can be further categorised as strategic, transactional, informational and infrastructural depending on their contribution in fulfilling organisation’s objective [9], [13]. ITPM is an instance of IT governance because it supports and implements the internal controls and procedures needed to ensure accountability, transparency and the efficient use of IT investments [13, 14]. It also provides central oversight of IT budgets, IT risk management and strategic alignment of IT investments. As such, IT governance

frameworks such as IT infrastructure library (ITIL) and Control Objectives for Information and Related Technology (COBIT) have addressed the ITPM concepts of ensuring the recognition of value and risks associated with IT initiatives [14].

The ITPM process establishes an investment framework for IT project selection for the construction of IT portfolios that is based on maximised expected returns and minimised risk. The IT project selection literature has predominantly focused on developing quantitative models derived from financial and operational research disciplines [10]. The main reason for the quantitative models is to make the decision making process rational with the use of rigorous and evidence-based comparisons [5], [15]. This is particularly important because other issues such as conflict, disagreements, coalitions and power of decision makers can obstruct the decision making process [16]. The quantitative models also aim at complementing decision makers' beliefs—acquired through observation and experience—about the future performance of proposed IT initiatives. Despite their benefits, empirical research has shown that quantitative models lack adoption in companies mainly due to their complexity and practitioners' lack of understanding regarding the models [11].

On the other hand, the literature has focused least on the activities and methods required after IT project selection, especially regarding the termination or de-escalation of commitment to misaligned or failing IT initiatives [9]. The termination of existing IT initiatives in IT portfolios is critical for discontinuing or removing initiatives that are either misaligned with the company's objectives or that do not realise the expected benefits [5]. Such actions allow resources to be freed up to create room for other opportunities. According to Kester et al. [5], termination decisions are often difficult to make because the individuals' responsible for certain projects have their emotions involved in the project, making them reluctant to terminate it. Also, even when other persons are involved, there is a risk that they may influence decisions through "overly positive evaluation of the project" [5]. In the IS literature, the evaluations methods of IT initiatives and assets both before (*ex ante*) and after (*ex post*) their implementation have been greatly studied [3]. The main challenge has been to explain the link between IT investment and value attained as well as how and from whose perspective that is value measured [3].

Although in literature ITPM is considered to constitute to a well-defined and structured process, few ITPM methodological frameworks exist [15]. This not only suggests the fact that contextual factors have a huge impact but also suggests the complexity and diversity in ITPM implementation. However, there is a consensus that the process involves continuous identification, prioritisation, balancing, allocation and review of IT initiatives making up IT portfolios [18]. Some studies have applied ITPM practices to an IT investment framework with three phases—namely, selection, control and evaluation [18-20]. In this study, we consider these phases to create an ITPM analysis framework. In the framework, an IT initiative can concurrently be active in more than one phase. For instance, an IT initiative is subjected to reselection throughout the control phase. Also, if an IT initiative has not met the goals originally specified or if the goals have been modified to reflect changes in the strategy, a decision must be made on whether to continue to invest in the IT initiative. Generally, "deselection" is one of the most difficult steps to implement, but it is necessary if resources are to be better utilised elsewhere. We further describe the activities in each of the named phases.

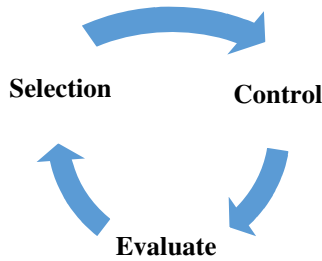


Fig. 1. A framework for IT portfolio management

2.1 IT Portfolio Selection

The portfolio selection phase describes how different proposals for IT initiatives will be defined, prioritised and selected for investment. From the literature [5] [10-22], summary of the aspects emphasised in the IT portfolio selection phase include:

- The availability of data for use in quantitative models
- The use of quantitative models in the information provided for decision making
- The nature of the decision making process (e.g. evidence-based, opinion-based)
- The criteria used for making the decision
- A consideration of individual IT projects at the portfolio level (e.g. IT project synergies)

Generally, the selection phase involves identifying, analysing and evaluating the risks and returns of IT initiatives both individually and collectively with other initiatives. Then, using certain criteria in the evaluation of risk and returns, IT initiatives are selected for inclusion in a portfolio.

There are various models proposed in the literature for the IT portfolio selection phase. For instance, return on investment (ROI) and net present value (NVP) for evaluating the returns and Analytical Hierarchical for evaluating the strategic fit [5]. A multi-criteria approach is favoured in IT project selection because the value of IT initiatives cannot only be captured in financial metrics due to the nature of IT projects e.g. exhibit high interdependencies [21, 22].

2.2 IT Portfolio Control

In the IT portfolio control phase, selected IT initiatives are monitored and tracked during implementation to ensure that the objectives and benefits are met at an expected or minimised level of risk and cost [18-20]. Periodic reviews, such as project review meetings, ensure that monitored information is provided to help assess the performance of IT initiatives against the specified targets [23]. In the control phase, companies should be able to make adjustments or address problems when the company's objectives have changed or problems arise during implementation.

The measures (both qualitative and quantitative models) need to be able to capture the progress against the targets.

2.3 IT Portfolio Evaluation

The evaluation phase involves post-implementation reviews (ex post evaluation) to compare the expected returns and objectives of IT initiatives against their actual performance [18-20]. It also involves examining and verifying the associated risks and impacts of selected IT initiatives regarding the achievement of the company’s goals and objectives. Some of the important issues identified from the literature [3],[5],[10-22] regarding IT evaluation include:

- The approaches used for evaluation models need to include a consideration of contextual factors and organisational transformation when being interpreted
- Assessment of the contribution of IT initiatives to other types of performances
- Clarity in the definition of benefits and risks

This phase serves the purpose of identifying the needed changes or modifications to the existing IT initiatives and also of revising the ITPM process based on the lessons learned from the existing ITPM process.

3 Research Process and Method

An explorative qualitative study was used to investigate ITPM in three companies. The aim was to understand ITPM practices in a real-world context where contextual information is important [24]. The focus was on identifying ITPM practices in each phase of the ITPM framework. Figure 1 shows the research process of our study.

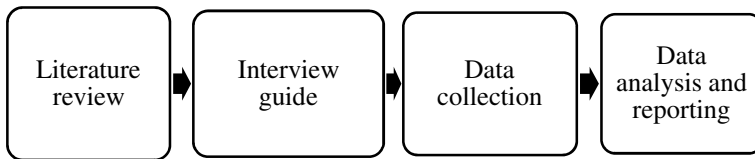


Fig. 2. Research process of the study

Literature Review. Relevant literature on ITPM was retrieved from the IS, project management and operational research disciplines that have influenced research on ITPM [10]. The studies were retrieved using the Google Scholar and Science Direct databases. In addition, we looked at the references of the retrieved studies to identify other relevant studies. The literature review served two main purposes: first, to provide a synthesis of previous research on ITPM, and second, to form an analysis framework for empirical investigation in the selected companies.

Interview Guide. The interview guide was developed using the findings from the literature review. The interview guide consisted of semi-structured questions divided into four sections: (1) ITPM understanding and IT governance; (2) current practices of ITPM in selection, control and evaluation; and (3) ITPM challenges, benefits and drivers. The semi-structured interview questions allowed for the collection of rich data and the necessary flexibility in an explorative study [24].

Data Collection. The data collection process was designed to carefully consider threats to validity. Empirical data was primarily collected through semi-structured interviews with practitioners from three companies. Based on the network of the research team, three companies were selected, and interview invitations were sent to key contact persons. The key contact persons agreed to take part in the study and also nominated other potential interview participants. The companies are reported anonymously in this study, owing to a confidentiality agreement. All interviews took place on the premises of the companies with a total of 10 interviewees who had varying roles in the companies, as presented in Table 1. Each of the three separate, in-depth, face-to-face interview sessions that lasted about three hours. All interview sessions were recorded and transcribed. The interview transcripts were sent back to interviewees for review so as to strengthen interpretive validity [24]. Additionally, an interview guide used in the interviews helped to reduce researchers’ reactivity bias [24]. The companies represent small and medium-sized companies in Finland with IT expenditures of 2 percent (B), 4 percent (A) and 10 percent (C) of the companies’ revenue. Henceforth, the interviewees are referred to as practitioners in the study.

Table 1. Companies and roles of interviewees

Company	Industry	Size	Interviewees
A	Telecommunications (equipment manufacturer)	Medium	IT Stakeholder Manager for R&D IT Portfolio and Enterprise Release Manager for R&D
B	Industrial goods and services	Small	CIO IT Portfolio Manager Head of R&D PDM Chief Engineer Head of Factory and Logistics
C	Telecommunications (service provider)	Medium	IT Service Director Solutions Manager Development Director

Data Analysis and Reporting. For data analysis, the transcribed and reviewed interview transcripts were analysed using NVivo¹. From the transcripts, we coded responses to the following themes: IT governance, ITPM understanding, ITPM practices (in the three phases of the ITPM framework), ITPM challenges, ITPM benefits and ITPM drivers. The structure of the interview guide helped in the analysis as different themes were identified beforehand as well as in setting the direction of what to

¹ Qualitative data analysing software (<http://www.qsrinternational.com/>)

look for in the data. The analysis of one company enabled its comparison with the other companies so as to further determine similar and/or differing patterns of ITPM practices in the ITPM framework.

4 Findings of ITPM in the Companies

This section presents the findings of ITPM in the surveyed companies using the ITPM process framework. In summary, practitioners described ITPM as including the types of IT services (or IT projects) that the companies currently had or that were planned for as well as how they were being prioritised, valued and managed across their entire lifecycle. Table 2 gives an overview of the findings using the analysis framework presented in Section 2.

Table 2. ITPM practices in the surveyed companies

ITPM		Company A	Company B	Company C
Selection	Information provided for selection	Business Case (ROI, NPV, break-even), Project Plan	Business Case (ROI, increases in margin, risk, payback time), Project Plan	Business Case (NPV, ROI, risks, delivery time and costs), Project Plan, Strategic Initiatives
	Selection and prioritisation criteria	1. Strategy 2. Company-specific 5 level criteria 3. Business case	1. Strategy 2. Business case	1. Strategy 2. Business case
Control	Tracked and monitored information	Status of projects, cost, schedules, scope, risk and quality	Costs, schedules, risks and quality	Schedule deviations
	Corrective actions	Corrective actions agreed upon for underperforming Cancellation only when there are changes to strategy	Action taken for risks that can be contained or minimised	Corrective actions for key risks
Evaluation	Information provided for evaluation	SLA, KPI of services and actual costs, risks and benefits	IT operational performance, Process KPI	Actual benefits, Operational performance of IT using KPIs

4.1 IT Governance

IT governance—in terms of how activities are organised (centralised or decentralised) and management teams responsible for making IT investment decisions—was crucial to the understanding of the ITPM processes in the companies.

In two companies, B and C, IT was centralised, whereas in Company A IT was both centralised and decentralised. The decentralised IT in Company A took the form of individual business units such as R&D being responsible for overseeing their own specific IT needs. In centralised IT, one division is responsible for overseeing common IT needs across different business units. For Company B, IT was centralised to enable business by providing IT tools and services to the main business units of the company such as customer services, logistics etc., with the exception of R&D. The IT tools for R&D, such as those for software development and simulation, were not supported by centralised IT and were thus the responsibility of the R&D division. Similarly, in Company C, IT was centralised. However, unlike company B, the IT tools for R&D were also supported by centralised IT.

All companies had clearly defined the roles and responsibilities for the management teams responsible for making IT investment decisions. In addition, flexibility in the structure enabled decision escalations to take place whenever necessary. It was also noticed that the size and nature of the IT initiatives influenced the hierarchical level at which the decision took place. The highest level of IT governance was the board of directors, which was responsible for providing leadership on the company's strategy and oversight. The next level was the executive board, which was responsible for allocating the budget as well as making investment decisions. Company B had its big IT projects approved at this level, whereas Company A and Company C had IT projects approved at the next lower level. The corporate development steering team responsible for selecting and reviewing the bigger IT initiatives that impact more than one business unit (process) was at the third level. It consisted of heads of business units (process), the Chief Financial Officer (CFO) and the Chief Information Officer (CIO). Typically, the team was also responsible for process development, cooperation and management between the different organisational processes and IT. According to the practitioners of companies A and C, this was also the IT review group, which had the authority to delay, cancel or approve projects. The next level was made up of a solution area or business unit steering team, which mainly consisted of a process owner and CIO, who together selected and prioritised initiatives specific to a particular business unit. The last level was occupied by other management teams such as the project steering team, who oversaw the execution of one specific project. As such, in all companies, IT investment decisions were not made solely by IT or business experts but rather through a common understanding between business and IT.

4.2 IT Portfolio Selection

In all companies, the determination of the IT annual budget preceded the selection process of IT initiatives as it was allocated as part of the annual corporate budgeting. The top-down approach of setting the cost framework for IT activities upfront also considered the bottom-up approach. In the bottom-up approach, business units annually developed and proposed IT investment plans in advance of the upcoming financial year.

In Company A, IT portfolio selection for R&D involved allocating a part of the assigned IT budget to the different IT projects, services and applications that enabled

R&D to rapidly develop and deliver products to markets. Business cases which included quantitative financial models (ROI, NPV, break-even) were used for proposing new IT initiatives. Often, the selection and prioritisation decisions were made based on the specified company's strategy and goals and were formalised according to five levels of criteria. Following the approval of IT initiatives, project plans were presented and used for making decisions to start and end new projects. The project steering team of the approved project oversaw project implementation at different milestones and set targets to be tracked. Unlike Company A, Company B did not have harmonised selection and prioritisation criteria for selecting IT initiatives. IT initiatives were selected through discussion and common understanding between the main business units and IT in a forum consisting of business process owners, the CIO and the portfolio manager. During the discussions, the forum analysed and evaluated business effect, ROI, increases in margin, risk and payback time for the proposed IT initiatives. It was stated by the practitioners that there is no harmonized criteria because they tend to be subjective: "we have a huge Excel containing all of our projects for evaluation in the common forum. There are many criteria inside the Excel like company's top priority said by the management team this year, a critical project but I would agree it's subjective. And in our case even if we would have specified selection criteria it would not be the guiding factor for starting the projects because resource bottleneck is the guiding principle for how many can be started at once and are then prioritized accordingly". Although the practitioners had different opinions regarding the importance of explicitly specifying the selection and prioritisation criteria, they commonly agreed that it helped in the development of IT project plans: "with that list, we were actually able to create a prioritised list of initiatives; and even though all the resourcing does not agreeing with it, there is still some understanding that we are now providing proper project plans for each by defining more clearly what is needed and when,". In Company C, a business case including information about NPV, expected benefits and returns (e.g. ROI, risks, delivery time and costs) was used as a source of information for selecting new IT projects, particularly capability building IT projects: "IT projects get prioritised if they have a business case. There is a list that contains initiatives in priority order, and these have cumulative expenditures and there is a point where the expenditure hits available budget. As there is a fixed budget, decisions go through prioritizations of available resources or through the priorities set by business owners (IT also gives inputs)."

In companies A and C, Microsoft Excel was used to make quantitative financial calculations that were then presented in the business case. The program was also used for storing a list of IT project inventory. As the quantitative models were included as templates in Microsoft Excel, there was a tendency for individuals to not fully understand them. Due to the limitations of Microsoft Excel, the companies were in the process of acquiring portfolio management tools.

4.3 IT Portfolio Control

After the selection of IT initiatives and during their implementation, different ITPM control activities were incorporated.

In Company A, IT portfolio control involved the frequent monitoring of status, cost, schedules, scope, risk and quality for the selected IT initiatives against the annual cost plan etc. This was reported and reviewed monthly at the business unit level by the specific steering teams, by the IT performance and assurance teams and occasionally by the corporate steering team. For IT services, the company frequently measured its service level agreement (SLA) and projects' key performance indicators (KPIs). When there was risk, schedule and cost deviations, and decisions on corrective actions were made on a case by case basis: "corrective actions are taken on a case by case basis because there is something unexpected. Sometimes, when there is some issue already known, there can be different options for how to correct it, and the project manager can say we have a problem and state some corrective actions, and the project steering team decides". Also, if there are changes in strategy, then existing IT initiatives are reviewed and changed accordingly: "during the prioritisation of projects, we noticed that some projects were categorised according to old criteria (the criteria were changed in December of last year) and thus were reviewed according to the new criteria, and all projects are now updated". In Company B, the forum responsible for initiating IT projects did not participate in IT portfolio control. The IT portfolio control is conducted by the project steering teams, where they review and track costs, schedules, risks and quality. Corrective actions are taken to minimise and contain risks when necessary. For Company C, portfolio control was conducted for IT projects through reviews of project schedule deviations: "we measure how development projects go through the process and projects schedules deviations. Currently many projects are overrun though not considered a problem in our organization".

4.4 IT Portfolio Evaluation

In the three companies, portfolio management reviews were either conducted informally or not at all. If they were not conducted, it was because they were considered to be officially conducted at the project level by the project steering groups.

For Company A, IT portfolio evaluations involved assessing SLAs, KPI of services and the actual costs, risks and benefits of IT initiatives. In Company B, ITPM evaluations involved evaluating the KPIs of the process to see whether there had been any progress that had been anticipated, the actual implementation costs and IT operational performance. The company mostly followed spending to see if it matched with the business cases' calculations, but it did not follow feedback from users: "spending is followed but not user feedback. We follow whether were able to match business case calculations in reality as these are defined in the process but not really controlled. We try to improve in that by not allowing the closure of the project without having approval from the executive management team; as a part of that process, you need to present the return". The practitioners identified this to be important and an area needing to be improved. For Company C, portfolio evaluations post implementation of IT initiatives varied depending on the projects. For large IT projects, the company conducts interviews and reviews to evaluate the benefits that have been achieved. However, the IT is normally evaluated for operational performance using KPIs: "They are measured depending on projects; for larger ones, we have interviews and reviews to

evaluate whether the benefits have been achieved, but this is not done comprehensively for all projects. At centralized IT, what is measured is KPI at the operational level: number of critical failures (and how successfully new systems are taken into production), user satisfaction, staying on budget. Critical ones are reported monthly, and targets of the measures are set on a half-year basis”

4.5 ITPM Challenges

ITPM is highly relevant and practised to an extent in the surveyed companies. The main key driver for ITPM implementation in the companies was that it provided a framework to control IT investment and ongoing IT initiatives. ITPM was also viewed as beneficial in providing visibility and transparency of IT activities throughout the company. Additionally, according to practitioners, ITPM provided useful information to senior management to aid in making decisions. However, the companies faced several challenges when implementing ITPM. The identified challenges are listed in Table 3 and further described below.

Table 3. IT portfolio management challenges in the companies

Challenge	Company		
	A	B	C
Lack of clear focus, resulting in too broad a portfolio		√	√
Inadequate categorisation of IT initiatives to help achieve comparable measures		√	√
In some cases, decisions were based on intuitions, opinions and power		√	√
Lack of focused post-implementation evaluations		√	√
Lack of a portfolio mind-set in identifying synergies and limiting redundant IT applications	√	√	√
Decisions to end IT initiatives rarely occur	√	√	√

One of the challenges related to the ITPM process was that companies often implemented too broad a portfolio. IT projects which had high flexibility in terms of what could be done at times posed a disadvantage, especially when the company focus was not clearly defined or communicated. This also gave the impression that there was no limit to the number of IT initiatives a company could implement at given a time, and as a consequence resources were not effectively utilised or termination decisions were hard to make: “when there are too many new things, there is a risk of not utilizing resources effectively...Currently, priorities change during the year, and in some cases it is justified, but in other cases it is easier to change than make hard decisions. As a result, momentum is lost. There is a need to have more clear focus areas and ensure these go through rather than implementing too broad a portfolio”.

All IT projects, regardless of the differences in their contributions (e.g. strategic or informational) were competing on equal grounds. Inadequacy in the categorisation of IT initiatives to reflect their contribution made it challenging for companies to

achieve comparable results and also difficult to find appropriate measures: “It is challenging to really have projects with comparable weighted KPIs which would help to make a good portfolio so we are able to highlights that these are important, these are strategic ones, etc.”

Despite the business cases, the selection of IT initiatives is based on beliefs, opinions and intuition: “Although we have business cases and clearly defined the structure in decision making process to be able to make better fact based decision, there are still places where the loudest person gets projects implemented over the silent person”. It was also observed that at times, individuals’ level of power can also be the deciding factor for IT investment: “factors and intuitions are used and the person allocating the money is calling the shots”.

Another challenge that was identified in the companies was related to the IT portfolio evaluation phase of the ITPM process framework. After the implementation of IT initiatives, the companies did not conduct IT evaluations systematically: “It should ne systematic that once an IT system has been implemented, IT together with the process owners should ensure the development activities create/improve value and efficiencies through some specified set of targets, like having better turnaround of inventory or better time to market”. Additionally, when IT portfolio evaluations were done, they had limited focus or that the companies had no good measures (e.g. focused on error tickets with no user satisfaction surveys): “we currently don’t have any SLAs that oversee how different requests are being fulfilled. We have from agile project methods that are targeting efficiency and visibility etc. Otherwise there are no good measures of how IT is meeting demand.”

The companies also lacked a “portfolio mind-set” to help determine synergies amongst IT initiatives, which would help to limit redundant IT applications: “we have enterprise architecture look for redundant IT applications, and also each of us working in business units should see that there aren’t applications doing the same things. For some reason there still are”. All companies had consolidation plans that had been developed but that are yet to be implemented. Additionally, most redundant IT applications that were either no longer serving the business but that were used by a few individuals or resulted from mergers still remained and were not removed from the IT portfolio. The reasons for this lack of removal relate to the unwillingness of the few users to “let go” and also the failure of consolidations plans to be realised.

5 Discussion

The findings of the study revealed that companies experienced various challenges when implementing ITPM. Additionally, companies had no an explicitly defined ITPM framework. This lack of an explicitly defined ITPM process framework illustrates the dynamic nature of the ITPM process [5] and a gap in the literature [13]. IT initiatives are constantly subjected to technological and environmental changes. This necessitates the need for agility in the decision making process as well as in ITPM practices [5]. Recent advances in the way IT applications are developed and acquired in companies (e.g. Agile/lean methods, virtualisation, Software as Service (SaaS) in

the cloud and increased use of Open Source Software) further emphasise the need for flexibility in ITPM. This relates to the organisational transformation dimension that is often ignored in IT evaluation approaches [3]. For instance, as a result of the advances mentioned, ITPM requires less detailed plans and also measures of how IT fulfilling the organisational needs.

As all companies in this study rarely conducted IT portfolio evaluations, these findings are consistent with other studies of IT (ex ante and ex post) evaluations reported in the IS literature [3], [25-27]. The latter studies observed that IT evaluation processes occur too infrequently in many organisations mainly due to imprecise and vague definitions of benefits and risks in the business cases and a lack of contextual considerations in the evaluation techniques. Inadequate IT portfolio evaluations prevent (or prolong) the taking of corrective actions where there are misaligned objectives or wrong intuitions. As a result of this observation, we included a “Termination” phase in the ITPM process framework. The termination phase would allow companies to evaluate whether an existing IT initiative (or the sub-components of that initiative) in their IT portfolio should be removed or reselected based on the results of the ITPM evaluation phase. As a result, companies will free up resources and also be able to identify specific areas in the current IT portfolio that need improvement as well as areas that are underserved, over served or misaligned with the company’s strategy and objectives.

It was evident in this study that IT governance plays an important role in ITPM. It has been identified in previous studies that a certain degree of IT centralisation has an impact on the management of IT application redundancies, the exploitation of IT synergies and the level at which IT initiatives are selected [6]. Our findings support this previous research but also reveal that redundant IT applications can exist despite the centralisation of IT. This suggests that a “portfolio mind-set” amongst decision makers is also necessary in identifying IT project synergies and redundant IT applications. IT governance also has an important role in developing and communicating the strategy and areas of focus of the company. From our findings, we identified that effective communication of the strategy and focus areas enabled the effective implementation of ITPM practices. This is because the strategy was used to develop the selection and prioritisation criteria, and changes in the strategy greatly impacted the IT portfolio evaluation and control phases. If it is not well communicated, companies lack focused efforts—both long term and short term—and effective ITPM. From our findings, a missing IT portfolio selection criterion that is explicitly defined demonstrated poor communication plan of the strategy or continuous changes in project priorities.

The following proposition and research implications can be drawn from our study findings. First, the ITPM process framework needs to be further improved given the different contextual conditions, agility in IT and organisational transformations. We have proposed the inclusion of a “Termination” phase in the presented ITPM process framework. Second, there needs to be more research on the subsequent phases of ITPM after the selection phase so as to identify the needed improvements and also to take into consideration the removal or retirement misaligned IT initiatives.

To practitioners our findings recommend that companies first acquire knowledge about the different ITPM evaluation techniques (both ex ante and ex post) and the

circumstances in which they can be used. Also practitioners' need to incorporate 'portfolio mind-set' in the selection of IT project so as to identify synergies in IT projects and redundant IT applications. Moreover, to avoid multiple interpretations, companies still need to have a clear set of criteria for use in the selection and evaluation processes.

6 Conclusion

ITPM practices exist in almost every organisation. Our study investigated ITPM practices and challenges in three selected companies.

The findings revealed a gap between the literature and the empirical implementation of IT portfolio management. The major misalignment between theory and practice was that portfolio reviews representing portfolio control and post-implementation IT evaluations as described in the literature were rarely conducted in practice or were conducted with limited scope. Moreover, in the literature, a variety of portfolio selection models have been proposed, but the companies mostly used business cases with few models to select IT initiatives for inclusion in their IT portfolio. Some of the challenges related to ITPM in the companies included: lack of clear focus resulting to too broad a portfolio, and that decisions to remove IT initiatives are rarely made.

The research implication of our study is that it provides background for future research and case studies evaluating ITPM in a larger number of companies. Specifically, the use of the chosen framework provided a sound basis for analysing the state of the practice in the companies studied. Additionally, based on our findings, there is still a need for more empirical research which investigates ITPM activities after the selection phase in order to obtain a more general understanding of such an undertaking.

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