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The Role of Application Portfolio Management in Application Services Outsourcing: Explicating Variations in Application Portfolio Management among Outsourcing Gestalts

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The Role of Application Portfolio Management in Application Services Outsourcing: Explicating Variations in Application Portfolio Management among Outsourcing Gestalts

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Abstract

Prior research has identified different outsourcing strategy types most likely to succeed, described by the outsourcing extent, the contract type, and duration. Each of the strategy types serves a particular outsourcing outcome. Since application portfolio management pursues improvement and optimization in the application landscape, it supports and enables decisions in the field of application services outsourcing. The aim of our research is to investigate the varying role of application portfolio management (APM) for different application services outsourcing strategies. Therefore, we conducted case study research with eleven large German and Swiss companies. In order to identify the varying role of APM, we compared the behaviors of the companies successfully applying particular strategy types, analyzing the differences in APM capabilities, application portfolio structure, and the influence of application characteristics. The results reveal that the companies applying different strategies vary in the extent to which APM is implemented in an organization.

Keywords

Application Portfolio Management, Application Services Outsourcing, Outsourcing Strategies, Application Portfolio Management Capabilities, Application Portfolio Structure

INTRODUCTION

Today, companies struggle with historically grown application landscapes which are laden with obsolete information technology (IT) systems, unfinished or long-lasting and, therefore, out dated projects, and applications no longer satisfying business requirements. In addition to large-scale rationalization and modernization projects to solve this problem, IT decision makers must change their ways of viewing development projects. While in the past, the “building of an application” and the “maintaining of an application” were mostly separate, today, a life-cycle approach is required, considering the lifetime of an application. Thus, maintainable applications are developed, instead of simply finding a solution for a current problem (Capgemini 2012). In order to achieve such a life-cycle view, organizations must implement application portfolio management (APM) as a sub-process of IT governance, to balance business requirements and IT investments (De Haes and Van Grembergen 2009). By maintaining and improving the application landscape to better meet business demands, APM seeks to decrease costs and to reduce application portfolio complexity (Caruso 2007). Today’s complex application landscapes require a comprehensive portfolio understanding of the inherent relationships and dependencies between applications (Simon and Fischbach 2013).

In the past, research has called for a comprehensive view of outsourcing decisions along all IS functions (Mahnke et al. 2005). Nevertheless, there are IS functions, such as the infrastructure services seen as “classic outsourcing functions” with standard approaches available (Fisher et al. 2008), which can largely be decided upon separately. The application services outsourcing (ASO) decision, including “all services associated with the acquisition, development, and deployment of an IT application” (Schwarz et al. 2009), on the contrary, is a complex and individual decision for organizations due to its close relationship to business processes (Fisher et al. 2008). Although there are standard approaches available in the field of IS development outsourcing (Dibbern et al. 2004), the outsourcing decision should be seen in the context of the whole IT application life-cycle. Especially since a large amount of the lifetime costs of an application are already determined within the development phase (Kramer et al. 2011).

Between ASO and APM exists a symbiotic relationship to achieve IS targets. Practitioners agree that APM enables “better outsourcing agreements” (Gliedman 2004). APM provides a clear picture of the application landscape, which supports the selection of the outsourcing scope, and triggers the improvement of the outsourcing relationship (Gliedman 2004). Lacity et al. (1996) have already pointed out the importance of well-considered,

incremental, and selective approaches in order to achieve efficiency. Outsourcing decisions are not only motivated by cost reduction, but also through access to skills, concentration on core competencies, or innovation (Dibbern et al. 2004). Besides the outsourcing scope, outsourcing decisions cover the outsourcing degree and the contract design (Lacity et al. 1996). Lee et al. (2004) derived three dominant outsourcing strategy types, which they refer to as outsourcing gestalts, most likely to succeed in different outsourcing outcomes, e.g. cost efficiency. Based on this general assumption to configure outsourcing strategies, we seek to understand how application portfolio management guides and enables ASO strategies. Therefore, we carried out case study research with eleven large German and Swiss companies. Our study shows that while research does not deal with this issue in depth, practice has already established methods of using APM in different ways to enable, support, and ensure different ASO strategies.

The remainder of this paper is structured as follows: The next section gives an overview of prior research explaining outsourcing strategies and ASO, as well as research implying the interrelation of APM and ASO. The subsequent section describes the research methodology, including data collection and analysis. The results are presented along APM capabilities, the application portfolio structure, and application portfolio characteristics addressing the varying role for each outsourcing gestalt. This paper closes with the conclusion, which includes the limitations and potential for future research.

RELATED WORK

Application Services Outsourcing Strategies

Kern (1997) describes IS outsourcing as “a decision taken by an organization to contract-out or sell the organization’s IT assets, people, and/or activities to a third party vendor, who in exchange provides and manages assets and services for monetary returns over an agreed period of time.” The outsourcing decision is very complex and unique to each organization (Cheon et al. 1995), and mistakes can lead to outsourcing failures, such as the loss of essential capabilities and/or business damages (Loh and Venkatraman 1992). The views of IT functions range from broad to a more detailed categorization, as well as from a pure technical to an offering oriented view. Grover et al. (1996) differentiate between “application development and maintenance, system operation, networks/telecommunication management, end-user computing support, system planning and management, and purchase of application software.” More recently, Mahnke et al. (2005) divided IT functions based on established industry offerings into infrastructure, applications and business processes. In accordance with Mahnke et al. (2005), we defined ASO as the outsourcing of “all services associated with the acquisition, development, and deployment of an IT application” (Schwarz et al. 2009).

Scholars identified different outsourcing typologies to specify outsourcing strategies. The most popular is the typology by Lacity and Hirschheim (1995), introducing three outsourcing types, varying in the IS budget transferred to one or multiple vendors: (1) total insourcing (less than 20 percent of the IS budget), (2) selective outsourcing (between 20 and 80 percent of IS budget), and (3) total outsourcing (more than 80 percent of the IS budget). Prior research by Lacity and Hirschheim (1993) also addressed the range of responsibility transferred to the vendor to define a typology. Body-shop, therefore, refers to the hiring of external staff managed internally, and thus resulting in nearly no responsibility transfer (Lacity and Hirschheim 1993). When transferring a specific project or portion of work, Lacity and Hirschheim (1993) refer to project management. The last type of responsibility transfer, called total outsourcing, includes the turning over of a significant part of the IS work (Lacity and Hirschheim 1993). Straub et al. (2008) claims that the extent of control over IT resources is the dominant aspect of the outsourcing decision. Several other strategy dimensions were added by further research, such as contract durations (Pinnington and Woolcock 1995).

Lee et al. (2004) empirically proved that distinct configuration of these strategy dimensions is more likely to lead to outsourcing success. Deduced from the residual rights theory, Lee et al. (2004) used three strategy dimensions to describe an outsourcing strategy: (1) the degree of integration, (2) the allocation of control, and (3) the performance period. The degree of integration, described as “the proportion of IT functions outsourced” measured by the IS budget, is classified into minimal outsourcing (less than 20 percent of the IS budget invested externally), selective outsourcing (between 20 and 80 percent of the IS budget invested externally), and comprehensive outsourcing (more than 80 percent of the IS budget invested externally). The allocation of control refers to the contract type, and thus, the extent of control transferred to the vendor, which can either be buy-in (nearly no authority transfer), fee-for-service (authority transfer for distinct part of IT functions with detailed specifications), or partnership (comprehensive authority transfer with an unspecific contract). The performance period describes the contract duration as either being short, medium, or long-term. Lee et al. (2004) conclude with three configurations of outsourcing strategies, which they refer to as gestalts, most likely to succeed in outsourcing. The outsourcing gestalts are further related to a particular outsourcing outcome, i.e. strategic

competence, cost efficiency, and technology catalysis (Lee et al. 2004). The three outsourcing gestalts are determined as follows (Lee et al. 2004):

- *Independent* – minimal outsourcing, buy-in contract, short-term contract duration, outcome: strategic competence
- *Arm-length* – selective outsourcing, fee-for-service contract, medium-term contract duration, outcome: cost efficiency
- *Embedded* – comprehensive outsourcing, partnership contract, long-term relationship, outcome: technology catalysis

While the independent as well as the arm-length approaches include outsourcing to multiple vendors, known as multi-sourcing (Currie 1998), the embedded approach implies the outsourcing to one major external vendor, a spin-off, a company owned as a subsidiary, or in the form of a joint venture (Dibbern et al. 2004).

Application Services Outsourcing in the Context of Application Portfolio Management

APM is responsible for the evaluation of existing, new, and potential applications in order to enable the determination of the business value of an application. Thus, APM supports decisions about the replacement, retirement, or further investment in applications. The implementation of APM seeks to improve the business IT alignment, and an optimal deployment of IT (McKeen and Smith 2010). Enterprise architecture scholars consider APM as a process in enterprise architecture management (Hafner and Winter 2008). Reviewing the literature, we structured APM into three categories: (1) APM capabilities, (2) application portfolio structure, and (3) application characteristics. APM capabilities include the ability to analyze, plan, improve and monitor the application portfolio in order to align the application landscape with business requirements (Simon et al. 2010). The application portfolio structure refers to the condition of the portfolio, e.g. the complexity or technical condition (McKeen and Smith 2010). The target of APM is to achieve a healthy portfolio structure by reducing costs and the complexity of the portfolio, as well as by eliminating and avoiding redundancies (McKeen and Smith 2010). APM literature reveals various application characteristics from a more technical (Weill and Vitale 1999) to a more economic (Ward 1990) point of view. Examples of such characteristics include the source code quality (Weill and Vitale 1999) or the strategic importance to the business (Ward 1990). Thus, research dealing with APM predominantly covers analytic approaches to classify applications, the condition of the portfolio, as well as initiatives improving the application landscape. These three categories support structuring the literature of outsourcing in the context of APM; furthermore, they guide the data analyses as well as the discussion of the results.

Only scant research views ITO or ASO in the context of APM, or aspects of it. Table 1 summarizes the scanned literature towards coverage of the three APM categories, and whether the research refers to one or all strategy gestalt(s). Research dealing with APM capabilities underlines the importance of APM to facilitate the selection of applications for outsourcing, as well as the ability to monitor the vendor's deliverables (McKeen and Smith 2010). Based on the work of Willcocks et al. (2006) introducing nine core IS capabilities, Han et al. (2008) investigated the impact of IS capabilities on outsourcing success. Both managerial IT capabilities, as well as organizational relationship capabilities, include the abilities to understand, transform, and align IT with business needs (Han et al. 2008), which is a major task of APM. Ross and Beath (2006) present how outsourcing following an embedded approach can be used to harmonize and modernize the application portfolio, and therefore improve the application portfolio structure. Looking at the influence of the application portfolio structure, this research mainly concentrates on the impact of the structure to fit with certain outsourcing strategy types. Barthélemy and Geyer (2004) suggest that organizations with a highly integrated application landscape profit more from total outsourcing than from selective approaches, as the interaction with multiple vendors is too complex and extensive. Thus, possessing the transparency over an application portfolio and the dependencies between applications, e.g. by an application scorecard, enables the determination of the degree of outsourcing (Prahald and Krishnan 2002). Besides the overall portfolio structure and the dependencies between the applications, an application-portfolio scorecard also contains the application characteristics, determining whether an application is suitable for outsourcing or not (Prahald and Krishnan 2002). APM scholars suggest various technical and economic application characteristics (Simon et al. 2010). In light of the resource-based view, outsourcing literature addresses the strategic impact of IT assets (including IT applications) and their influences on the choice of the outsourcing scope for selective approaches (Lacity et al. 1996). Based on the principles of transaction costs theory, asset specificity is a major indicator of the outsourcing feasibility (Cheon et al. 1995; Saarinen and Vepsäläinen 1994). Gable et al. (2001) discuss how the software source influences the possibility to

outsource the development and the maintenance of an application. Furthermore, Schwarz et al. (2009) suggest considering ten attributes when outsourcing an application to an application service provider.

Table 1. Overview of major research combining outsourcing with aspects of APM.

Source	APM category*			Outsourcing strategy**			
	APMC	APS	AC	I	A	E	n/a
Barthélemy and Greyer (2004)		X			X	X	
Cheon et al. (1995)			X				X
Gable et al. (2001)			X				X
Han et al. (2008)	X						X
Lacity and Willcocks (1996)			X		X		
McKeen and Smith (2010)	X	X	X				X
Prahald and Krishnan (2002)		X	X				X
Ross and Beath (2006)	X	X				X	
Saarinen and Vepsäläinen (1994)			X				X
Schwarz et al. (2009)			X		X		
Willcocks et al. (2006)	X						X

* APMC=APM Capabilities, APS=Application Portfolio Structure, AC=Application Characteristics
** I=Independent, A=Arm-length, E=Embedded, n/a=not applicable

Thus, outsourcing should not be viewed outside its organizational context (Jayatilaka and Hirschheim 2009) and in the case of ASO, outside the context of APM. Based on these assumptions, we see the need to view ASO strategies in light of APM, asking the following research question:

How does the role of application portfolio management vary for different gestalts of application services outsourcing?

RESEARCH METHODOLOGY

The intent of our research is to reveal explanations (in the sense of how and why different outsourcing strategies are influenced, enabled, and supported by APM) rather than testing an already established hypothesis (Benbasat et al. 1987; Paré 2004; Yin 2003). Thus, we chose a holistic multiple case study research design (Yin 2003) to study the research object in its context. In contrast to hypothesis testing, constructs and measures are not determined upfront and developed in the process of this case study research (Eisenhardt 1989). Nevertheless, our study design is guided by prior research findings to structure the approach (Sutton and Staw 1995; Yin 2003). Our research study is based on the general propositions derived by Lee et al. (2004), considering three outsourcing gestalts representing the outsourcing strategy types, as well as prior assumptions towards APM. Following the principles of case study research, we remain open for new constructs and measures emerging during data acquisition and analysis (Eisenhardt 1989; Paré 2004).

Multiple case studies allow for better generalization of the research findings (Benbasat et al. 1987). In order to limit inter-case differences due to firm size, and for cultural reasons, our target group consists of heterogeneous large German and Swiss enterprises, with a turnover of 50 million euros and higher (OECD 2005). The interview guidelines with standardized open-ended questions (Patton 2002), and a questionnaire with closed questions (Eisenhardt 1989), were based on the findings identified within the literature review of APM, and the different outsourcing gestalts by Lee et al. (2004). To pre-test the questionnaire and the interview guideline, two Chief Information Officers (CIOs) were consulted before beginning the data acquisition. Before the face-to-face interview was carried out, the questionnaire was provided to the interviewees, and analyzed. During a preparation call, the questionnaire was verified regarding understanding and missing information. The face-to-face interview was carried out by one researcher, while a second researcher took notes (Dubé and Paré 2003; Eisenhardt 1989). Data validity was guaranteed by an additional validation of the interview protocol by the interviewee(s). In addition, external data was collected and recorded in fact sheets. Out of the original 37 companies that we received a completed questionnaire from, we selected eleven companies which predominantly apply one of the gestalts introduced by Lee et al. (2004), and which are successful (due to the answers in the questionnaire) in the chosen gestalt. Five of these companies use the independent approach, four use the arm-length approach, and two

use the embedded strategy. The interviews were carried out with a total of 18 interviewees, and the industry coverage ranged from Banking and Financial Services (1), Manufacturing (2), Information and Communication (2), Transportation and Logistics (2), Pharmaceuticals and Chemicals (2), Retail (1), to Utility (1).

Following Miles and Huberman (1994), we analyzed the data in an iterative process. We started with a coding scheme including the outsourcing gestalts, and the three categories of APM identified by prior literature (see above). During the analysis, we further specified the attributes describing the APM capabilities, application portfolio structure, and application characteristics in more detail by triangulating interview data with the survey data as well as the fact sheets, as well as the extant literature. After coding, we looked for within-group similarities (Eisenhardt 1989) to evaluate the varying role of APM for different outsourcing gestalts. In order to limit the risk of biased data, the acquisition and analysis were jointly accomplished by two senior researchers (Patton 2002).

RESEARCH RESULTS

During the data analysis, we investigated the variance between the outsourcing gestalts with regard to the role of APM in the three categories of APM capabilities, application portfolio structure, and application characteristics. Therefore, we derived attributes further specifying these three categories. In the following, these attributes are explained for each category of APM. Subsequently, the expressions of the characteristics for every outsourcing gestalt are compared.

APM Capabilities

McKeen and Smith (2010) introduced three APM capabilities. The capability *strategy and governance* refers to the ability to define an application portfolio strategy, and to determine and implement “a set of policies, procedures and rules that guide decisions and define decision rights in an organization.” *Inventory management* includes capabilities to provide documentation of the application portfolio based on comparable and similar application descriptions, including general application information or the technical condition of an application. *Reporting and rationalization* is the capability to control and continuously improve the application landscape (McKeen and Smith 2010). In order to analyze the extent to which the APM capabilities are implemented in an organization, we used the *Application Portfolio Management Maturity Model* developed by Simon et al. (2010), differentiating between five maturity levels. *Application portfolio obscurity* (Level 0) describes the situation in which no application portfolio management is implemented. *Application portfolio understanding* (Level 1) refers to a documented application inventory. *Application portfolio intelligence* (Level 2) is related to the capabilities to analyze the application portfolio. After implementing capabilities necessary to optimize the portfolio, *application portfolio quality* (Level 3) is reached. *Application portfolio excellence* (Level 4) describes the comprehensive institutionalization of APM (Simon et al. 2010).

The data analysis of the APM capabilities in the different outsourcing gestalts reveals a significant variance of the extent to which APM capabilities are implemented in organizations. The companies applying the independent strategy possess a low level of maturity in APM capabilities (Level 1). “Even though we carried out a comprehensive portfolio analysis to document the landscape, the transparency to understand how to gain more efficiency is missing” (Direct to the CIO, ID 1). Nevertheless, data reveals that explicit and institutionalized APM capabilities are not required to succeed with the independent approach. The work delegated to the third party is determined and controlled by staff with knowledge of the relevant applications. However, the approach limits the tasks which can be transferred externally. It demands monitoring on an individual level constrained to single employees, as well as good knowledge about the skills of the external staff. In contrast, firms making use of the arm-length strategy showed a high maturity in APM capabilities (Level 3 and Level 4). “Our selective sourcing approach was enabled through our central portfolio management” (CIO, ID 6). An appropriate APM is necessary to guarantee that all externally developed applications fit into the portfolio, and that the maintenance of the application works efficiently and smoothly. This is especially important as the applications are outsourced to multiple vendors. The two companies with the embedded approach possess a high and a low maturity in APM capabilities (Level 3 and Level 0). One of the companies used the high APM competence to determine the suitable outsourcing partner in order to transform and modernize the application landscape. “After the portfolio analysis and the development of a comprehensive portfolio plan, we were able to search for and to decide on a single outsourcing partner to carry out the planned application landscape modernization” (CIO, ID 10). These findings correspond with those of Ross and Beath (2006), using an outsourcing partnership to transform the application landscape. The other firm, in contrast, trusted the capabilities of the IT service provider. “We do not have a detailed and documented overview over the application landscape. These capabilities are provided by our exclusive outsourcing partner” (CIO, ID 11). Thus, the company relied on the vendor’s capabilities, with the high risk of a lock-in effect. Even though the APM capabilities are not implemented to the internal organization, the provider needs to hold these capabilities in order to create benefits compared to total insourcing.

Application Portfolio Structure

The application portfolio structure describes the dependencies between the applications to gain a comprehensive view of the overall portfolio configuration. During the data analysis, we identified three relevant characteristics for the application portfolio structure, namely the *application portfolio standardization degree*, the *technical condition of the portfolio*, and the *application portfolio complexity*. The standardization degree of an application portfolio refers to the penetration of standard software in a portfolio (Gable et al. 2001). The technical quality of an application determines the technical condition of the portfolio (McKeen and Smith 2010), including the source code quality, the maintainability, the compatibility, the documentation quality, and the architectural fit (Simon et al. 2010). The portfolio complexity is specified by the number of applications, the number of redundant applications, the number of interfaces between applications, and the technical complexity (McKeen and Smith 2010).

The data analysis showed that for the independent approach complex, unhealthy and individual portfolio structures are suitable as the whole responsibility for the portfolio stays internal. Thus, the portfolio and its complex dependencies remain cohesive, as a separation of responsibility leads to an inefficient management effort. The application portfolio structure for the cases with the embedded approach also possesses high complexity. For the embedded strategy, nearly the entire responsibility is transferred to the outsourcing partner, which leaves the responsibility for the portfolio to one instance, the outsourcing partner. Furthermore, the firms in the group with the embedded approach predominantly obtained an unhealthy technical portfolio condition, as well as a low standardization degree. "A high degree of standardization is not possible for our specific situation. Therefore, we set up an individual approach to work with our exclusive outsourcing partner" (Direct to the CIO, ID 11). Barthélemy and Geyer (2004) have already pointed out the better applicability of total outsourcing for complex portfolios. As the arm-length approach best suits the achievement of efficiency, the firms implementing this strategy benefit from application portfolios with low to medium complexity, a healthy technical condition, and a high standardization degree. As part of the portfolio complexity, the number of applications does not seem to be a salient determinant hindering the outsourcing. However, it does increase the potential for the complexity induced by the interrelation between, and the integration of, the applications. Even though not all of the organizations fulfill every criterion, at least two were met by organizations succeeding in this outsourcing approach. A healthy technical portfolio condition was met by all four companies. A low portfolio complexity, especially regarding dependencies and redundancies between applications, allows the separation of applications and IT functions, such as application development and maintenance. The possibility of separating application development and maintenance enables better competitive situations, and lowers the risk of lock-in effects (Currie 1998). "We separate the outsourcing of application development and maintenance to exploit competitive forces between service providers" (CIO, ID 6). Organizations, nevertheless, need to guarantee a life-cycle view to ensure maintainability and long-term business satisfaction. A high degree of standardization positively influences the possibilities of outsourcing (Gable et al. 2001). "80 percent of our portfolio is based on SAP today. There is still a tendency to eliminate individually developed applications" (CIO, ID 6). The low portfolio complexity, the healthy technical condition, and the high standardization degree are a result of the high maturity level in APM capabilities achieved by the companies approaching the arm-length strategy, since these aspects are major targets of APM (Simon et al. 2010).

Application Characteristics

There are numerous application characteristics describing an application by the classification of applications from a technical, economic, and business perspective (Simon et al. 2010). In total, the application characteristics of all applications within the portfolio determine the application portfolio structure. Looking at the characteristics of a single application, nevertheless, allows the determination of the impact an application possesses on the organization, and decisions about the future development (McKeen and Smith 2010). Analyzing the data, five major characteristics were salient within the outsourcing decision: the *strategic impact*, the *business criticality*, the *software source*, and the *life-cycle stage*. The strategic impact refers to the positioning of a firm (Lacity et al. 1996). An application with a high strategic impact creates sustainable competitive advantage (Pati and Desai 2005). Applications that business operations strongly depend on contain a high business criticality (Ward 1990). The asset specificity refers to the transferability of an application to a third party (Cheon et al. 1995). For an application, we consider the software source of an application as characteristic of specificity, which can either be *custom*, *hybrid*, or *packaged* (Gable et al. 2001). The perspective of an application life-cycle is twofold. The function-oriented life-cycle, based on the definition of Information Technology Infrastructure Library (ITIL) (Cannon et al. 2007), is subdivided into the stages *design*, *build*, *deploy*, *operate*, and *optimize*. The economic perspective on the life-cycle refers to the contribution of an application to the business, as well as the technical quality of an application, and can be classified into *upgrade*, *nurture*, *question*, and *consolidate or eliminate* (Weill and Vitale 1999).

In this category, it is interesting that only for the arm-length approach do the characteristics of a single application influence the outsourcing decision. For the independent approach, all responsibility remains within the internal organization. The primary target of this approach is the access to skills. "Our IT organization is

growing faster than the company itself. In order to satisfy the requirements, we need to source external knowledge” (IT Manager, ID 2). Only in the case of standard software, is required external staff easier to acquire from the market, as more skills are available for standard software. This is in conformity with prior findings in outsourcing research, which state that the higher the asset specificity, the less applicable and useful outsourcing might be (Cheon et al. 1995). The application characteristics of the single application do not matter for the embedded strategy, as the responsibility for the major part of the portfolio is cohesively transferred to the vendor. For the arm-length approach, however, the characteristics of the applications determine whether an application is outsourced, and to whom. Prior literature has proven that a high strategic impact, as well as a high business criticality, leads to the decision to keep an IT asset, in the case of ASO an application, internally (Lacity et al. 1996). During the data analysis, we discovered that applications with a high strategic impact, or a high business criticality, are outsourced depending on the life-cycle stage, from a functional perspective. While the strategic impact is a salient determination to keep the development of an application in-house, the maintenance of this application was, nevertheless, outsourced. Applications with a high strategic impact enable competitive advantages, whose creation is seen as a core competence of the organization. Applications with a high business criticality, in contrast, were outsourced for the development, but implemented internally or back-sourced for the application maintenance. “We outsource the maintenance of non-critical applications while critical applications remain internal” (CIO, ID 7). For business critical applications, a stable operation needs to be guaranteed to avoid damage to the business. Applications with the combination of high strategic impact and business criticality were, in all cases, kept in-house. The software source influences the outsourcing decision, as standard software is more feasible for outsourcing (Gable et al. 2001). Looking at the economic life-cycle perspective, we discovered the practice to outsource applications in the phases of *nurture* and *eliminate*. “We concentrate the outsourcing of applications in the *maintain* and *reduce* life-cycle stages. To outsource applications in the reduce stage helps to size down our IT organization” (IT Manager, ID 8). In the case of outsourcing an application which has reached its elimination phase, outsourcing is used to free-up resources for strategic and business critical applications. To transfer the staff or services of an application to the external provider, furthermore, intentionally creates distance between the IT staff and the users and the application. “With the outsourcing of an application which should be retired, we are able to get our IT staff and users out of the comfort zone” (IT Manager, ID 8).

Cross Case Comparison

Table 2 structures our cross-findings according to the outsourcing gestalts, and the attributes of the different APM categories. Comparing the expressions of characteristics for the three outsourcing gestalts, our findings reveal that the arm-length approach requires the highest extent to which APM is implemented in an organization.

Table 2. Significant group characteristics for outsourcing gestalts.

<i>Outsourcing gestalt</i>	Independent	Arm-length	Embedded
<i>APM category</i>			
APM capabilities	<ul style="list-style-type: none"> • APM Maturity Level 1 • Knowledge about applications is implicit and bounded to individuals 	<ul style="list-style-type: none"> • APM Maturity Level 3 or higher • APM capabilities enable the selection of applications as well as smooth and efficient vendor management 	<ul style="list-style-type: none"> • Varying APM Maturity Levels (high and low) • Vendor with high APM Maturity Level required • Outsourcing to transform application landscape
Application portfolio structure	<ul style="list-style-type: none"> • High complexity • Unhealthy technical condition • Low standardization degree 	<ul style="list-style-type: none"> • Medium to low complexity • Healthy technical condition • High standardization degree 	<ul style="list-style-type: none"> • High complexity • Unhealthy technical condition • Low standardization degree
Application characteristics	<ul style="list-style-type: none"> • Salient characteristics for outsourcing decision: software source 	<ul style="list-style-type: none"> • Salient characteristics for the outsourcing decision: strategic impact, business criticality, software source, life-cycle stage (functional and economic) 	<ul style="list-style-type: none"> • Application characteristics not salient for the outsourcing decision as nearly all of the applications are outsourced to one outsourcing partner

The independent approach does not necessitate a high maturity in APM capabilities, and can even be applied with a complex and unhealthy technical portfolio condition, and a high individualization degree of the portfolio. Since nearly no responsibility is transferred to the vendor, the application characteristics are not major drivers for deciding on outsourcing. Only for the availability of skills on the market software source, can influence the outsourcing decision. For the embedded approach, a high extent of APM capabilities is required. However, these

capabilities can be provided by the vendor as part of his responsibility which contains the risks of lock-in effects. Especially for complex portfolio landscapes with a low standardization degree and an unhealthy portfolio condition, high vendor management effort can be avoided by transferring the a major part of the application portfolio to one vendor (Barthélemy and Geyer 2004). As nearly the complete application portfolio is outsourced, the characteristics of a single application are out of the scope of the outsourcing decision. The arm-length strategy, in contrast, requires a high maturity level in APM capabilities internally. This approach benefits from low portfolio complexity, high standardization degree, and requires a healthy portfolio condition. The salient application characteristics influencing the outsourcing decision include the strategic impact, the business criticality, the software source, and the application life-cycle stage (functional and economic view). Nevertheless, outsourcing is not an end to itself. It is, rather, an instrument to achieve a dedicated target. Therefore, companies need to choose the right strategy to meet their goals. As each outsourcing gestalt better fits another target, the IT organization must consider the requirements of the outsourcing gestalt matching the current targets. "We consider changing our outsourcing towards the arm-length approach to gain cost reduction. But we know that the internal change management process is the key to succeed in the new outsourcing strategy" (CIO, ID 5).

CONCLUSION

Our research seeks to evaluate how the role of APM varies for the different outsourcing gestalts, identified by Lee et al. (2004), in the case of application services outsourcing. Therefore, we performed holistic multiple case study research with eleven large German and Swiss companies that were successful in predominantly applying one of the outsourcing gestalts. The results reveal that the arm-length strategy requires the highest extent of implementation of APM, while the independent and embedded approach only demands certain implementation aspects. The independent approach is applicable with a low maturity level in APM capabilities, and for a complex, unhealthy, and individual portfolio structure. The strategy is used to access skills and knowledge from the market that are more likely available for market standards. The arm-length strategy targets efficiency; therefore, a high maturity of APM capabilities is required to identify the leverage provided by the current portfolio status and planned initiatives, with the support of outsourcing. To apply the selective outsourcing approach, and thus, the splitting of the outsourcing volume across multiple suppliers, IT organizations benefit from a non-complex, healthy, and standardized portfolio structure. In order to select the applications for outsourcing, several application characteristics are salient and need to be available for the decision. The embedded strategy, however, is applicable for complex, unhealthy, and individual portfolio structures. On the one hand, an outsourcing partner can take over the entire responsibility in an individual agreement to meet the corporate specifics of the organization. On the other hand, outsourcing can be applied to transform and modernize the application landscape through the outsourcing partner. Our research extends the scientific knowledge base with the perspective on requirements for outsourcing strategies in the field of application services outsourcing. Practitioners can use these findings to evaluate their own outsourcing strategy towards the requirements, and to initiate necessary actions.

Our research is limited to the requirements of APM, and thus, to internal IS requirements. It does not include the market perspective and, therefore, external factors, such as the influence of the vendors' capabilities on outsourcing success (Plugge and Bouwman 2012). The findings are also limited to the eleven cases, and should be considered to be tested in a large scale survey, in order to provide additional empirical evidence. Jayatilaka and Hirschheim (2009) investigated the drivers and outcomes of changing outsourcing arrangements. The change in outsourcing strategies over time is based on the fact that organizations are subject to constant change. In light of APM and strategies for application services outsourcing, it could be interesting to understand how APM evolves with the changes, and how APM can support these changes. Therefore, this research could benefit from longitudinal study approaches.

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