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Abstract

Effectiveness and even more efficiency are substantial indicators of information technology (IT) performance management. Evaluation of an organisation's IT performance relies heavily on benchmarking with other organisations. The comparability of IT key performance indicators (KPIs) is critical for resilient benchmarking results. KPI suggestions of established frameworks remain very generic. They are incapable of taking individual characteristics of different business models into account and impede, therefore, a sophisticated benchmarking. Such an occurrence can be observed frequently, especially in the environment of business groups. In the case of one leading international financial service business group, we analysed this problem and applied action research to identify IT cost drivers and develop specific KPIs for the group IT performance management. This article provides insights into a real-life example of evaluating IT performance and suggests a set of KPIs for IT cost efficiency benchmarking among asset management firms within a business group considering the firm's different business models.

Keywords

IT/IS evaluation, IT/IS performance management, key performance indicators, asset management

1. Introduction

Over the last few decades IT for service oriented business models (e.g. financial services) has become a critical success factor for many business models. For example, banks whose IT applications and infrastructure are incapable of reliably handling millions of transactions daily

will not endure this challenging market (Brynjolfsson, 1993; Finchman et al., 1994). Financial service industry has significantly higher IT expenditures than other industry sectors. Generally, IT expenses already represent up to 15% of corporate turnover. Analysis of worldwide IT expenditures over the last decade revealed continuous yearly growth (Bartels, Mines, & Musto, 2011; Minton & Shirer, 2010). For 2012, a growth of 3.7% to 6.9% is projected compared with 2011. This makes the weighing of IT cost against benefits a focus area of IT management (McAfee & Brynjolfsson, 2008; Van Grembergen, 2001). IT managers use a large variety of KPIs to evaluate their IT organisations and benchmark them against others (Buchta, Eul, & Schulte-Croonenberg, 2007).

Both scholarly and practitioner-oriented literature assess IT evaluation as a mature research domain with a wide variety of frameworks (Gunasekaran, Ngai, & McGaughey, 2006; Kohli & Grover, 2008; Rom & Rohde, 2007). However, those frameworks remain generic and do not cover specific approaches for KPI development or specifics of an application in certain organisation forms (i.e. business groups) or industries (i.e. asset management). Moreover, to prove the practical relevance of this research topic we conducted expert interviews which confirm the missing coverage on the topic.

The group IT performance management of a leading financial service business group (hereafter referred to as ALPHA) was confronted with the task of evaluating and benchmarking the IT performance of about 20 asset management (AM) firms. The business group ALPHA consists in total of more than 150 legally independent companies and one corporate centre. The group IT performance management is responsible for challenging and ensuring the IT cost effectiveness and efficiency of the individual IT organisations of the business group member companies. The existing IT KPI set was not capable of delivering resilient findings. Several expert interviews with chief information officers (CIOs) of the AM firms revealed that the utilised KPIs are too generic. Furthermore, they are not taking the different business models of the AM firms into consideration. Therefore, the need for more specific KPIs rose. In order to provide a contribution to the scientific body of knowledge and to address the challenges of business group ALPHA, an action research approach has been chosen. In this article the authors present the derived approach and target the following research questions (RQ):

[RQ.1] *What influence do different business models of AM firms have on the comparability of their IT costs?*

[RQ.2] *How could the performance of IT departments in AM firms within a business group be evaluated while considering the different business models?*

The following paper is structured as follows: The first part lays the foundation for the most relevant terms and describes the research methodology. The second part presents the research setup and results. Finally, the paper highlights lessons learned and concludes with the research findings.

2. Foundation

Prior to the research setup and findings, the fundamental terms “AM (asset management)”, “business model”, “business group”, “KPI” and “group IT controlling” have to be explained to ensure common understanding.

AM (asset management) is a systematic process of maintaining, upgrading and operating assets in a cost-effective manner (Walter, 1999). The institutional asset-management industry is one of the largest and most dynamic segments of the global financial services industry (Davis & Steil, 2004; Walter, 1999). Asset managers administer thousands of funds and IT is a crucial factor within their business model (Davis & Steil, 2004). Hence, it represents a significant portion of the operational costs.

A *business model* can be described as the way in which a company creates and captures value (Chesbrough 2007). It encompasses from an abstract point of view the aspects of your value proposition, customers and revenue source. Therefore, it is crucial to any organisation (Magretta 2002).

Business groups consist of a collective of legally independent firms (Smangs, 2006). These companies are linked by various ties, including ownership or economic means through which they achieve mutual objectives (Granovetter, 2005). The organisation consists of business entities (BEs) and a parenting core entity. The core entity – also known as the corporate centre – acts as a parent company over this collective and provides to some extent common administrative or financial control, or managerial coordination among the BEs (Granovetter, 2005; Hoffmann, 1993). This organisational setup leads to a non-transparent IT environment, which challenges the group IT management and especially the cost and performance management of IT (Hamel, Herz, Uebernickel, & Brenner, 2011).

KPIs are an instrument used to quantify the performance of a particular object of investigation. In the context of management, performance measurement is an analysis of both effectiveness and efficiency in accomplishing a given task (Wheelen & Hunger, 2009). KPIs are used by IT management to monitor IT performance in key strategic areas (Buchta, et al., 2007). The evaluation of a company's IT performance is a vital managerial function (Garrison, Noreen, & Brewer, 2009). Despite their wide acceptance in business, indicators, especially financially related measures, also encompass certain drawbacks. It has been argued that such measures might be subject to manipulation (time of calculation, numbers taken, etc.) (Myddelton, 2009). The latter increases the difficulty of comparing companies regarding their IT performance (Potter, Smith, Guevara, Hall, & Stegman, 2011; Schniederjans, Hamaker, & Schniederjans, 2010).

The term "*group IT controlling*" has to be explained according to its constituent parts. Controlling is a term which is established in the central European language area and inherits the aims and tasks of management accounting (Hoffjan & Wömpener, 2006). *IT controlling* is the application of management accounting theories within the IT or information systems (IS) domain. It is also known as "IT/IS evaluation" and "IT/IS performance management" (Strecker, 2008). The aim of this IT management domain is to ensure the efficient and effective use of IT and the provision of IT services according to function, quality and time requirements of the business (Schwertsik, Wolf, & Krcmar, 2009). IT controlling can be structured into three substantial processes – planning, monitoring and steering – which is in line with the Deming PDCA cycle (Walton, 1986), if we leave out the "do" step of Deming. Moreover, it does not include any internal or external auditing tasks (Garrison, et al., 2009; Horváth, 2009). Furthermore, group IT controlling represents the application of IT controlling on group level. In this context, legal entity controlling is worth mentioning because it shows similarities to the group IT controlling discipline. Legal entity controlling supports the effective, target-oriented management and control of subsidiaries in order to increase corporate success and value (Burger

& Ulbrich, 2010). Group IT controlling is inspired by legal entity controlling and is dominated by financial KPIs rather than technologically oriented KPIs.

3. Research methodology

The action research methodology is an established approach in several research domains including IS research (Avison, Lau, Myers, & Nielsen, 1999; Baskerville, 1999; Baskerville & Wood-Harper, 1996; Davison, Martinsons, & Kock, 2004). Action research simultaneously assists in practical problem-solving and contributes to the body of knowledge (Baskerville, 1999; Davison, et al., 2004; Hult & Lennung, 1980). It represents an approach which allows for direct collaboration between scientists and practitioners. Thus, it generates extremely relevant research results (Baskerville & Wood-Harper, 1996). This study strives to solve a current problem of ALPHA and promote scientific progress at the same time. A major requirement of action research is that the researcher is actively involved in the practical problem-solving approach. One of the authors was part of the project team at ALPHA and, thereby, established a research environment according to Baskerville and Wood-Harper (1996). The project reported in this paper was conducted from July to October 2010.

KPI Set Version	Iterative Cycle	Stakeholders (involved organisation units)	Position	Results
v_0	N/A	ALPHA - CC *Group IT Controlling*	− Executive IT Manager	Scope and objective agreed Milestone planned agreed
v_1	I	ALPHA – CC *Group IT Controlling*	− Senior IT Manager	Existing KPI set extended by best practices
v_1	I	OE of ALPHA *AM company I & II*	− CIO	Extended KPI set commented
v_2	Ii	ALPHA – CC *Group IT Controlling*	− Senior IT Manager	Extended & revised KPI set commented
v_2	Ii	BE of ALPHA *AM company III*	− Business development manager	Extended & revised KPI set commented
v_3	Iii	ALPHA – CC *Group IT Controlling*	− Executive IT Manager − Senior IT Manager	Extended & revised KPI set commented
v_3	Iii	OE of ALPHA *AM company IV*	− CIO − Senior IT Manager	Extended & revised KPI set commented and optimised towards ease of implementation

(AM) Asset management; (CC) Corporate center; (BE) Business entity

Table 1 Iterative process model

Action research has different forms. One of the most prevalent applied in this paper is the five step cyclical approach (diagnosing, action planning, action taking, evaluating and specifying learning) according to Baskerville (1999). The researcher's contribution includes the setup and coordination of the project schedule and the identification of requirements in a collaborative way with business group ALPHA. Furthermore, the literature review of best practice IT controlling approaches, the identification of IT cost drivers and the development of appropriate IT KPIs were done by the project team and the researcher in a collaborative manner. During the entire project several expert interviews (refer to Table 1) took place to evaluate and revise the research findings and solution concepts in an iterative process.

The research setup presented in this article demonstrates immediate knowledge usage and links theory and practice in a cyclical process. These characteristics provide the ideal domain to apply action research (Baskerville & Wood-Harper, 1996). Moreover, the proposed principles of canonical action research were applied (Davison, et al., 2004):

- Agreement between researcher and client: Research cooperation between ALPHA and the researcher was established in 2009. Prior to the start of this specific project, both parties negotiated the project timeline and objectives as well as roles and responsibilities.
- Iterative process model: At the beginning of the project, the researcher and ALPHA agreed upon a three-step approach to identify cost drivers and develop KPIs.
- Theoretical foundation: The findings of a literature review identified the need for research in terms of group IT controlling (Hamel, Herz, Uebernickel, & Brenner, 2010). In addition, the first identification of cost drivers and KPIs was inspired by existing literature.
- Willingness to bring about change: The willingness to improve the situation was identifiable throughout the entire project and fully supported by ALPHA.
- Documentation of lessons learned: During the entire study, approaches, research findings and derived concepts were documented. Lessons learned where derived from experiences during the project and a reflective post project evaluation.

4. Towards IT cost driver identification and KPI development

4.1 General setup

ALPHA is one of the leading financial services business groups worldwide. It provides financial services within the insurance, AM and banking sector to more than 75 million clients in about 70 countries worldwide. The business group ALPHA consists of a corporate centre – also known as management holding or parent company – and more than 150 independent companies – hereafter called BEs – with a total of about 150,000 employees. About 20 companies within the group belong to the AM business line.

The IT domain of business group ALPHA can be characterised as a decentralised IT organisation with a group CIO and local CIOs at OE level (refer to Figure 1). Moreover, the IT governance is defined as a federal model according to Weil and Ross (2005). Therefore, ALPHA uses an IT committee, consisting of the group CIO and CIOs of leading BEs, to take major IT decisions. The group IT controlling team supports the group CIO, IT committee and OE CIOs with reports and analyses of IT resources across the group. Group IT controlling focuses mainly on IT costs and productivity measurements. The figures are used for performance evaluations and to benchmark the BEs with regard to their IT efficiency against each other.

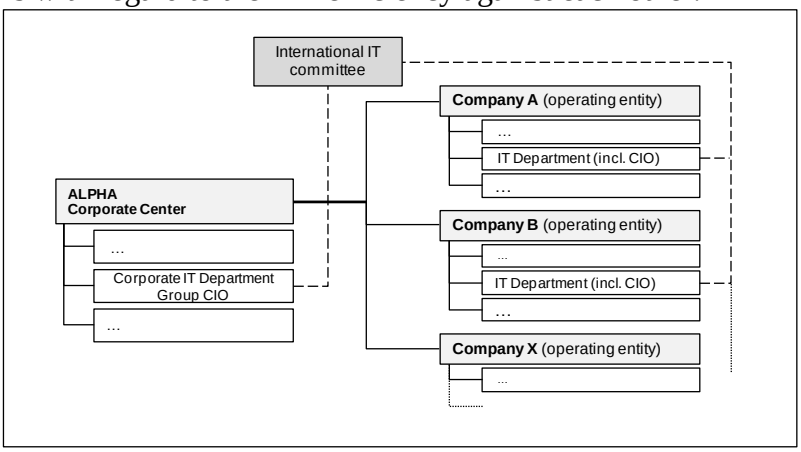

Figure 1 Organisational IT structure of business group ALPHA

4.2 Problem identification and analysis

Recently, ALPHA's AM business line has grown rapidly, impacting total IT expenses. Therefore, the entire AM business line IT expenses now represents more than 10% of the group IT budget. This motivated ALPHA to increase their controlling efforts. Up to this point in time, group IT controlling relied on a small generic set of figures and KPIs to monitor the IT performance of AM BEs (refer to Table 2).

Focus	KPIs (excerpt)
IT performance	− Cost ratios (e.g. IT costs / assets under management) − Quotas (e.g. change the company / run the company) − Functional cost distribution (e.g. application development & maintenance, infrastructure) − Source cost distribution (e.g. hardware, software, internal personnel, external personnel)
Business performance	− Business development (e.g. assets under management, operational costs, # FTEs, # IT FTEs)

Table 2 Initial KPI set

Appropriate business oriented IT unit cost KPIs were not in use. The IT cost ratio and also a cost benchmarking analysis showed a significant variance in correlation with the business size or assets under management (AuM) amount respectively. These findings could lead to two propositions. First, the IT efficiency among the AM OEs varies significantly. Or secondly, the variation of business models among the busines entities has a strong influence on IT costs and lowers the quality of benchmark results.

This situation stimulated the requirement for the group IT controlling department to identify business-related IT cost drivers among AM OEs and to develop more specific IT KPIs for benchmarking initiatives. Initial expert interviews with the CIO of the largest AM OE and two senior IT managers verified the second proposition and confirmed the requirement.

4.3 Analysis of existing frameworks

During the initial phase of the project, the researchers and the project team of ALPHA agreed to analyse existing literature regarding appropriate KPI recommendations and development approaches. We did not limit our search to scientific literature or the IT controlling domain, but also looked for analogies in other areas in accordance with Gavetti and Levinthal (2005). For the analysis, we took four established IT controlling text books into consideration and one market research agency's IT benchmarking report (refer to Table 3). The selection of relevant text books were inspired by current literature reviews (Hamel, et al., 2010; Schwertsik, et al., 2009).

Essentially, IT controlling is derived from general management accounting (Horváth, 2009). Therefore, we also took fundamental managerial accounting literature into consideration. According to this literature, KPIs for efficiency benchmarking should be based on activity induced figures (e.g. revenues, units) (Garrison, et al., 2009), which are directly related to entity's business performance.

Source	Orientation		Level of genericness	Industry specifics	Focus of KPI suggestions
	Theoretical	*Practical*			
(1) (Krcmar, 2009)	✓	–	4	0	− Costs − Utilisation − Value contribution
(2) (Remenyi, Bannister, & Money, 2007)	✓	–	3	0	− Costs − Service quality
(3) (Kesten, Müller, & Schröder, 2007)	✓	✓	2	0	− Costs − Utilisation − Value contribution − Service quality − Process performance
(4) (Irani & Love, 2008)	✓	–	3	0	− Costs − Utilisation − Value contribution
(5) (Potter, et al., 2011)	–	✓	2	3	− Costs − Human resources

4 Very high 3 High 2 Medium 1 Low 0 Very low

Table 3 Literature analysis

All selected IT controlling textbooks provided recommendations for KPIs (refer to Table 3). (1) provides KPI recommendations on a general level, while (2) and (3) deliver more specific recommendations. Only (4) provides a KPI library with detailed descriptions. Moreover, only (5) provides industry specific KPI suggestions. A segmentation of the text books can be made: generic (1), financial and business (2, 3, 5) and technologically (4) dominated. Finally, with regard to KPI development, no stringent approach is suggested, but four types of KPIs are mentioned frequently: cost ratios (e.g. IT costs as a percentage of total operational costs), quotas (e.g. IT outsourcing quota), productivity indicators (e.g. end-to-end IT supported process time) and unit costs (e.g. costs per PC). According to (5), the ratio of IT costs alone is not very meaningful and can only deliver reliable insights in conjunction with further KPIs. However, all sources remain generic and do not cover influences of specific business models.

4.4 Identification of cost drivers and KPI development

After evaluating the first findings the project team of ALPHA and the researcher decided to involve business experts from AM OEs. The aim of this step was to get a precise picture of various existing business models and their influence on IT costs and performance respectively. As a first step, the team evaluated which elements of the AM business process could be identified as activity induced figures (refer to Table 4) according to best practices of management accounting (Garrison, et al., 2009).

(A) A transaction is commonly understood as settlements (buying and selling of e.g. securities, stocks, bonds) and corporate actions (e.g. forward and reverse splits of stocks, dividend and interest payments).
(B) A fund represents a collective investment vehicle that manages capital from one or more investors for the purpose of investing in assets (e.g. securities, stocks, bonds).
(C) AuM represents the amount of client assets which are under the control of the AM firm. It is one of the key volume drivers within this industry sector.

Activity induced figures	Ease of measurement	AM business model impact	
		Product mix	*Client type*
(A) # of transactions	1	3	2
(B) # of funds	3	1	3
(C) # of asset under management (AuM)	4	2	4
(D) Others	*N/A*	*N/A*	*N/A*

4 Very high 3 High 2 Medium 1 Low 0 Very low

Table 4 AM activity induced figures incl. expert assessment

According to our expert interviews with AM business managers and IT managers, product mix and client type (e.g. institutional, retail) (refer to Table 4) are the most significant business model characteristics, which influence the mentioned activity induced figures. (B, C) are heavily influenced by the client type of the specific business model, while the impact of the product mix remains rather low. For (A) it is the opposite. Furthermore, the business model characteristics have a direct impact on the operational costs and, therefore, on the IT costs as well. For example the KPI IT cost ratio (AuM) is very sensitive to business model characteristics; if the KPI has a segmentation according to the client type, the sensitivity is mitigated. This highlights that a sole benchmark based on this generic KPI is not appropriate for evaluating the individual IT performance. Also, the IT costs per fund differ according to the client segment. If the client is of the institutional type, IT costs are lower because the effort for fund accounting is significantly lower.

KPI		Formula	Value	Segmentation	Measure aim	Implemented
(K1)	IT cost ratio	$\frac{IT\ cost\ per\ client\ type}{AuM\ per\ client\ type}$	Percentage	Client	Cost ratio	✓
(K2)	IT costs per fund	$\frac{IT\ costs\ per\ client\ type}{\#\ funds\ per\ client\ type}$	Decimal	Client	Unit cost	✓
(K3)	Operational cost ratio	$\frac{IT\ costs\ per\ client\ type}{Operational\ costs\ per\ client\ type}$	Percentage	Client	Cost ratio	✓
(K4)	IT costs per transaction	$\frac{IT costs\ per\ product\ type}{\#\ transactions\ per\ product\ type}$	Currency	Product mix	Unit cost	–
(K5)	Back office productivity	$\frac{AuM\ per\ client\ type}{Total\ BO\ FTE\ per\ client\ type}$	Decimal	Client	Ratio	✓

Table 5 IT KPI set extension

The business and IT perspectives were considered in the undertaken approach and five essential IT KPIs developed (refer to Table 5) to extend and optimise the existing KPI set. This enabled the group IT controlling department to evaluate the AM firms according to their IT performance with a high degree of precision.

(K1 – K3, K5) is segmented by clients to mitigate the business model sensitivity as mentioned above. Segmentation according to the product mix is possible but requires more reporting effort by the OEs and the influence is lower as shown in Table 4. In addition, segmentation according to the product mix for (K2) would be very difficult because many funds have a mixed investment

structure. (K1 – K3) are focused on the IT performance. According to Potter et al. (2011), the sole analysis is based on very weak IT KPIs and we have, therefore, integrated further KPIs, which take the overall operational performance into consideration. The mentioned weakness of (K1) can be further mitigated by (K3) because it shows the overall picture. Furthermore, (K5) is an indicator of how good the business process support of IT resources is.
To date, four of the mentioned IT KPIs (K1 – K3, K5) have been implemented by ALPHA.
(K4) has not been implemented due to the complexity of gathering transaction data. Required data for (K1 – K3, K5) has already been gathered from all AM OEs of ALPHA and regression analyses have proven that the new KPIs are more precise. This finding is justified by the higher average coefficient of determination (initially 0.6, now 0.9).
Consequently, all four KPIs were used for the yearly IT reporting of ALPHA in combination with the initially mentioned KPI set. They are the basis for further regression analysis to benchmark the IT performance of the 20 AM OEs.

4.5 Lessons learned

After the collaborative study with ALPHA, the authors observed a set of lessons learned. The most relevant ones are described in the following.
Lesson 1: Business models of investigated firms in a business group have significant impact on IT costs. The study outlined that small differences (e.g. client type) have a huge impact on the IT costs and, consequently, impede precise benchmarking of similar firms within a particular business group. This follows for the KPI development that such small differences have to be considered to add more value by demanding benchmarking initiatives.
Lesson 2: Involvement of business experts ensures a better understanding of the investigated context. The project team of ALPHA and the researcher agree that it improves tremendously the results of initiatives as presented if independent observers are involved. This allows a broader approach and reduces organisational blindness. Those independent observers are represented by business or IT experts with a different point of view (in this project scientists, consultants and business managers or IT managers of OEs). The outside perspective allowed a better understanding of the business model and was crucial for problem-solving.
Lesson 3: Low central governance complicates the implementation of changes. The environment of ALPHA as regards the group-wide IT organisation is characterised by loose coupling between IT departments with significantly low central governance. Centrally driven initiatives are thwarted by the affected entities and the level collaboration between group centres as well as BEs is rather low. The project team could resolve this situation through open communication with all stakeholders. The level of collaboration improved tremendously after the first IT managers of the BEs were convinced of the project benefits.
Lesson 4: Integration of all relevant stakeholders fosters acceptance of new concepts. Open communication and integration of all relevant stakeholders facilitated the acceptance of additional reporting efforts due to implemented KPIs. It is especially recommended in a federal organisation with decentralised leadership principles to involve and inform all stakeholders from the beginning.
Lesson 5: Extensive documentation of the concept, interviews and lessons learned led to higher ease of implementation. The stringent and precise documentation was helpful for open communication with the stakeholders and eased discussions with experts. Furthermore, ambiguities could be avoided. The detailed documentation provided an appropriate knowledge base and improved the implementation process.

5. Conclusion, limitations and further research

This article describes the most significant business model attributes (i.e. client type, product mix), which influence the IT costs of AM firms. Based on our findings five IT KPIs have been developed at ALPHA. The purpose of the KPIs is to benchmark the IT cost efficiency of AM firms within a business group. In order to contribute both to the practical concerns of ALPHA and the scientific body of knowledge, an action research based approach was chosen.

The aim of this study is to address two research questions. In a first stage, *what are the business model's attributes that influence IT costs within AM firms?* [RQ.1]. Consequently, we analysed existing scientific and practitioner literature to identify best-practice KPIs or IT cost drivers respectively. In addition, we interviewed practitioners from the business side as well as the IT domain of AM firms to provide relevant insights into the business model and IT operation. Using these findings as the theoretical foundation, in combination with analogies from the managerial accounting domain, we identified activity induced figures which have significant impact on the IT costs of AM firms.

The second stage addressed the question: *How could the performance of IT departments in AM firms within a business group be evaluated?* [RQ.2]. ALPHA and the researcher developed five IT KPIs based upon the aforementioned observations. Moreover, to achieve the requirements of action research, these KPIs have been implemented at ALPHA within the yearly group-wide IT reporting and now improve the validity of this benchmarking initiative.

This study provided a real-life example of identifying significant cost drivers within a specific business domain and developed KPIs. Furthermore, it gave a brief description of how practitioners can approach such problem sets.

This article, however, does have certain limitations. The very close project setup with ALPHA or the reliance on specific AM business models that are represented within ALPHA, constitute two noteworthy limitations. One must also consider that a different selection of scholarly sources to identify best practices would have led to a slightly different outcome. Nevertheless, the approach of the study should be generalisable within the domain of financial service business groups.

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