

PERFORMANCE INFORMATION AND MANAGERIAL KNOWLEDGE NEEDS

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Abstract

Performance management raises managerial information needs. This paper elaborates various knowledge processes that are used for gathering, analysing and communicating performance information. Thus, the paper explores the potential contribution of knowledge-based management disciplines on performance management. Although the literature on performance measurement provides guidance on building performance measurement systems, there remains many open questions relating to how the data is obtained, analyzed and utilized. To address these phenomena knowledge-based management literature focuses on knowledge assets as performance drivers and the role of knowledge management as a lever of performance. There are also approaches that aim to streamline knowledge flows in order to improve operational performance. However, between these strategic and operative approaches is a research gap concerning the question, how can knowledge-based management support performance management. To address this gap in practice, the paper studies managerial information needs in 9 case environments in Finland.

1 Introduction

Performance management (PM) is a central task in all organizations despite the difficulties in defining what it actually is and what tasks should be categorized as PM. Difficulties arise especially when performance is defined broadly as an ability to attain targets (Dwight, 1999). Indeed, improved performance is something that every management function should aim to. Organizations strive to their goals and performance management is therefore somewhat inherent to the definition and existence of an organization. In practice, it might not be called as performance management. Performance is then managed by other management functions, like strategic management, quality management, customer-relationship management, human resources management, operations management and many other management approaches that all have their own particular aspect to performance (Thorpe and Holloway, 2008). Thus, performance is managed at various levels within organizations – personal, team, organization and network-levels with a support of various management control systems (Simons, 1994; Neely et al., 1995).

This paper explores the potential contribution of knowledge-based management disciplines on PM. By knowledge-based management disciplines the paper refers widely to the research streams examining the challenges and managerial practices related to information and knowledge (Lönnqvist and Laihonen, 2013). Most of the performance measurement and management literature investigates the issue from the more traditional perspectives of management control, management accounting and operations management (Neely, 2005). More recent and growing research areas highlighting knowledge perspectives have been less considered. Knowledge viewpoint is important first, because knowledge is one of the most important value drivers for modern organizations (Grant, 1996; Chaharbaghi and Lynch, 1999). Therefore, it is necessary also for PM to understand the different roles knowledge can play as a strategic resource and performance driver. Second, PM necessitates information about the status of resources, processes, outputs and outcomes (Neely et al., 1995; Kaydos,

1999). Thus, gathering, analyzing and refining this performance information into strategic insight has to be systemically managed.

Ideally, performance information provides an ability to evaluate, compare and benchmark performance of individuals, teams and organizations. Hence, this information creates basis for PM and also links the discussions on knowledge-based management and management control, which is defined as the “process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization’s objectives” (Anthony, 1965). In order to compose balanced and effective control system, management needs different kind of control mechanisms, which Simons (1994) has categorized into beliefs systems, boundary systems, interactive systems and diagnostic control systems. PM within this strategic management framework is considered as a diagnostic control system. This is the case especially in the performance measurement literature, which considers the “process of quantifying the efficiency and effectiveness of action” (Neely et al., 1995).

The rationale for this study originates both from theory and practice. From the practical viewpoint, performance-driven organizations are increasingly striving towards knowledge-based decision-making and management more generally. However, very basic questions still remain: “with what knowledge should I manage and make decisions” and “how should I gather and condense this information”. The aim of this study is to compose a framework that helps in positioning these knowledge-related management challenges into the PM discussion. Theoretical aim of the chosen approach is to bridge the knowledge gap regarding the role of knowledge-based management approaches in supporting PM. Although the literature on performance measurement has put a lot emphasis on design, implementation and use of measures (Bourne et al., 2000), it has left the underlying knowledge processes with fairly modest attention (Nudurupati et al., 2011). Simultaneously, knowledge-based management literature has focused especially on these processes. However, it has been criticized that the focus has been more on the role of knowledge as a strategic resource and source of competitive advantage than on analyzing how the different knowledge needs of PM are served (cf. Kalling, 2003).

To address the abovementioned knowledge gap and better understand what kind of knowledge needs organizations have related to PM, the current study constructs a framework linking the theoretical discussions on PM and knowledge-based management. This framework recognizes two different views: 1) management of knowledge assets and 2) managing with knowledge (Lönnqvist and Laihonen, 2013). The main focus of the study is on the latter but the former is also needed when studying PM from knowledge viewpoint. The empirical part of the paper describes PM initiated managerial information needs in 9 organizations. In the discussion part, these needs are linked to different knowledge-based management disciplines that support PM by providing insights to monitoring and managing organizational performance. In addition to clarifying the role of knowledge-based management in connection to management control and PM, the paper has also practical value; the eligible ideal of managing with knowledge is still a distant mirage for many organizations.

The remainder of the paper is organized as follows. Section 2 focuses on performance information and reviews performance and knowledge-based management literatures from this perspective. The review is not comprehensive because there is an enormous amount of literature in this cross-disciplinary area. However, the purpose is to construct a general

framework that can be extended into more specific areas of PM later on. Section 3 describes the research design and section 4 presents the results. Section 5 discusses the main findings and possible implications on PM theory and practice. Finally, section 6 concludes the discussion.

2 Theoretical background

2.1 From performance information to performance management

Within a knowledge-based management framework, performance information lays the foundation for PM. Management needs up-to-date and accurate information in order to guide organization towards its targets and proactively respond to various challenges posed by the environment (Nudurupati et al., 2011). This information enables monitoring performance, identifying weak areas, enhancing employee motivation, improving communications and strengthening accountability (Waggoner et al., 1999). Furthermore, an ideal PM system would also provide information about strategic uncertainties (Simons, 1994) and external phenomena, such as changes in market situation and customer behavior. It has been noted by several authors that PM combines the views of internal efficiency and external effectiveness (Keegan et al., 1989; Kaydos, 1999; Neely et al., 1995).

There is an extensive body of literature on performance measurement discussing on individual measures and performance systems as well as the process of designing, implementing and using these (Neely et al., 1995; Bourne et al., 2000). This literature implicitly refers to PM but focuses on the measurement aspect and defines PM as a process or a management philosophy supported by measurement (Bititci et al., 1997; Lebas, 1995). Nevertheless, this literature contains also many notions that refer explicitly to PM. For example, Bourne et al. (2000) point out that measurement system needs to include mechanism to review and revise targets as well as processes for developing individual measures and questioning a set of measures and even challenging the underlying strategic assumptions. Here, the focus is on PM although it is approached strongly from measurement perspective.

Although the discussion on PM is more or less derived and related to strategic management and management control, it seems that due to its strong measurement orientation it has somewhat lost its power. Performance measurement literature focuses strongly on technical issues related to quantification of action despite the focus was intended, and is still argued, to be on facilitating implementation of the strategy (Kaplan and Norton, 1992; Nudurupati et al., 2011). Amaratunga and Baldry (2002) quite appropriately call for a change from performance measurement to performance management. Managerial usage of information provided by the performance measurement is not very thoroughly discussed in measurement literature. Focus is more on providing performance information than on its usage. For example, Bourne et al. (2005) pass the usage of performance measurement information by describing it as a straight-forward process; gathering information, analyzing it, interpreting and evaluating, communicating, reporting, decision-making and the implementing decisions.

Yet an important aspect has been noted by de Waal (2004) who stresses the integration of performance measurement information to daily managerial activities. Also Nudurupati et al. (2011) discuss on performance information behavior, which they define as “people’s behavior with performance information”. In order to foster performance-driven thinking and behavior, management needs to be trained to interpret and analyze measurement results, define action plans and monitor the results of actions (de Waal, 2004). Also management

information systems can drive performance-driven behavior (Davenport, 1997; Eccles, 1991). Similar aspects are highlighted by Franco-Santos et al. (2012) who refer to the goal-setting theory, which can be used in examining how performance measurement targets affect employees' behavior and motivation. Specific and clear performance measures and targets are associated with reduced confusion about strategic direction leading to better goal commitment, behavior and performance (Webb, 2004).

In summary, this section highlighted three aspects of PM noted by the literature. First, performance management requires on-time and accurate performance information. This information has various managerial uses such as planning, decision-making, communicating, reporting and change management (Bititci et al., 2012; Lääts et al., 2011). Second, PM is often approached from the measurement perspective, which focuses on technical issues and information provision instead of information usage. However, it is clear that benefits are only gained when measurement information is taken into use (Davenport, 1997; Eccles, 1991; Bourne et al., 2005; Vakkuri and Meklin, 2006). Third, somewhat related to aforementioned points it is worth noticing, the importance of performance information in fostering performance-driven behavior. This discussion is also related to management control and ways to direct employee behavior with different control mechanisms (Simons, 1994; Malmi and Brown, 2008).

2.2 Knowledge-based management disciplines and performance

Starting from the industrial organization view (e.g., Porter, 1985) and followed by the resource and knowledge-based views of the firm, strategic management literature provides several methodologies focusing on various aspects and determinants of competitive advantage (Barney, 1991; Grant, 1996, Spender, 1996; Kraaijenbrink et al., 2010). The resource-based view (RBV) presupposes that firms within an industry may differ based on their strategic resources and that these resources may not be perfectly mobile, which leads to an assumption that heterogeneity and therefore, competitive advantage, can be long lasting (Barney, 1991). Deriving from RBV, a knowledge-based view focuses on knowledge resources and argues that knowledge matches the requirements of a resource to be a source of competitive advantage (Grant, 1996; Spender, 1996).

To master this valuable resource a specific research stream of knowledge management evolved in the mid 1990's to help organizations to out-perform competitors (Chaharbaghi and Lynch, 1999; Mahdi, et al., 2011; Schiuma, 2012). In addition to academic interest, there was also an increasing practical need for understanding and managing organizations' knowledge resources. The discipline of knowledge management aims to improve performance by stressing the importance of knowledge creation, development, organization and leveraging (Wiig, 1997). Thus, knowledge management is a tool for improving performance and transforming knowledge resources and skills into competencies and capabilities (Mahdi et al., 2011).

Since the works of Grant (1996) and Spender (1996) knowledge-based management literature has developed and diversified into several independent research streams. At least intellectual capital management, business intelligence, knowledge management and information management are well established disciplines (Lönqvist and Laihonen, 2013). This paper uses the term 'knowledge-based management' for referring to the group of these somewhat independent literature streams. From the PM viewpoint these provide complementary aspects to the role of knowledge. Table 1 provides short definitions for each of these disciplines.

Table 1. Knowledge-based management approaches.

Knowledge-based management discipline	Definition
Intellectual capital management	“a strategically oriented management activity which aims to take overall care of an organization’s non-physical, knowledge-related assets” (Kujansivu, 2008).
Information management	“aims to harness information resources and information capabilities so that the organization learns and adapts to its changing environment” (Choo, 2002)
Business Intelligence	“a management philosophy and a tool that is used to help companies to manage and refine business information and to make more effective decisions” (Ghoshal and Kim, 1986).
Knowledge management	“aims to improve organizations’ performance by stressing the importance of knowledge creation, development, organization, and finally leveraging” (Wiig, 1997).

Two slightly different aspects stand out from the knowledge-based management literature. As shown, intellectual capital management concerns the recognition and management of strategic knowledge resources. This approach is based on the idea that competitive advantage is increasingly derived from intellectual capital (Halawi et al., 2005; Lev, 2001; Seetharaman et al., 2002; Edvinsson and Malone, 1997; Sveiby, 1997) and that a strategic viewpoint is needed to gain a view to organization as a bundle of knowledge resources. Thereby, it helps to answer the question: what knowledge is needed to support PM. The main focus is on strategically important aspects but this view should naturally be operationalized throughout the organization by the management control systems. Thus, intellectual capital management is about ‘managing knowledge assets’.

Three other disciplines focus more on ‘managing with knowledge’. This refers to the processes of knowledge-based management. Of course, this is an oversimplification. In practice the issue is not black and white. However, as the previous section highlighted, PM entails information needs. These relate for example to target setting, status of performance and customer preferences as discussed earlier. For this purpose knowledge-based management literature provides several methods and tools for filling managerial information needs and creating basis for ‘managing with knowledge’.

Choo (2002) defines information management as a continuous cycle of six closely related activities. The cycle begins with the identification of information needs, which are then addressed by information acquisition. Third step is information organization and storage. The gathered information is packaged into information products and services targeted at different users and information needs. Next, information is distributed and finally used for the creation and application of knowledge. The focus of information management is on explicit knowledge and supporting of decision-making. This fairly simple and straightforward approach nicely captures the essentials of performance measurement process (cf. Pekkola and Rantanen, 2013).

Business intelligence process aims to find relevant information about markets, changes in customer preferences and competitors’ actions. It uses both internal and external information sources. In addition, it provides tools for condensing information (Gilad and Gilad, 1986; Kahaner, 1996; Fleisher, 2001; Pirttimäki, 2007). Business intelligence has been lately

connected to business analytics and also PM (Schl fke et al., 2013). This stream provides process models for systematizing information gathering and analysis; it can also provide management dashboards if the underlying data is appropriate. This approach is also known as competitive intelligence (Vuori, 2011), which puts even more emphasis on external information. Although business intelligence is often seen mainly as a technical solution, the recent literature emphasizes non-technical and human-oriented methods.

Knowledge management discusses for example on the conceptual basis of knowledge. It builds more or less on Ackoff's (1989) definitions: "data are defined as symbols that represent properties of objects, events and their environment; information is contained in descriptions, answers to questions that begin with such words as who, what, when and how many; knowledge is know-how, and is what makes possible the transformation of information into instructions". This categorization is important to be considered also when refining performance information and strategic insights from the measurement data; without a context and interpretation data and information have little value for management. Knowledge management also discusses the differences between tacit knowledge and explicit knowledge (Polanyi, 1974; Nonaka and Takeuchi, 1995), which relates, for example, to the selection between subjective and objective measurement approaches and technocratic or social control mechanisms (Alvesson and K rreman, 2004; Bititchi et al., 2012). Furthermore, knowledge management differentiates between individual and organizational learning (Argyris and Sch n, 1978) and the ways how knowledge transforms from tacit to explicit knowledge (Nonaka and Takeuchi, 1995). Still, issues of knowledge sharing, transfer and storage are widely discussed (Alavi and Leidner, 2001). All of which are important aspects in creating and supporting performance-driven behavior in organizations.

Although it is tempting to make the above described clear distinction between 'managing knowledge assets' and 'managing with knowledge', and to divide knowledge-based management disciplines as done above that is not the whole truth. It is important to acknowledge that it was here made only for the sake of simplification and illustrating possible ways to apply knowledge-based management approaches in PM. In practice, intellectual capital management is not only about managing knowledge assets; it also provides reports, measurement data and analysis about the state of knowledge assets and creates a basis for managing with knowledge. Likewise, both information management and business intelligence are used for managing knowledge assets, for example, when mastering databases, dealing with issues of data security and customer relationship management.

In summary, knowledge-based management disciplines provide a management tool pack for gathering, analysing and sharing performance information. On one hand, these approaches help to understand the role of knowledge as a resource and source of competitive advantage. On the other hand, approaches support management in overcoming knowledge-based management challenges and thereby improve organizations' performance. However, the literature has not very thoroughly studied the linkages and possible synergies of these approaches and PM.

2.3 Framework for analysis

The theoretical aim of the paper was to elaborate the interfaces of performance management and knowledge management. As the literature review illustrated, both aim to improve organizations' performance and create competitive advantage. Nevertheless, in practice these management tasks often get mixed and practitioners overwhelmed with all the information available. Kalling (2003) presents a good discussion on the linkages of knowledge

management and performance and concludes that despite the clear aim of knowledge management is on performance results, emphasis is typically on cost improvement rather than competitive advantage or profit. Kalling also points out that there is a strong focus on knowledge itself; not on knowledge management as a tool for performance improvement and management.

Figure 1 presents a simplified summary of the literature review and brings together two different views on the role of knowledge-based management approaches in PM: 1) managing knowledge assets and 2) managing with knowledge (cf. Kalling, 2003; Lönnqvist and Laihonen, 2013; Mahdi et al., 2011). These approaches have their roots in resource- and knowledge-based views of the firm that aim to theorize the value creation process of an organization. Left hand side of the figure differentiates strategic management from performance management in order to highlight their slightly different views on organizational success. The former strives for competitive advantage whereas the latter aims to performance improvements. In practice these objectives are more or less the same as well as the tools; performance measurement system is one management control system.

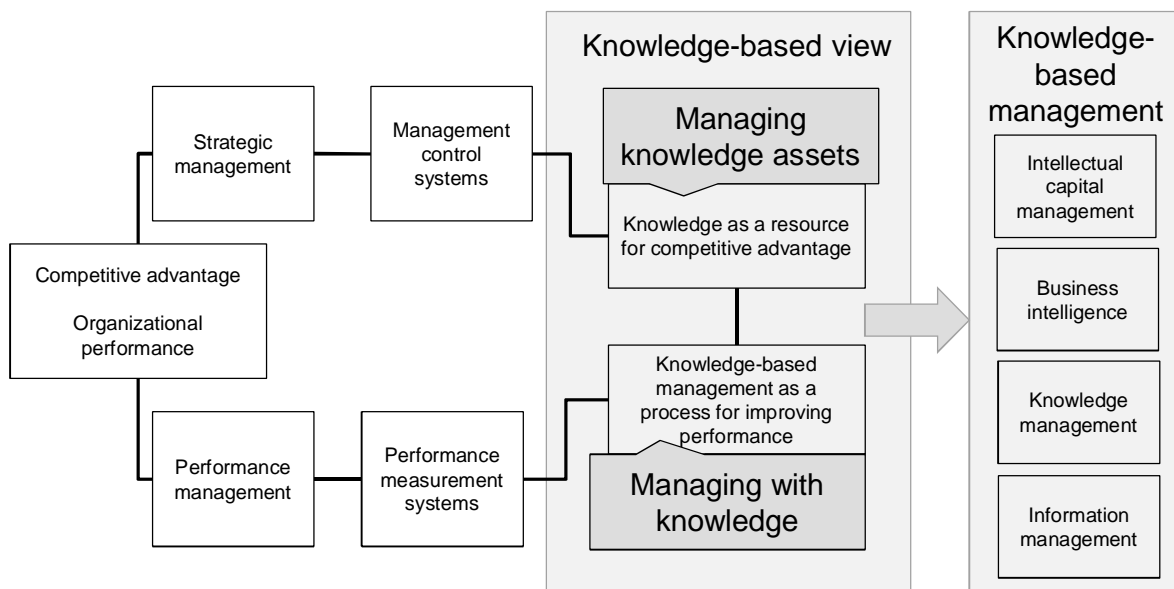


Figure 1. Conceptual framework of the study.

Understanding what are organizations' key knowledge assets and how these are harnessed in value creation lays the foundation for developing and applying knowledge-based management approaches (Lönnqvist and Laihonen, 2013) and also for PM. The empirical part of the paper focuses on 'managing with knowledge' but it is crucial to bear in mind the viewpoint of 'managing knowledge assets', and the followed discussion on intellectual capital management, when selecting measurement targets and gathering performance information. If the focus gets turned away from strategically important resources, the management solution will most probably be inadequate, not to speak about the practical tools. Similarly, it is important to align measurement systems to organization's other control systems.

Managers use information to understand their organizational environment, to create new knowledge for innovation and support decision-making (Choo, 1996). The theoretical part recognized three knowledge-based management approaches that serve slightly different information needs. These were chosen based on the analysis of PM literature, which

recognizes the need for internal and external knowledge as well as for composing a shared understanding and encouraging performance driven behavior (Keegan et al., 1989; Kaydos, 1999; Neely et al., 1995; de Waal, 2004).

The process model of *information management* (Choo, 2002) conceptualizes the needed activities on the way from information needs to adaptive behavior. This model depicts the very basic idea of information management and is well suited for approaching design, implementation and use of performance measurement and refining measurement data to strategic insight (Bourne et al., 2000; Neely et al., 1995; Pekkola and Rantanen, 2013). This view is closely related to performance information practices and management information systems discussed by Nudurupati et al. (2011). Furthermore, in order to stay competitive information is needed also about business opportunities and threats posed by the environment. For this purpose *business intelligence* literature provides process models that focus on external information (Gilad and Gilad, 1986; Pirttimäki, 2007). These are basically very similar to the information management process model but provide a valid approach for organizations whose strategy is strongly based on rapidly changing customer preferences. Thus, this knowledge-based management approach provides an external view to performance information and tools and practices for mastering it.

Knowledge management literature offers multiple important viewpoints to the PM discussion. The whole knowledge-based management discussion begun within this stream and therefore, the very basic discussions concerning knowledge, its creation, sharing, transfer, storage, and many other issues are dealt here (Alavi and Leidner, 2001). For PM, these issues are crucial especially because of its behaviorally and socially oriented aspects (de Waal, 2004; Bititci et al., 2012). For determining organization's goals, strategy, culture, management practices and reporting structures it is quintessential to have a shared language and a favorable atmosphere for discussion. The widely known SECI-model (Nonaka and Takeuchi, 1995) covers many of the above-mentioned issues. Its basic philosophy provides a good basis for PM especially in cases where multiple organizations are trying to compose a shared understanding about their mission, strategy and performance targets.

In conclusion, it is argued that the issues discussed above are areas that have not been under a detailed investigation in PM literature. Based on the theoretical review, it seems that knowledge-based management approaches cover quite well those performance information related issues that were noted at the end of section 2.1. Next, the empirical part of the paper will investigate how PM and the different management tools provided by the knowledge-based management literature relate in practice.

3 Research design

This study relates to a large research and development project in which measurement systems were developed in 9 case environments including knowledge-intensive, public and industrial organizations. The sizes of these organizations varied from small knowledge-intensive organizations to large public organizations (see Appendix).

In all organizations the process started with a group interview in 2011. In smaller organizations the group was formed by the management group whereas in larger organizations participants were mid-level managers responsible for a certain business area. Also some specialists took part in some of the cases, typically analysts, controllers or IT experts. At the beginning, organizations' objectives and processes were widely discussed in order to gain a general understanding about their key processes and recognize measurement

objects. In each case the organization had already specified the area of special interest from the perspective of performance measurement. These varied from productivity (internal view) to effectiveness (external view) and the unit of analysis from one organization to a network of actors. During the interviews the initial measurement needs were discussed and minor adjustments were made. Thus, the managerial information needs were elaborated and the role of new measures was linked to organizations' existing management control systems and purposes of PM.

Interviews, which took about three hours, were semi-structured intended to gather data on the performance measurement and management practices as well as better understand related information needs. In addition to interview data, documentation related to organizations' business and PM was studied. Two researchers took part to interviews, while another led the conversation the other made notes. This data forms the main empirical data source for this paper. However, the interviews were followed by intense development projects, consisting almost 60 workshops altogether, with a very pragmatic aim of improving the level of performance measurement in the studied organizations. During the writing of this paper, the design phase has been finalized and organizations are gathering data with their new performance measurement systems. Experiences of the development phase most certainly affect the interpretations of the original knowledge needs although the purpose is to restrict the analysis on managers' insights as perceived in the group interview.

4 Results – managerial information needs

This section is structured based on the nature of managerial information needs. It divides case organizations' performance information needs to internally driven, externally driven and socially driven. This categorization is derived from the literature as pointed out earlier. The categorization is an oversimplification but for the sake of illustration it serves its purpose well. In practice, all the needs are there concurrently, only their weights vary. It is worth noting that managers have also other information needs, those that are presented below illustrate only one special need at the given point in time. Nevertheless, this need depicts an important aspect for organizations' performance.

Internally driven need for performance information

All the studied organizations had already recognized some specific area that they wanted to measure or on what phenomenon they wanted information about. Two smallest organizations were aiming towards a balanced performance measurement system in order to better manage their performance. However, Science Park is owned by the city of Turku, which also necessitates up-to-date reporting to the city council and other external stakeholders. Finas is the only organization in Finland providing accreditation services. It has a fairly standardized service process although every customer case is different. A starting point here was to develop external reporting. However, during the development work the information need turned more towards internal measurement information that would increase transparency and target-orientation. In both organizations, performance measurement had previously concentrated mainly on producing figures that were requested by the external stakeholders.

Fire Brigade of the City of Helsinki wanted to renew their productivity measurement. The old measurement approach was considered outdated. In addition to the need for developing external productivity reporting to municipal administration, managerial information need related to defining appropriate service capacity and illustrating the meaningfulness and outputs of a stand-by time. Also the effectiveness of services was discussed. Also in the City of Helsinki, the productivity of social work was under investigation. Managerial information

need focused on finding general components among various types of social work in order to improve the productivity awareness of operative managers. This would enable benchmarking and recognition of bottlenecks in different types of services. Also enhanced ways for internal reporting were searched for.

From the knowledge-based management viewpoint, filling the above-described managerial information needs can be considered straightforward. Although designing measures for the effectiveness of accreditation or science park operations is extremely challenging, the knowledge processes and information flows that are needed in these two cases were mostly restricted within an organization and only few people were needed to master the information flows of the small organizations. Major challenges in the small organizations related to data gathering and lacking information systems. These were not a problem in fire brigade and social services; both gather lots of measurement data, which can be refined into performance information. Of course, also some qualitative measures are needed for example in order to capture the effectiveness of social services.

Externally driven need for performance information

Another group of managerial information needs was formed by organizations that needed information about customers or phenomena that related to external environment. Finpro wanted to measure effectiveness of their internalization services. The timely managerial information need there focused entirely on measuring the impact of Finpro's professional services on customers' business. The aim was to answer the question of how well customers succeed in internalizing their operations with the help of Finpro. Orfer was not satisfied with the ability of the customer satisfaction survey to provide information about the customer-perceived value of maintenance services. The managerial information need related to a more in-depth understanding about customer needs and preferences. Both of these organizations operate in a business-to-business market and pursue for deeper involvement also from the customer. Both organizations acknowledge that in order to have a greater effect on customer value, customer needs have to be discussed and targets set together with the customer.

The important role of external information was discussed also in other cases but Finpro and Orfer were the most extreme examples about the external information need. In other cases, also information concerning other external stakeholders was discussed. For example, in the networked environment there was a need to better understand how own organization succeeds in comparison to network partners or competitors. Furthermore, the success of the whole network becomes an important determinant and a need for information that would tell about fluency of co-operation emerges.

Nevertheless, filling the managerial information need in Finpro and Orfer calls for a slightly different knowledge flows and knowledge-based management solutions than the previous examples. Information has to be gathered from outside an organization. This brings along new kind of challenges. The organization is not in charge anymore, there has to be an incentive also for the customer to participate. Some information about the success of customer companies can be gathered from national statistics and it is possible to follow customer behavior, for example through customer retention but these provide only a partial picture about the success of services. Customer involvement is needed in order to obtain proper performance information. The nature of this information is often qualitative and is obtained through non-traditional means of measurement like interviews.

Socially driven need for performance information

A third group was formed by organizations that needed information about the performance of inter-organizational operations. Three of the four cases were public organizations representing large organizations in the chosen group. This may indicate that inter-organizational information need is typical in such contexts. However, based on the data it is not possible to make this kind of generalization. City of Tampere needed information about effectiveness of welfare services. Two cross-functional service processes were studied. Generally, measurement in Tampere is still strongly based around organizational structures but it seems that managerial information need focuses increasingly on the effectiveness of services that is typically produced in the collaboration of many units such as hospitals, housing units and social service centers

City of Helsinki had analogous information need. In the joint infrastructure construction case there were five independent public utilities that together aimed to develop measures for their joint performance. Purpose of the strategic initiative was to improve quality of co-operation, induce less inconvenience to the public and improve overall productivity. By a better project planning Helsinki Energy, Public Works Department, City Planning Department, City Transport, Helsinki Water are expected to streamline their construction projects and to achieve abovementioned goals. Thus, the managerial information need related to the evaluation of inter-organizational processes and joint results of independent actors.

The similar managerial information need was detected also in the private sector. Novart operates as a franchising network and its managerial information need related to the better understanding of service quality and customer-perceived value. Although Novart had previously developed its performance measurement based on the ideas of networked performance measurement, management still considered that customer view was not fully exploited in PM. Management needed more accurate information about the overall customer experience covering selling, installation and after-sales services. Also support services, like invoicing and phone service, influence customers satisfaction and therefore Novart went through all processes from customer perspective and designed measures based on this analysis.

A common factor for these four cases is their complex and multi-actor nature. In this kind of management setting, significant effort is needed in composing a shared vision and understanding about the measurable objects and relationships between different measures. It is also difficult to share responsibilities because no organization typically has power on another. Often a common culture and experience on operating as a network are also missing. Knowledge processes become extremely complex when data is gathered from many different sources and many people get involved in data gathering and interpretation. There typically are also technological restraints in merging and aggregating data. Knowledge-based management approaches can help in many ways to build the success of networking as well as in overcoming the typical challenges of network management.

5 Discussion and implications on performance management theory and practice

Simons (1994) defines management control systems as “the formal information-based routines and procedures used by managers to maintain or alter patterns in organizational activities”. Performance management derives its objectives from the organization’s strategy and depicts one control mechanism. With the support of performance information

management is able to exercise appropriate control over critical performance variables, support learning and innovation and thereby guide organization towards its targets. The theoretical framework of this paper connected management control and performance management to knowledge-based management approaches that were considered as a tool pack for mastering performance information.

Empirical data dealt with managerial information needs focusing especially on performance information. The empirical data was gathered in performance measurement development projects, which puts the emphasis strongly on performance. In the knowledge-based management literature this focus gets easily changed to knowledge itself (Kalling, 2003) and the tight connection to performance improvement gets lost. To avoid this, the presented analysis is based on the very first discussions with the management. Hence, the results provide understanding about the most challenging and timely need for performance information in the 9 case settings studied without losing focus on knowledge or technicalities of individual measures.

Table 2 categorizes the observed information needs into three main categories. The first category consists of internally driven information need that is followed by fairly simple and straight-forward knowledge flows. This need is typically served internally and information sources can be easily recognized. Within an organization it is also easy to apply formal control methods when performance information can be retrieved from databases in an explicit and objective form. The second category is labeled as socially driven and consists of the most complex information need. A need for this kind of information typically arises in multi-actor environments where balancing between organizational and shared performance targets causes a major management challenge. Here, a key to successful PM lies in shaping a shared understanding about the objectives, roles and methods of action. The third category is externally driven; information is gathered mainly from external sources. Non-traditional measures like interviews are typically involved with this strategy. Customers are in charge of forming, and sometimes even serving, this information need. Formal control methods are not appropriate. Measures as well as performance targets can be defined in collaboration with the customer.

Table 2. Three different knowledge strategies serving performance information needs.

Internally driven	Socially driven	Externally driven
- How to gather and consolidate performance information within an organization?	- How to compose a shared understanding about objectives, roles and methods?	- How to motivate customers to gather and share performance information?
- Information management	- Knowledge management	- Competitive intelligence
- Information management cycle (Choo, 2002)	- SECI-model (Nonaka and Takeuchi, 1995)	- Competitive intelligence model (Vuori, 2011)
Internal	←————→	External
Explicit	←————→	Tacit
Efficiency	←————→	Effectiveness
Formal control	←————→	Informal control
Vertical	←————→	Horizontal

The recognized categories resonate with the suggestions of Bititci et al. (2012) who argue that the majority of current performance measurement practices focus on performance of organizational entities (internally driven). They also point out that the service orientation of modern business environments and the lot discussed theme of service-dominant logic (Vargo and Lusch, 2004) call for more customer-oriented solutions also for performance measurement (externally driven). Finally, authors see that the future performance measurement (and management) will shift from positivistic epistemology and control to more interpretative approach where control aspect is replaced by social aspects and learning (socially driven). This can also be recognized in the studies calling for more research on the social aspects of performance measurement and management control (Elzinga et al., 2008; de Waal, 2004).

The presented discussion and empirical evidence indicate that knowledge-based management approaches are well suited for supporting PM. Those focus particularly on information and knowledge aspects and thereby complement PM and performance measurement literature. They also highlight the importance of information usage, which has been recognized as a deficiency of PM literature (Eccles, 1991; Bourne et al., 2005; Vakkuri and Meklin, 2006). Furthermore, the knowledge-based management literature also considers social aspects of information and knowledge, which is an important aspect in fostering performance-driven behavior (de Waal, 2004; Bititci et al., 2012). This is an extremely important viewpoint if organizations aim to create an open organizational culture that encompasses knowledge-based decision-making.

The contribution of this paper on performance management theory and practice relates to the recognition of two main paths for attaining performance improvements: 1) strategic management and related management control systems, and 2) performance management and related performance management systems. From the knowledge-based management viewpoint these paths lead to different management practices. The former can be connected to more radical innovations that are achieved by changes in resource portfolio whereas the latter deals with incremental performance improvements gained through more informed decision-making. However, these two views are intertwined and inseparable. Ultimately, competitive advantage and organizational performance are defined by the employees; their motivation, commitment to organizational objectives and methods of action define which organizations will succeed. Therefore, human perspective forms the third, highly important aspect of performance management.

6 Conclusions

This paper opened a discussion about the possible contribution of knowledge-based management disciplines to the practice of performance management. Although there are studies considering knowledge as a strategic resource and knowledge management as a lever of performance, the presented view to an overall contribution of knowledge-based management disciplines has not been dealt in connection to performance management. Business intelligence, information management, knowledge management and intellectual capital management all have their particular and valuable view to performance management. This paper illustrated several ways how knowledge-based management disciplines can support performance management.

Performance measurement and management control strive for an ideal of ‘managing with knowledge’. This view is in the prime focus of knowledge-based management literature, which provides methods and tools for answering the question of “how should I gather and

condense available information”. In answering this question, the paper derived three types of managerial information needs from the performance management literature: internal, external and social. These were connected to the most appropriate knowledge-based management approaches. Furthermore, the paper discussed about the importance of recognizing key knowledge assets when seeking answers to another important question of “with what knowledge should I manage and make decisions with”. Knowledge-based management approaches provide also ways to enhance understanding about the key value drivers and learning from performance information. This was conceptualized as ‘managing knowledge assets’, which forms the basis for organizational performance in many modern businesses.

Performance impact should be an inherent goal for both management theory and practice. Thereby, performance management is a multi-disciplinary phenomenon, and like always innovations emerge on the interfaces of different views. For this reason, more research is needed also on the common areas of PM and knowledge-based management. The paper provided a peek to the potential contribution of knowledge-based management approaches to PM but from the viewpoint of management practice there is an increasing need to go further in seeking ways to improve organizations’ knowledge-based performance. Especially, from the business perspective it is extremely important to develop ways to find the most appropriate tool from the knowledge-based management tool box.

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Appendix: examined case contexts

Case context	Description of the context	Key need for measurement information
Finnish Accreditation Service (FINAS) <ul style="list-style-type: none"> - < 50 employees - public sector 	FINAS is the national accreditation body responsible for organizing the accreditation activities according to the international criteria. FINAS offers accreditation services for testing and calibration laboratories, inspection and certification bodies and providers of proficiency testing.	<ul style="list-style-type: none"> - balanced performance management of the organization - reporting to the ministry
Turku Science Park <ul style="list-style-type: none"> - < 50 employees - private sector 	Turku Science Park Ltd promotes the utilization of university-based expertise and competitiveness of enterprises as well as generating new business in the fields of biotechnology and information and communication technology.	<ul style="list-style-type: none"> - balanced performance management of the organization - reporting to the owner
Fire Brigade of the City of Helsinki <ul style="list-style-type: none"> - > 250 employees - public sector 	Helsinki City Rescue Department is one of Finland's 22 regional rescue departments. It is responsible for carrying out tasks such as monitoring and inspections of fire prevention measures, fire and rescue operations and medical rescue operations, i.e. urgent patient transportation, in the Helsinki area.	<ul style="list-style-type: none"> - balanced performance management of the organization - reporting to the central municipal administration
Social work of the City of Helsinki <ul style="list-style-type: none"> - > 250 employees - public sector 	Social work employs around 500. The service context represents a part of the measurement system of a large social and health service department.	<ul style="list-style-type: none"> - balanced performance management of the organization - benchmarking of similar service operations - reporting to the departmental administration
Orfer Ltd. <ul style="list-style-type: none"> - < 250 employees - private sector 	Orfer produces customized robot systems for material handling. The company is a family business founded in 1970 employing around 90. The examined context relates to maintenance services.	<ul style="list-style-type: none"> - understanding the preferences of customers for the promotion of own services and improving their customer-orientation
Finpro <ul style="list-style-type: none"> - < 250 employees - private sector 	Finpro is the national trade, internationalization and investment development organization in Finland. It supports clients' international growth and success by enabling them to be in the right markets at the right time with a competitive concept and offering.	<ul style="list-style-type: none"> - information of the success of customer companies as a result of Finpro's activities for promoting customer value of services
Joint infrastructure construction of the City of Helsinki <ul style="list-style-type: none"> - > 250 employees - public sector 	Joint infrastructure construction is a strategic initiative of the City of Helsinki. The main operators (Helsinki Energy, Public Works Department, City Planning Department, City Transport, Helsinki Water) participating in large construction projects have made an agreement to achieve better coordination of large infrastructure construction projects.	<ul style="list-style-type: none"> - improving and demonstrating efficiency and effectiveness of a cross-functional service chain
Welfare services of the City of Tampere <ul style="list-style-type: none"> - > 250 employees - public sector 	Tampere is the third largest city in Finland. The city carries out a large development work considering its performance measurement. One perspective relates to effectiveness of new welfare services aiming at professional co-operation and preventive care.	<ul style="list-style-type: none"> - improving and demonstrating the effectiveness and customer impacts of cross-functional service chains
Novart Ltd. <ul style="list-style-type: none"> - > 250 employees - private sector 	Novart Ltd. Is the biggest producer of kitchen and bathroom fittings in Finland. The examined context is a service process of a franchising network.	<ul style="list-style-type: none"> - information on the customer experience of franchising a service network