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Overcoming the specific performance measurement challenges of knowledge-intensive organizations

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Abstract

Purpose – The purpose of this paper is to identify practical ways to overcome the specific performance measurement challenges of knowledge-intensive organizations. By reviewing performance measurement, service management and human resources management literature the paper recognizes two aspects that are crucial for the success of knowledge-intensive organizations: the performance and well-being of individual knowledge workers and the ability to provide value for the customer. The authors evaluate three measurement solutions for measuring these aspects, in three empirical settings.

Design/methodology/approach – Qualitative case approach, carried out as an action research, is used with empirical data obtained through interviews, workshops and analysis of documentation related to measurement systems. The empirical study consists of three case studies where two main phases were carried out: investigating the status of existing measurement practices; and development and evaluation of new measurement approaches and tools.

Findings – The results of the evaluation of proposed measurement approaches provide understanding of their potential in different workplaces. Eventually, this potentially supports the managers of knowledge-intensive organizations in developing not only the measurement practices but also the overall performance of their organizations.

Originality/value – As the key academic contribution, the study provides new understanding on the potential of selected measurement approaches in overcoming the specific performance measurement challenges in knowledge-intensive organizations. The results take into account the perspectives of an individual knowledge worker, a customer and an organization as a whole. In many previous studies, the main focus has been solely on the organizational perspective.

Keywords Case studies, Knowledge-intensive organization, Performance measurement, Performance, Knowledge organizations, Service management

Paper type Research paper

1. Introduction

This paper studies performance measurement of knowledge-intensive organizations whose success relies strongly on the efforts of knowledge workers (Alvesson, 1993; Blackler, 1995; Miles, 2005). Therefore, it is important to understand the special characteristics of knowledge work. Davenport (2008) defines knowledge worker as follows: "they have high degrees of expertise, education or experience and the primary purpose of their jobs involves the creation, distribution or application of knowledge". Already Drucker's (1999) renowned book highlighted the improvement of

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knowledge work performance as a key challenge of modern economy, but the issue still remains as a highly challenging area of research.

Much of the earlier research has concentrated on the nature of knowledge work and the means to improve its performance (Davenport, 2008; Miller, 1977). Yet, there are surprisingly few studies on knowledge work performance measurement (Ramirez and Nembhard, 2004; Takala *et al.*, 2006; Thomas and Baron, 1994). Despite the fact that many knowledge-intensive organizations are fairly small, performance measurement can support their management, especially in facilitating employees rather than in formal control (Amir *et al.*, 2010; Groen *et al.*, 2012). However, the functionality and impacts of measurement are rarely discussed in the literature (Ittner, 2008). This paper aims to bridge this research gap by evaluating the applicability of the chosen measurement approaches.

Measurement of knowledge work performance is challenging due to many intangible performance drivers (e.g. employee competencies and working atmosphere; Amabile, 1998; Davenport, 2008; Drucker, 1999), the intensive interaction between knowledge worker and customer (Grönroos and Ojasalo, 2004; Johnston and Jones, 2004) and the complex and intangible nature of service outputs (Lettice *et al.*, 2006; Sherwood, 1994). More specific measurement challenges relate to the measurement of service impacts and customer value (Davern and Kauffman, 2000; Kujansivu and Lönnqvist, 2009). These observations lead to a proposition that there are at least two specific aspects that have to be taken into account in measurement and management of knowledge-intensive organizations: the performance and well-being of individual knowledge workers and the ability to provide value for the customer. This paper focusses on the measurement of these drivers of organizational performance.

This paper is structured as follows. The first part of the literature review justifies the perspectives used in examining performance of knowledge-intensive organizations. Second part reviews the current scholarly understanding on different measurement tools relevant for the chosen aspects. In addition to performance measurement literature, service management and human resources management (HRM) literature are reviewed. The empirical part begins with the identification of practical needs for measurement in three case contexts. Three potential measurement approaches presented in the literature are chosen and applied in practice in order to evaluate their suitability in capturing the performance of knowledge-intensive organizations.

2. Theoretical framework

2.1 Two perspectives of performance in knowledge-intensive organizations

The organizations' ability to achieve its objectives represents an overall perspective to performance. This is essentially the viewpoint of top management and aims to capture the performance of the whole organization or a certain business area. This is typically approached with a balanced view of performance measurement (e.g. Kaplan and Norton, 1992) including aspects such as employees, processes, customer and finance linked to the strategic goals of an organization. There are also performance frameworks specific to knowledge-intensive organizations (Takala *et al.*, 2006). The problem with the balanced performance frameworks is that they do not provide any measurement solutions (how to measure); they support in recognizing measurement objects (what to measure).

Two aspects (or measurement objects) stand out from the literature when the performance of knowledge-intensive organizations is discussed. First, knowledge-intensive organizations are widely seen as "people organizations" because their success

relies strongly on highly qualified staff and the expertise of individuals (e.g. Alvesson, 1993; Blackler, 1995; Von Nordenflycht, 2010). It is also well known that creativity-based organizations require flexible control mechanisms to support and encourage self-designed nature of knowledge work (Løwendahl *et al.*, 2001) and the request for clear individual performance goals (Miller, 1977). Therefore, much of the discussion on the performance of knowledge work and knowledge-intensive organizations relate to an individual knowledge worker (Amabile, 1998; Drucker, 1999; Greene and Myerson, 2011). This view approaches performance bottom-up, beginning from the operative level of service operations. The high significance of human capital is a key distinctive feature of knowledge-intensive organizations (cf. Von Nordenflycht, 2010). Therefore, also performance measurement has to take this people aspect into account.

Second, the role of clients, partners and other external interest groups is highlighted in most studies focussing on knowledge-intensive organizations (cf. Alvesson, 2001; Drucker, 1999). Knowledge-intensive organizations strive to make existing knowledge useful for their customers and improving customers' performance (Miles, 2005). Also service management literature stresses the importance of customer-perceived value (e.g. Vargo and Lusch, 2004; Grönroos and Helle, 2010). This close interaction with clients has also been described as a bilateral learning process or a co-production of capabilities (Grönroos and Ojasalo, 2004).

One very practical and important viewpoint to measuring and capturing of service outputs and outcomes is pricing. Knowledge-intensive services are typically priced based on the cost structure of an organization instead of customer-perceived value. This may lead to too low (or high) prices. Customer value-based pricing is still in its infancy but increasingly aspired (Hinterhuber, 2008). On the other hand, there is often a need to demonstrate why a customer should buy a certain service in the first place. Public organizations have a specific need to demonstrate the value and productivity (output/input ratio) of their service to the public. The customer aspect has not been fully taken into account when discussing performance of knowledge-intensive organizations, even though satisfied customers are widely seen as the key indicator of performance (Ramirez and Nembhard, 2004; Ray and Sahu, 1989).

Due to the central role of individual knowledge workers and customers in organizational performance, this study concentrates especially on these aspects. Organizational perspective to performance measurement is deliberately left with less attention, because the literature on balanced performance measurement and management extensively covers this view. Figure 1 summarizes the analytical framework of the study.

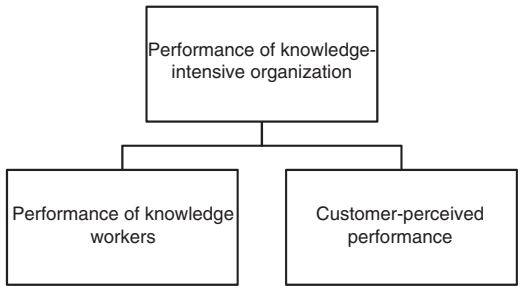

Figure 1.
Specific performance perspectives in knowledge-intensive organizations

The next section concentrates on the chosen perspectives from the viewpoint of measurement challenges and describes possible alternatives for overcoming these challenges.

2.2 Performance measurement in knowledge-intensive organizations

Measuring performance of knowledge workers. Due to the individual and constantly changing nature of knowledge work, measurement needs to be approached from the level of individual employees. Managerial information need is poorly satisfied with the common, quantitative and collective performance measures (e.g. number of service transactions or profitability). These observations lead to a proposition that knowledge workers are the best evaluators of their own performance and the factors affecting it. However, it has been noted that self-ratings are often lower than ratings given by peers (Mann *et al.*, 2012) and therefore, the usage of multiple evaluators is also an option. The actual measurement is then based on the subjective evaluation of key persons involved.

The literature of HRM presents a great variety of widely used and generic tools and practices (e.g. behaviorally anchored rating scales, competence frameworks and 360° feedback evaluations) aiming at performance appraisal of employees (Fisher, 2005; Mann *et al.*, 2012). These tools are used for evaluating employee competencies or results in relation to objectives and for creating a basis for remuneration, promotion or termination, and to identify training needs (Dulewicz and Fletcher, 1992). Performance appraisals are often more related to behavior or actions of employees than the results of these actions (Koopmans *et al.*, 2013). Person-related performance can be approached not only from the perspective of task performance but also as the contextual performance (supportive factors of the work community, such as facilities, technological equipment, personal relationships or working atmosphere; Ferris *et al.*, 2001; Kahya, 2008; Koopmans *et al.*, 2013). These HRM measures are still not always aggregated at the organizational level, systematically analyzed nor seen as a part of performance measurement and management systems.

There are also subjective measurement tools specifically aimed at performance measurement of knowledge workers (Clements-Croome and Kaluarachchi, 2000; Janz *et al.*, 1997; Kemppilä and Lönnqvist, 2003). These tools have been justified as easy and flexible to use in different work contexts and work profiles with the possibility to capture comprehensively the relevant intangible aspects of knowledge worker performance. However, subjectivity brings along its own problems. The reliability, comparability and credibility of the results can be questioned, sometimes leading to the avoidance of their usage.

Measuring customer-perceived performance. The intense interaction between a knowledge-intensive organization and a customer characterized with a non-standard nature causes many measurement challenges which can be reduced into two main aspects: how to capture the content of service outputs and how to demonstrate the service outcome in the form of customer value. Grönroos and Ojasalo (2004) argue that since services are immaterial in nature, their observation and evaluation is mainly done subjectively. This further increases the complexity of measuring outputs and outcomes (Løwendahl *et al.*, 2001).

A starting point for analyzing performance of service operations is to understand what actually a service output is. For the measurement purposes it is then necessary to recognize standard measurable objects detailed enough to capture the essence of service content. This has been referred as the technical design quality of services

(cf. Rhee and Rha, 2009). Furthermore, intangible output elements require special attention and distinctive measurement approaches. In private sector these challenges may be solved with proper pricing (Grönroos and Ojasalo, 2004). In the non-profit sector, one solution is to apply output weighting. This means that different output classes are weighted according to their resource-intensity or customer value (Häkkinen, 2008). For capturing intangible output aspects Jääskeläinen and Lönnqvist (2009) have proposed the application of component-by-component method. It is used for obtaining one output index building upon a set of output measures (e.g. three to five quantitative and qualitative components related to the content of output). One possibility in applying the method is to utilize objectives matrix (Riggs, 1986).

Measurement of service outcomes has its specific challenges including at least the following issues:

- how to identify a common set of measurable outcome attributes among various types of customers (Rhee and Rha, 2009);
- how to identify which factors in customer are actually impacted (Bailey, 2011);
- how to distinguish the outcome resulting from a certain service activity (e.g. consultancy) from other factors (e.g. economic recession) affecting customer at the same time (e.g. Hill, 1977; Kujansivu and Lönnqvist, 2009); and
- how to deal with the time lag between a certain service activity and the realization of outcomes (e.g. Davern and Kauffman, 2000; Miller, 1977).

Only few solutions for outcome measurement can be found in the literature. In B to B services, measurement may be carried out by comparing customers' performance to suitable counterparts or comparing performance levels of customers before and after certain service interactions (cf. Imbens and Wooldridge, 2009). There are also complicated mathematic models designed mainly for academic purposes (e.g. Wardell *et al.*, 2008). The most common approach in customer-oriented measurement is the customer satisfaction survey utilized in practically every organization. However, it rarely captures genuinely the outcomes or customer value of a service.

The comparison of the realized performance and customer's pre-defined expectation (e.g. agreement) of performance (customer-target-oriented measurement) is a pragmatic way to the performance measurement of consultancy services (Chang and Williams, 1999; Deakins and Dillon, 2006). This approach takes a customer perspective genuinely into account by applying a tailored approach to measurement. Hence, it is a potential way to fill the market information gap presented in service management literature (Parasuraman, 2004).

As a summary of this section, Table I provides four potential measurement approaches, namely person-specific subjective measurement, index measurement (component-by-component, output weighting) and customer-target-oriented measurement to be analyzed in more detail in the empirical part of this paper. It should be noted that also other methods could have been chosen. The choice was driven by the practical requirements in the case organizations studied.

3. Empirical examination

3.1 Research contexts and methods used

Qualitative case approach, carried out as an action research (Gummesson, 2000; Voss *et al.*, 2002) was used with empirical data obtained through interviews, workshops and analysis of documentation related to measurement systems. The first part of the

empirical study mapped employees' perception of the measurement system used in their work community (one case study in a knowledge-intensive unit of a large public organization). In the second part, new measurement systems were developed in two private sector organizations. Despite the different motivational factors, each case organization had a strong ambition to develop their performance measurement to better serve the management of these knowledge-intensive organizations.

The first case study was carried out during 2007-2008 in the Economic Planning Division (EPD) of the City of Helsinki employing 15 knowledge workers. The unit supports city directors in decision making related to economic issues by preparing instructions, plans and recommendations and by consulting in issues related to economy and management control. The motivation of EPD to develop its measurement was the intention to extend the usage of productivity measurement from the examination of operative public services to the investigation of administrative services. Purpose was to increase the detail of measurement and to give a message that every worker is under scrutiny.

The research proceeded as follows: first, a productivity expert working in the case unit presented the current measurement system to the researchers with the support of written documentation. Second, personnel were interviewed in order to gain a more in-depth understanding on the functionality of the measurement system from the user's perspective. Five semi-structured interviews lasting for around an hour were carried out. The interviewees were selected purposively in order to capture the viewpoints of diverse work tasks. They represented one-third of all employees of the unit. Third, the measurement system was evaluated by analyzing the main observations of the interviews.

The second part of the empirical study was carried out between April 2011 and January 2012. The two case organizations were a science park (TScP) employing 37 and an organization (Finpro) providing internationalization services for Finnish companies with 350 employees internationally. In TScP one starting point for developing performance measurement was the increasing need for developing external performance reporting. TScP also wanted to improve performance management at the operative level of service operations. There was a need to obtain performance measures that can be genuinely affected by the actions of individual knowledge workers. Finpro had a specific need to improve the measurement of effectiveness of internationalization services in order to find out what the role of Finpro in the success of its customer companies is. This information would be useful not only in the ministry reporting but also for marketing purposes.

A similar research process was carried out in both organizations. It started with group interviews involving six employees and lasting about three hours. The executive

Perspective	Measurement challenge	Measurement approach to overcome the challenge
Individual knowledge worker	Capturing performance of individual and constantly changing work	Subjective measurement of knowledge worker performance
Customer	Standardizing service outputs	Output weighting method
	Capturing the qualitative aspects of service outputs	Component-by-component measurement
	Measuring the outcomes and customer value of a service provision	Customer-target-oriented measurement

Table I.
The chosen measurement approaches for empirical examination

group was chosen for the interviews in both cases in order complement employee perspective of the first case study. Group interviews were regarded to increase the depth of examination (Bryman and Bell, 2007) and to provide a holistic view to performance drivers and the status of measurement.

After the initial interviews four workshops were organized with the same participants as the group interview. Each of the workshops had a dedicated theme and an underlying research question (see Figure 2). Generally it was difficult to keep the discussions tightly within the certain theme because performance concerns such a wide range of topics. Nevertheless, modeling of service operations in the studied context as well as the evaluation of a selected set of approaches and tools potential for overcoming the identified measurement challenges formed the basis for all the workshops.

An average of four to seven persons attended the workshops facilitated by the authors. Typically, these persons held a managerial or expert position in their organizations. Workshops were carefully documented by the authors, and this documentation forms the empirical data of the two case studies. This paper focusses especially on developing measurement solutions for the specific management challenges and therefore the application phase and its particular problems are not discussed in detail.

3.2 Evaluation of the proposed measurement approaches in practical management settings

Subjective measurement of knowledge worker performance. For evaluating subjective performance measurement, two different tools in two different knowledge-intensive organizations (EPD and TScP) were applied. The reason for different tools relates to the different organizational environments and contextual characteristics. In EPD subjective assessment was carried out with a survey addressed to the employees in order to evaluate the factors affecting performance of individuals. These factors were related to information flows, IT systems, competencies, knowledge on various shared working practices, and atmosphere in the working community and workplace development activity.

In the beginning, the personnel of EPD had mixed opinions regarding the subjective evaluation of the quality of their own work. Others regarded it problematic since it was possible to manipulate the results in order to have good results. On the other hand, supporters of the approach stated that outsiders do not understand and know the content of their work well enough to evaluate its quality. The latter opinion was further rationalized by stating that the level of self-criticism was at such a good level among the personnel that there was no risk of manipulation or overrating the individual performance.

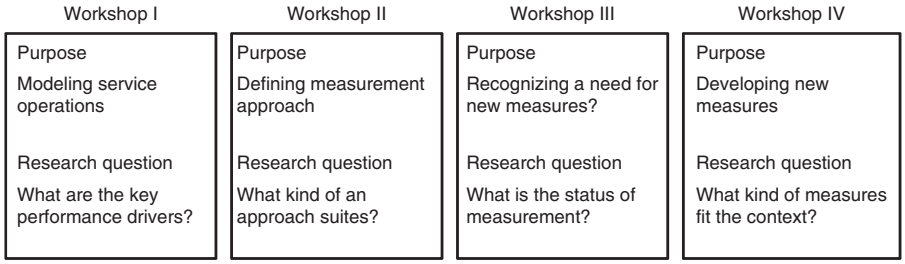

Figure 2.
Purpose and research question in each of the four workshops

In TScP subjective evaluation was carried out by using a web-based questionnaire, which was sent to all employees. The questionnaire consisted of two parts considered critical from the perspective of organizational performance: knowledge worker productivity and well-being at work. In addition, two perspectives of drivers supposed to improve productivity and well-being were included. These comprised statements related to work environment and individual work practices. The aspects and statements were derived from the literature.

The representatives of TScP regarded subjective evaluation as a suitable way to improve understanding about the causes of good or poor performance of the organization. Subjective evaluation was also considered as a promising way to support the recognition of performance-related development areas (in contrast to comparing the performance level of individuals, groups or organizations). Subjective measurement highlights the voice of individual knowledge workers, which was regarded as an important aspect. However, some doubts related to the subjective interpretation of individual employees. It was regarded that this kind of an approach should be complemented with objective measures.

In both cases, some concerns in implementing subjective measurement approach related to target setting as well as reporting and visualizing measurement results. These were highlighted in order to get the most out of time and resources invested in data gathering. From the research point of view, difficulties relate to the design of a generic tool for performance evaluation of all knowledge workers with plenty of personal and organization-specific features.

Capturing outputs and outcomes provided to the customers. More detailed information on outputs can improve understanding about the linkage of the actual service operations and outcomes to the customer. In EPD, output measurement was examined in more detail from two perspectives. First, a form was used for gathering quantitative information about the volume of different activities carried out by the personnel (e.g. brief, average and demanding consultancies defined in terms of average working time needed). Thus, output weighting was applied. Second, this information about output quantity was combined to qualitative aspects of outputs.

Aforementioned form, as such, was regarded as an appropriate and even necessary tool enabling the calculation of an overall aggregated output figure later on. However, similarly to survey-based measures, the form used may pose challenges regarding reliability of measurement. The personnel regarded that a general problem related to the form was the pre-set classification used. Definitions of different output classes (e.g. consultancy and statement) were not unambiguous. Therefore, there is a risk that results are not calculated with a systematic logic. Different persons may record their actions differently (i.e. similar tasks to different classes). Since personnel are by themselves registering their outputs, there is also a possibility to manipulate the results. However, this was not seen as a major problem.

A further challenge in output measurement recognized in EPD was even more fundamental. It was not always desirable to have a high number of certain outputs. For example, it is not productive to make an official statement from every minor issue that could be handled simply by phone calls. This problem is closely related to general challenges in measuring knowledge work productivity – do we strive for quantitative outputs or outcomes? To overcome this challenge, EPD decided to combine information about output quantity and qualitative aspects related to outputs. In practice, component-by-component thinking was applied with an objectives matrix composing a single measurement index. An essential challenge in adopting this

approach was not only to obtain proper quality-related measurement information but to decide on weights between quantitative and qualitative aspects of outputs. However, this approach was deemed as a necessary addition to the output measurement.

In Finpro the focus of measurement was exclusively on outcome measurement. Finpro had previously conducted various statistical analyses related to the customer value of their internationalization services. For example, the success (in terms of changes in turnover) of customer companies was compared to an appropriate group of similar companies. However, these analyses were regarded as deficient for two main reasons:

- comparison analysis is biased (customer companies have their own specific nature); and
- it is practically impossible to assure what caused the changes in the studied companies (the services by Finpro or changes in the market, for instance).

In addition, it was deemed that sample sizes in terms of customer numbers were not ideal for statistical analysis. In addition to these statistical analyses, Finpro had previously utilized qualitative reporting related to customer value with a non-systematic basis. A customer-target-oriented measurement approach was applied. Specific measurement objects related, for example, to the changes in customer organizations' turnover, exports from Finland, regional turnover, employment, customer amounts, partner networks, competencies and visibility in markets. These are measured with different time scales in terms of achievement (less than expected, as expected, more than expected) of pre-defined numerical targets as well as actual changes in figures (before and after intervention). Targets are set in collaboration with customer representatives. Follow-ups are organized annually together with the Finpro's key account manager and the representative of a customer company. This is also a place for reassessment of the targets if needed.

Discussion and definition of targets with the customer was regarded as a positive thing as such. This learning process was deemed as important. One of the strengths of customer-target-oriented measurement relates to more detailed information, which enables capturing of the causes behind certain customer outcomes. Not only were the measures more detailed than previously, the discussions complemented the picture with qualitative information. More intensive interaction with the customer was the reason why the increased burden of measurement was not considered as a problem.

The main challenges of the approach related to two main aspects. First, the reliability of measurement was a concern. Can the representative of a customer company see the whole picture in the company or is there a danger of over-optimism in target setting? Regular discussions between a key account manager and the customer representative were regarded to improve the trustworthiness and possibly also the comparability of target-setting logic between customers. Realistic business plan was considered as a robust starting point. Second, measurement of qualitative aspects of customer impacts (i.e. recognition at the market, improved competencies) was still regarded as a problem not solved by the customer-target-oriented measurement as such.

Customer-target-oriented measurement was also evaluated in TScP. The conclusion was that it is not suitable due to the specific nature of service operations. Customer relationships were regarded as too short and the role of TScP in customer's operations

too varying. In addition, many services such as incubation operate in a very uncertain environment where target setting is extremely difficult.

Summary of the empirical findings. Table II summarizes the main findings of the empirical evaluation related to three specific measurement approaches. Based on the empirical observations, it is argued that these approaches have a good potential in overcoming some of the key challenges in the performance measurement of knowledge-intensive organizations by complementing the picture provided by other alternative measures.

Aside to customer-oriented and personnel-specific perspectives, the traditional organizational approach to measurement was also investigated and further developed in two of the cases studied. It appeared that many common and generally utilized quantitative measures (e.g. time related) can be satisfyingly adopted. The most commonly used measures for qualitative performance aspects were surveys related to the satisfaction of employees and customers.

4. Conclusions

There is still a lack of empirical research on the topic of measuring performance in knowledge-intensive organizations. Based on the empirical observations and indication of the prior literature, it can be noted that, as such, the traditional balanced

Perspective	Measurement approach	Summary of comments presented in the studied organizations
Individual knowledge worker	Subjective performance evaluation by individuals	Support for identifying specific performance-related development targets (TScP) Makes the "voice of employees" visible (TScP) Should be complemented with objective measures (TScP) Mixed opinions on the evaluation of own work (EPD) Clarity of evaluation criteria should be high (EPD)
Customer	Output weighting/ component-by-component	Variance of outputs need to be captured which can be supported with output weighting (EPD) Clarity of definitions related to output classes must be good (EPD) Qualitative output components need to be captured which can be done with component-by-component approach (EPD) Determination of proper weights for qualitative output components is challenging (EPD) High quantity of outputs is not always desirable, outcomes are what matters (all)
	Customer-target-oriented measurement	Provides more detailed information on what caused certain impacts on customer (Finpro) Interaction with customer improves (Finpro) lacks the reliability of quantitative analysis (Finpro) Difficult to measure qualitative aspects of customer impacts (Finpro) Uncertainty of customer outcomes complicates application (TScP) Requires long and intense customer relationships (TScP) Requires a clear role of service provider in customer's operations (TScP)

Table II.
Evaluation of the proposed measurement approaches

performance measurement approach does not substantially differ in knowledge-intensive organizations. Many performance aspects can be captured with the similar measurement practices as in any organization. Therefore, a more focussed research approach is needed. Two distinctive perspectives (knowledge worker and customer) were proposed to be emphasized in the context. These were also demonstrated by the case analysis. The study also evaluated potential ways of overcoming the known measurement challenges related to these two perspectives. The study accompanied the previously presented search for the linkage of operative HRM practices (e.g. performance appraisals addressed to individual knowledge workers) and the discussion of strategic performance measurement (Toulson and Dewe, 2004). This is a specifically important task in knowledge-intensive "people" organizations.

This study also demonstrated the need to apply the ideas of service management in improving performance measurement in knowledge-intensive organizations. Customer-oriented performance measurement is a topic that has yet received surprisingly little attention (Tucker and Pitt, 2009). Two of the practical measurement solutions examined in this study were linked to the interaction between customer and service provider. According to service management literature, the content of service varies depending on a customer. This means that also service performance is a very customer-specific phenomenon, which calls for more rigorous models for measuring the components of service outcomes (Rhee and Rha, 2009). Customer-oriented performance measurement is easily linked to customer satisfaction surveys, even though it should be considered as a broader approach of developing measurement. For example, a customer can take a role in setting the measurement criteria of service outcomes. For this purpose, customer-target-oriented measurement appears as a potential way to measure customer value in a tailored manner.

Finally, the context-specific nature of service provision necessitates further development and application of the contingency-based approach of performance measurement and management control (Auzair and Langfield-Smith, 2005). On the other hand, the application of measurement always requires tailoring to a specific context since also knowledge-intensive organizations form an incoherent group with varying characteristics. For example, it was found out in this study that the customer-target-oriented measurement requires long-term customer relationships, which restricts its applicability in every knowledge-intensive organization. In addition, the studied output measurement methods are more suitable in the public sector since output measurement is not a similar problem in companies. There is still a continuous search for more generalizable measurement approaches in coherent empirical contexts. This can only be done with even more detailed contextual analysis and practical testing of measurement approaches in different service environments (Amir *et al.*, 2010). This offers plenty of important objects for further research.

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