

Identifying a Suitable Approach for Measuring and Managing Public Service Productivity

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Abstract: Every public organisation faces the challenge of improving productivity. In this effort, productivity measures are essential managerial tools. However, the task of measuring service productivity has proven to be challenging. A key reason for the challenges seems to be related to the intangibility of services. The objective of this paper is to identify and apply a productivity measurement method satisfying the information requirements of public managers. The study is carried out using a qualitative case study approach. The paper consists of two parts: first, the current knowledge of the issue is examined by reviewing the literature on (service) productivity and performance measurement; second, an action research is carried out in the context of four case services of the City of Helsinki, Finland. A disaggregated approach to productivity measurement is applied. Three different measurement frameworks and methods are evaluated in light of practical criteria for measurement. Finally, a matrix method is chosen and applied in practice. As a result the paper provides more understanding of the process of applying the disaggregated productivity measurement approach in the context of public welfare services.

Keywords: intangibles, performance measurement, productivity management, public services

1. Introduction

Public organisations have typically many competing performance-related objectives. One of the key objectives valued by most stakeholders relates to the productivity improvement of service processes. In this effort measurement systems are valuable tools in providing condensed information for identifying concrete targets for improvement.

Productivity has traditionally been defined simply as the ratio between output (e.g. the quantity of services produced) and input (e.g. the number of employees). There is an abundance of research on productivity measurement in manufacturing operations (e.g. Banker et al., 1989; Hannula, 1999), whereas service productivity has been studied much less. The application of the productivity concept in service organisations seems to be a rather complicated task. The development of valid and relevant productivity measures has proven to be an especially tough challenge. Current measures have been criticised since they seem to provide biased information that is not very useful for managerial purposes. An essential reason behind the measurement challenges relates to the intangible nature of services (Sherwood, 1994). According to Filipo (1988), examples of the intangible factors of services are service image, contact personnel image, atmosphere in service provision and the level of customer satisfaction. Even though the intangibility of services has long been discussed, there seems to be a lack of understanding of how capture to this feature in order to design purposeful productivity measures.

Many of the existing studies on public service productivity (and service productivity in general) examine the issue at the macro (e.g. industry or firm) level (Boyle, 2006; Brax, 2007). Jääskeläinen and Lönnqvist (2009) have proposed the application of a disaggregated measurement approach in the productivity examination of complex public services. However, their study did not describe the actual process of applying the approach in practice. There are several alternative methods and frameworks for applying the disaggregated approach. This study aims to contribute to the prior discussion by identifying and applying a measurement method satisfying the information requirements of public managers. The objective of the paper is approached with qualitative case research (Eisenhardt, 1989). The paper proceeds as follows: First, the current knowledge of the issue is examined by reviewing the literature on (service) productivity and performance measurement. It is concluded that there are several potential approaches available and that the specific characteristics of public services may require an extended examination of productivity. Second, an action research is carried out in the context of four case services of the City of Helsinki, Finland. Three measurement frameworks and methods identified in the literature are evaluated in light of practical criteria for measurement and the application of one method is described. As a result the paper provides more

understanding of the process of applying the disaggregated productivity measurement approach in the context of public welfare services.

2. Literature review

2.1 Defining public service productivity

Despite the simple definition of productivity (output/input), it is a rather ambiguous concept that can be easily confused with other concepts. Productivity closely relates to concepts such as operational performance, which refers to the efficiency and effectiveness of business processes (Kaydos, 1999), efficiency, which is related to the utilisation of resources and effectiveness, which refers to the ability to reach a desired objective or the degree to which desired results are achieved (Tangen, 2005) and performance, since the productivity of an organisation can be seen as a component of its performance (Hannula, 1999). The practical application of the productivity concept seems to vary depending on the background of the researcher (e.g. economist, engineer, psychologist), the level of examination (cf. national economy, large organisation, organisational unit) and industry (service vs. manufacturing, public vs. private sector).

In many studies on service productivity, an extended approach to productivity examination is applied, which seems to be closer to the meaning of the performance concept. Several service productivity models can be found in the literature (e.g. Grönroos and Ojasalo, 2004; Parasuraman, 2002). In the discussion on service productivity, factors such as the quality of service (Sahay, 2005), utilisation of service capacity (Grönroos and Ojasalo, 2004) and the role of customers (Martin et al. 2001) have been emphasised. In the context of public services, productivity has been related to cost-efficiency and quality of services (Hodginson, 1999). According to Faucett and Kleiner (1994), public service productivity can be improved by producing more outputs of better quality at the same costs or by producing the same number of outputs of the same quality at less cost. Rosen (1993) also highlights the role of quality in public service productivity examination by stating that excluding output quality leads to efficiency examination.

The rationale for an extended approach in productivity examination has been linked to the specific characteristics of services such as intangibility. Outputs and outcomes of services have often intangible elements. There are also intangible productivity drivers (e.g. input factors). As an example, Jääskeläinen (2008) identified the following intangible factors affecting productivity in public services: employee competence, employee satisfaction, working atmosphere (inputs) and subjective output quality. Many aspects of service quality are linked to the intangible elements of services. According to Wakefield and Blodgett (1999), the intangible factors related to service quality are reliability, responsiveness, assurance and empathy. Grönroos (2001) identifies three dimensions in the quality of services: technical quality, functional quality and perceived service quality. Intangible factors are related especially to the third quality dimension – customers often evaluate service quality subjectively in relation to the pre-expectations affected e.g. by service image. It may be concluded that in applying the productivity concept in practice in the context of public services an extended approach (including many factors instead of mere quantities of outputs and inputs) is appropriate. This may also affect the way productivity is measured.

2.2 Exploring different measurement approaches

Discussion on productivity measurement approaches is not a new topic in general. Many different approaches and methods have been presented in the literature. Traditional productivity measurement methods applied in manufacturing contexts examine, e.g., the change of total output (products) divided by the change of total input (human resources, material, energy etc.) (cf. Hannula, 1999). The measurement of service productivity is an old challenge with only few solutions demonstrated in practice (McLaughlin and Coffey, 1990; Grönroos and Ojasalo, 2004). One of the key challenges in the productivity measurement of services relates to the defining of the basic unit for measuring the quantity of the services performed (Sherwood, 1994). After outputs have been properly defined it is usually fairly easy to link them to inputs (e.g. costs or working hours) used. This section begins with a presentation of general approaches (philosophies) to productivity measurement (2.2.1 and 2.2.2.) and continues on more detailed measurement methods and frameworks.

2.2.1 *Productivity level vs. productivity change*

In principle, there are two ways of measuring productivity: measuring the level or the change of productivity (Uusi-Rauva, 1997). These can also be referred to as static and dynamic productivity measures (Sink, 1983). Static measures provide information on the current productivity level. They can be useful in benchmarking the productivity level of different organisational units at a certain point in time. Dynamic measures are commonly used in measuring the productivity of nations and industries. They compare the current results of the measure to a former result of the same measure. The results of dynamic measures are typically easier to compare between units providing different outputs. However, if the level of productivity is low at the starting point it is easier to achieve productivity improvements.

2.2.2 *Disaggregated vs. aggregated approach*

Mammone (1980) identifies two approaches to productivity measurement at the firm level: component (disaggregated) measurement and aggregate measurement. Component measures capture the productivity of a single activity or unit. Aggregate measures are intended to examine the productivity of a large organisational entity or the whole organisation. McLaughlin and Coffey (1990) suggest that the measurement of service productivity could be first focused on disaggregated components (e.g. product or process) of a complex mix of services. In this conception, inputs and outputs for each component are examined separately and compared separately. An opposite approach (e.g. firm level) is to use a model that deals simultaneously with multiple inputs and outputs. They also argue that much of the emphasis on service productivity research needs to focus on disaggregate measures. In the context of public services, Boyle (2006) refers to a similar kind of approach as micro level or “bottom up” measurement of productivity and suggests that more emphasis should be put on developing these kinds of productivity measures.

Jääskeläinen and Lönnqvist (2009) have suggested that in measuring the productivity of single service or unit a further disaggregation could be applied. According to their study, it is possible to first identify the intangible and tangible productivity components of single services and then design measures that capture these factors. Finally, an aggregated index of these component measures can be calculated. The idea is derived from the component-by-component measurement methods (Luthy, 1998) of intellectual capital (IC) where individual components (e.g. image or employees' competencies) of complex intangible phenomena are identified and measured.

2.2.3 *Monetary measurement*

In the context of service productivity, numerous authors seem to propose monetary measures in order to properly capture all the elements (both tangible and intangible) in service outputs. Grönroos and Ojasalo (2004) claim that financial measures that calculate the value of the outputs are the only valid measures of service productivity. Klassen et al. (1998) rationalise sales price as an output by stating that in this way the subjective evaluation of service value can be avoided. While the monetary measurement method seems potentially suitable in service providing companies it is of no use for public organisations which do not have markets and prices in the same way as companies do.

2.2.4 *Output index method*

There are also more specific formulas for measuring public service productivity and outputs in particular. Rosen (1993) has proposed a measurement method for better quantifying complex service outputs. Two aspects of output are distinguished: output quantity and output quality. These two aspects together form the actual output which is measured simply as follows: output quantity * output quality. Output quantity is measured by the number of output units (e.g. number of investigations) produced. Output quality is calculated by summing up the results of weighted quality indicators. Each quality-related measure is weighted by allocating 100 % to all of the measures. Quality measures with different measurement scales are commensurated by dividing measurement result with the set target level.

Hodginson (1999) has proposed a productivity measurement method for public services the aim of which is to take into account the efficiency factors as well as the outcomes and the quality of services. The basic idea of the method is similar to that presented above, the quantitative outputs are multiplied by a quality-related index.

2.2.5 Matrix method

Productivity matrix is a method in which a set of direct and indirect productivity measures are used to compose a single measurement result. Every measure has its own weight (0-100) in the calculations. There should not be more than 7 measures per matrix since matrices with more measures are in danger of becoming too complex (Laaksonen et al. 1992). In a traditional application of the matrix, the expected values of different measures are scaled in order to produce a score from 0 to 10 for each measure. By first multiplying the score of each measure by the weights and then summing up the results, the matrix produces a total score from 0 to 1000.

Different names, such as objectives matrix (OMAX), productivity matrix, multi-criteria performance measurement technique (MCP/PMT), importance-performance matrix and interpretations of matrix method have been used in the past. An early application of the matrix method was carried out by Riggs (1986). Measurement framework has been applied in manufacturing industries, services and public organisations (Dervitsiovits, 1995). According to Rantanen and Holtari (1999), the matrix method of performance measurement is one of the most popularly used alongside balanced performance measurement frameworks such as the Balanced Scorecard.

The matrix method distances itself from the traditional productivity examination. It includes many different factors affecting productivity which do not necessarily measure the relationship between output and input. Therefore, the term performance matrix would also be well justified.

2.2.6 Scorecards

Performance measurement systems, such as the Balanced Scorecard, were developed in the 1990s for strategic management purposes of companies (Kaplan and Norton, 1992). They include different strategy-driven perspectives which all have their own objectives and measures. As an example, Boyne (2002) presents the following perspectives of public service performance: outputs (quantities and qualities), efficiency (costs per unit of output), service outcomes (e.g. formal effectiveness and impact), responsiveness (e.g. staff satisfaction, customer satisfaction) and democratic outcomes (e.g. probity and participation).

Although these systems clearly differ from traditional productivity measurement, they too may be powerful in identifying means to improve productivity. There are many studies on the successful implementation of performance measurement systems in public organisations. However, there are also reports that public organisations are having problems in applying them (see e.g. Rantanen et al., 2007). Public organisations typically have many different stakeholders. According to Wisniewski and Stewart (2004), there is a risk that taking the needs of various stakeholders into account can result in a measurement system that is too complex and therefore too time-consuming to use. There may be substantial problems in choosing a coherent and compact set of measurement objects.

A challenge in using a comprehensive performance measurement system for purposes of productivity management is that factors at the core of productivity may remain hidden due to the complexity of the systems. There is a potential danger that no real emphasis is placed on monitoring productivity or on developing the currently used productivity measures (cf. Hodginson, 1999).

2.3 Summary of the literature

It seems clear that public services are a complex context for productivity measurement which may require specific and extended examination. Several approaches, methods and frameworks for measuring productivity can be found in the literature some of which (monetary measures) can clearly not be applied in the case of public services. On the other hand, many others, such as output index and matrix methods as well as scorecards could be suitable. Earlier research suggests that it is necessary to begin the investigation from the operative level (individual services). In this way, it is also possible to apply the disaggregated approach to measurement. Since there still is limited knowledge on applying the approach in practice, an action research was carried out. The application of the disaggregated approach in practice may require a more detailed measurement method such as index or matrix measurement. In the case study, three different methods and frameworks (output index, matrix and scorecard) were evaluated and one method was further applied.

3. Case study

3.1 Data and research methods

The author has been involved in an action research project since the beginning of 2007 (two and half years). The project has included development work in productivity measurement in the City of Helsinki. The City of Helsinki is a large municipal organisation with around 40,000 employees and an annual expenditure of around 3,000 million Euros. Social welfare and health care account for more than a half of the total expenditure. Most of the income is derived from tax revenues. (City of Helsinki, 2002) The experiences reported in this study are related to following services provided by Social Services Department:

- **child day care**
- around 200 day care centres
- fewer than 10 centres provide services 24h/day
- **child welfare**
- eight foster homes
- some units provide extra services such as school and care for the disabled
- **elderly services**
- four service centres for clients needing special care
- 13 units of sheltered accommodation also providing care services
- **disability services**
- seven day activity units for the mentally disabled
- services available only during normal working hours

All of the services are by nature classic services with close interaction between service provider and customer (cf. Hill, 1977). They may also be characterised as high-touch services (Grönroos, 2000) which refers to the employee-intensity in the provision of services.

The practical aim of the action research project is to develop more valid productivity measures than those currently available. As in many other public organisations, valid measurement of productivity has proven to be a great challenge in the organisation. Productivity measurement has been carried out for years with a system that provides information on the productivity trend of a rather large organisational entity (e.g. Social Services Department) based on output/input index (outputs / costs).

Action research is the most far-reaching method used in case studies (Gummesson, 2000). Action research is a method in which the researcher participates in an organisation's activities – in this case the design process of productivity measures – and examines a situation while it is occurring (Coughlan and Coughlan, 2002). Action research requires interaction between researcher and actors in the organisation studied (Gummesson, 2000). Design-based research is a specific type of action research which aims to develop knowledge that can be used in solving field problems (Andriessen, 2004; Van Aken, 2007). The effectiveness and validity of the solutions are not only evaluated by the researchers but also by the users in the field of application (Stam, 2007). Designs may refer to entities such as actions, structures, processes or systems whereas design methods can be design processes, design roles and more specific methods for resolving certain design issues (Van Aken, 2007).

This study clearly is clearly in the nature of design-based research since it aims to identify and develop a solution to the problem from the practical field. In this study, workshops have been utilised as a practical development method in the design work. Six different working teams with their own workshop schedules carried out the design work. In addition to the author, 3-5 persons (managers, analysts and accounting experts) from the Social Services Department attended the workshops. The author acted as a facilitator of the design process by presenting different measurement approaches from the literature, asking questions and directing discussion as well as the design work. The design process followed roughly the generic process of designing performance measures (see e.g. Bourne et al., 2000). First, the purpose and requirements for measurement were identified by interviewing directors and managers from different organisational levels. Second, different measurement methods and frameworks were evaluated in relation to the requirements identified. Third, a particular

measurement method was chosen. Fourth, factors to be measured were identified. Fifth, new measures were designed. At the time of writing this paper, the design work in child day care and elderly care had been finalised and the measures adopted. The whole process had taken for around 20 months time and some 10 workshops per working team. In the other services, the various factors affecting productivity had been identified but the actual development work related to measurement was still ongoing. The first three phases were carried out in only the two services that started their development project earlier. With the other services the same measurement method was applied and the project started from the fourth phase.

The experiences of the workshops have been carefully documented for research purposes. From the research point of view the action research aims to answer to these questions: 1. Why was a particular measurement method chosen in the case services? 2. How can the method be applied in practice? 3. What are the challenges in applying the method?

3.2 Experiences from the action research in the case services

At the beginning of the project there was already an intention to apply the disaggregated approach in designing the new productivity measures. This intention was strengthened in interviews with some 20 directors (mainly departmental heads) of the City of Helsinki. The directors presented several requirements related to productivity measurement. For example, productivity measures should provide detailed information on factors affecting productivity in order to identify concrete targets for development. On the other hand, productivity measures should help in monitoring productivity trends in a larger organisational entity, such as the Social Services Department. In addition, productivity measures should provide tools for benchmarking different units. In general there was clearly a need to obtain more detailed information on productivity. In turn, the representatives of the case services (operative level managers) emphasised the following requirements for the productivity measurement system:

- usefulness as a productivity and performance management tool at the operative level,
- information on all the key factors that affect productivity
- controllability of the factors measured, measuring only those factors that can be affected by managerial means
- possibility to compare units providing similar services
- possibility to utilise the measurement information provided by currently used measures
- simplicity of the measurement system (easy to understand).

At first, designing a measurement system to satisfy all the different requirements seemed a rather complicated task. The next step was that the author presented three productivity measurement approaches identified during the literature review. These were evaluated in an open discussion among the members of working teams. The key comments related to each proposed measurement approach are summarised next.

a) *Developing the currently used output/input indicator in order to better capture both tangible and intangible output elements.* The representatives of the case organisation felt that this approach was rather complicated and did not give enough information on productivity-related factors for managerial purposes. Based on these arguments index approaches with mathematical formulas were rejected.

b) *Developing a couple of new simple productivity measures that could be used as part of the balanced performance measurement system* commonly used in different units. In this approach, measures related to different elements of service inputs and outputs could be monitored alongside with their own measures. The members of working teams felt that this approach was not novel enough. There were many measures already in use. Since there are many units providing similar services and using similar measures, it was felt that a large number of measures would yield an overwhelming mass of data which would be difficult to monitor. Different measures are easily left disconnected.

c) *Productivity matrix* was eventually chosen for the purposes envisaged for several reasons. One key reason was that the representatives of the case units were really enthusiastic about the method. They felt that something really new could be accomplished for managerial purposes. The matrix provides

one index calculated from several productivity-related indicators. In addition, it is easy to understand what factors have influenced the index. The matrix is not very complex: the measurement method is transparent to every employee. The approach also shows what a good result is. Therefore, it can be used in the management by objectives. Individual objectives for each measure and for the total index can be defined in the case of each unit. Therefore it is easier to identify means to improve productivity. It was also felt that the matrix approach was a good way to give more weight to the indicators that were already in use but not intensively monitored and analysed.

At the beginning of the design process, each working team identified what the various factors affecting productivity were in the context of their organisational unit. This was done in order to identify the factors to be included in the productivity matrix (what to measure?) as well as the importance and cause-effect relationships between different factors. The result was a map that is roughly similar to the strategy map (cf. Kaplan and Norton, 2004) which includes key goals (productivity improvement) and the factors that drive them. Initially, two productivity components were separated: service quality and cost efficiency (cf. Hodginson, 1999). The cause-effect relationships identified were based on earlier literature and on the long experience and knowledge of the representatives of the case services. Figure 1 illustrates an example of the result. Usually the maps did not encompass as many factors. However, typically certain factors were clearly tangible, such as output quantity, output magnitude, the condition of customers and, on the other hand, resources and resource utilisation. In addition, intangible factors were identified. Examples of those were customer satisfaction, happiness of customers (output factors), likewise working atmosphere and employee competence (input factors). Even though the map is not a prerequisite for applying the matrix method, it was regarded as useful in understanding and prioritising the different productivity affecting factors.

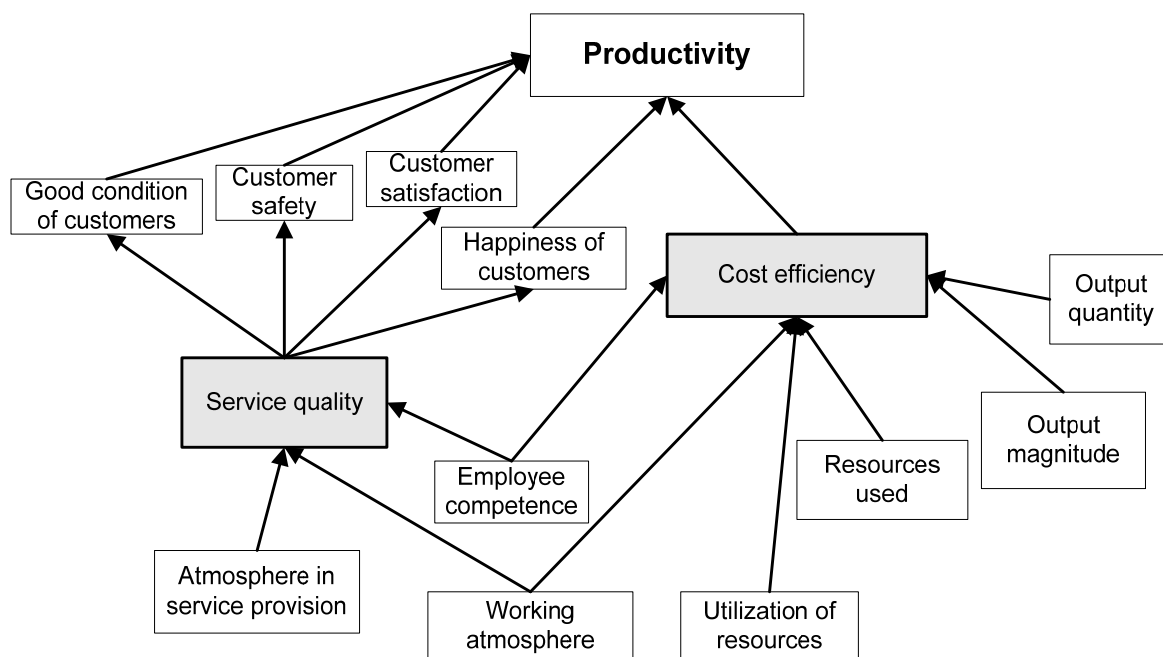


Figure 1: Map of different productivity affecting factors

The next step was to identify measures for different productivity affecting factors. Many of the tangible factors had already been measured. For instance, output quantity was measured with the number of care days provided. Resources and resource utilisation were linked to their own measures, such as the utilisation of premises or the average number of customers per employee. Not surprisingly, the intangible factors were regarded as considerably more difficult to measure. However, several measures were linked to them, the deficiencies of which were acknowledged. For example, it was assumed that the rate of short sickness absences was indicative of the working atmosphere of an organisational unit. Similarly, employee competence could be measured with measures related to educational activities (eventually this measure was not included in any of the matrices). Such measures can be referred to as indirect measures. However, direct measures for certain intangible factors were in use. For example, customer satisfaction with childcare was measured with a questionnaire addressed to parents. Most of the work of designing new measures was related to improving the output measurement and capturing different aspects of service quality.

The following step in constructing a productivity matrix was to prioritise the measures. 100 % was allocated to all measures. This was done by evaluating the significance of each factor from the point of view of productivity improvement, which was not an easy task. Here also the experience and context-specific knowledge of the case service representatives played a key role. In addition, a statistical study was initiated in order to support the decision-making regarding the weights. In order to finalise the matrix, it was necessary to collect measurement data from each measure. Since the matrix uses a scale from 0 to 10 to describe the score for values of different measures, it was necessary to understand what the current values for each measure are. This was done by examining the measurement data from all the service providing units during the previous 3 years. The average result got a score of 4. Scores 0 and 10 were defined in such a way that only single units had such scores at the beginning of using the matrix.

The following figure presents a matrix that was designed in the case of elderly care. In the example, the value of the first measure was 15.50 €. This means that it does not yet fulfil the requirements of the score 6. Score 5 is multiplied by a weight of 45, which means that the weighted score for the measure is 225. When the same is done for each measure we get the final score of 580.

	Unit cost of calculated care day, €	Percentage of customers with deteriorating condition	Average number of customers per number of employees	Degree of utilisation of premises, %	Rate of short sickness absences, %
Measurement result	15,50	4	0,55	100	3,6
10	12	0	0,28	100	3
9	12,5	1	0,29	99,9	3,2
8	13	2	0,3	99,7	3,4
7	14	4	0,31	99,5	3,7
6	15	6	0,34	99	4
5	16	8	0,37	97	4,5
4	17	10	0,4	95	5
3	19	13	0,5	92,5	6
2	21	16	0,6	90	7
1	23	20	0,7	85	8
0	25	25	0,8	80	10
Score	5	7	2	10	7
Weight	45	15	15	15	10
Weighted score	225	105	30	150	70
Total score	580				

Figure 2: Illustration of the matrix

It is planned that the matrix score is calculated once a year for each unit. The initial experiences of the matrix measurement are encouraging. Some issues based on initial experiences may be highlighted. Since the matrix presents a multidimensional evaluation of the productivity of the service providing units it is unlikely that a single unit can have a good score on every measure. It is also clear that the results of some measures may not be improved indefinitely. These issues should be noted in setting targets for the total score and individual factors. Based on the initial measurement results, however, it seems that the scores from units providing similar services (and using similar matrices) vary rather a lot. Hence, the matrix clearly reveals the differences between those units. The controllability criterion related to the measured factors could not be totally fulfilled. For example, the customer structure of units (which cannot be controlled by unit managers) may restrict the possibility to improve certain factors.

In order to compare the total score of a productivity matrix, the same scales, weights and measures have to be used. Therefore, the total score of the matrix is comparable only when the same matrix is

used. In the case of similar units using similar matrices the score provides a good basis for benchmarking and has also been regarded as a potential tool in supporting payment by results. The flexibility of the approach enables the updating of the matrix whenever it is deemed necessary. However, in order to sustain the comparability of the results from various years the same matrix should be used for a longer time period.

This paper only examined the first step in applying the disaggregated productivity measurement approach. The matrix approach aggregates the results of different productivity components and drivers in single service providing units. The next step would be to aggregate the results from different units. In the case of the City of Helsinki, it is planned that the results of different matrices will be commensurated by examining the change in total score not the score as such. However, the discussion on this issue is not within the scope of this paper.

4. Conclusions and discussion

Many challenges in the measurement of public service productivity have been identified. For example, the intangible nature of services and the complexity of service outputs have been regarded as key reasons for the lack of appropriate productivity measures. This paper aimed to identify a suitable approach for measuring and managing productivity in public services. The contribution of this study is related to the detailed description of the application of disaggregated measurement approach in practice. Several requirements for productivity measurement were identified during the case study. For example, it is necessary to obtain information on the level of productivity of similar service providing units in order to properly compare their productivity. There is clearly a need to gather more detailed information on factors affecting productivity: measures should be designed for operative level units. This requirement underlay the initial choice of a disaggregated measurement approach.

In the actual implementation of the disaggregated approach evaluation of a suitable measurement method was necessary. Based on several arguments, the representatives of case services felt that matrix method was the most suitable for their purposes. A key reason for not choosing the output index method, for instance, was the requirement of simplicity. In addition, the matrix method provides a powerful tool for the operative management of productivity. The flexibility of the method was also appreciated by the representatives of the case organisation. Components of productivity can be regularly evaluated and better measures for them can be designed. However, this method is not without limitations. The score of the matrix is comparable only in units using the same matrix. In aggregating the scores of different services the change in the score of matrix may be more comparable. However, this also requires some common guidelines and rules (related e.g. to the weights used). It should also be noted that the results of the matrix are possibly not comparable with some more traditional productivity measures.

The application of the matrix method was a fairly straight-forward task in the case services of this study. Identification of productivity components and factors affecting productivity was usually carried out in two workshop meetings. Most of the challenges were related to difficulties in designing measures for certain factors. For example, there were several measures already in use for measuring the tangible productivity factors but only few direct measures of intangible factors: indirect measures with limited validity were used. Another cause of challenges was related to the decision on the weights for different measures. There were no obvious solutions available for the task. In setting the measurement scales for different measures, the availability of historical data and the large number of units clearly facilitated the process. In some other (possibly smaller) organisations with less history of performance measurement and with a lack of available measurement data, much more time may have been required for designing new measures and deciding on the measurement scales to be used.

More research on the topic of this paper is called for. A key question in the context of large public organisations is whether the measurement result of a matrix can be used as a component of the productivity index of a larger organisational entity. The most obvious advantages of the matrix method are in managerial usage. This study only examined the situation immediately after designing the matrices. More research could be carried out regarding the actual impacts of the utilisation of the matrices as to whether any concrete benefits been achieved.

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