

Indicators for measuring the impact of lean management in healthcare organizations

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Abstract: Several authors have developed informative indicators to measure the lean performance in different sectors, like the business sector, R & D sector and maintenance sector. However, no set of informative indicators to measure the lean performance in healthcare organizations has been developed yet. Therefore, the following question is central in this thesis: “Which indicators are most informative to measure lean performance in healthcare organizations?”. Answering this research question is practical relevant since it enables managers of healthcare organizations to better assess the effectiveness and efficiency of applying lean management in their healthcare organization. In the management literature, it is ambiguous whether lean performance measurement has a positive or negative impact on intrinsic employee motivation. It is theoretically relevant to research which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance, since it helps defining informative indicators in such a way that they do not harm or even benefit the intrinsic employee motivation. This is important since the intrinsic employee motivation is the critical determinant of the creation of a continuous lean management improvement culture, which is necessary for the successful and sustainable application of lean management (and hence lean performance measurement) in healthcare organizations. Therefore, the following (sub) question is also relevant in this thesis: “Which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance in healthcare organizations?”. The outcome of this question will contribute to the literature regarding the development of informative indicators which do not harm or even foster the intrinsic employee motivation and hence contribute to the literature regarding the successful and sustainable application of lean management in healthcare organizations. In order to answer both questions, first a (systematic) literature review was conducted. Based on the (systematic) literature review, a set of indicators (related to perspectives) was developed, to inform empirical research. The set of indicators is refined through three focus groups conducted at healthcare organization Karakter. Focus group two (with members of a project) and three (with members of care line) were kept since most healthcare organizations only apply lean management in projects and/or in care lines and not system wide. Therefore, by further refining the set of indicators and related perspectives in focus groups with both members of a project and care line of Karakter, it is more likely that the results of this thesis are at first informative for other child and youth psychiatric institutions, and maybe even for psychiatric institutions and healthcare organizations in general. In answering the central question of this thesis, it can be concluded that eight indicators divided over four perspectives are most informative for measuring the lean performance in healthcare organizations. In the customer perspective, two indicators are informative. The first indicator is the degree to which customers recommend the healthcare organization to other customers and the second indicator is the level of service quality, consisting of the following themes: reliability, assurance, tangibles, empathy and responsiveness. In the employee perspective, two indicators were found to be informative as well. The first indicator is the level of employee commitment. The second indicator is the level of general knowledge regarding lean management, which can be measured by two questions focused on the training level and experience level of the employees regarding lean management. In the process perspective, three indicators were found to be informative. The first indicator is the first time right ratio, the second indicator the lead time, and the third indicator the waiting time, which consists of the waiting time on a list and the waiting time in a room. In the financial perspective, only the return on lean management investment was found to be informative for measuring the lean performance. In answering the sub question of this thesis, it can be concluded that the participants were intrinsically motivated in performing their job, to measure the lean performance through the indicators in the customer perspective, employee perspective and process perspective, because it allowed the participants to focus on what is important in lean management and provided them the opportunity to track the progress made on the score of the indicators. In order to minimize the negative effect on intrinsic employee motivation or even foster the intrinsic employee motivation and hence the successful and sustainable application of lean management, the level of service quality indicator, the level of general knowledge of employees regarding lean management indicator and waiting time indicator were specified. The participants were also intrinsically motivated in performing their job to measure the return on investment in the financial perspective, since it could help to convince the doubters about the value of the program of continuous improvement. The participants were not intrinsically motivated in performing their job to measure the lean performance with the indicators in the continuous improvement perspective, since it delivered a feeling of being controlled in their work and delivered extra unnecessary work. Therefore, it was decided to only make continuous improvement a central factor in the other perspectives and related indicators, in order to minimize negative effects on intrinsic employee motivation.

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1. Informative indicators to measure lean performance in healthcare organizations and the impact of lean performance measurement on intrinsic employee motivation.

Lean management in healthcare organizations is a relatively new phenomenon (Joosten, Bongers & Janssen, 2009). Lean management has been applied in the healthcare sector since the early 2000s, in order to create value for the customers (D'Andreamatteo, Ianni & Lega, 2015). In the healthcare sector, the customers are most often the patients in need of diagnoses or treatment (Fomundam & Herrmann, 2007). The lean management philosophy has its origins in the Ford corporation and Toyota corporation and was formally documented as the 'Toyota Production System' (TPS) since about 1965-1970 (Holweg, 2007). According to D'Andreamatteo et al. (2015), there is no generally accepted definition of the concept of lean management. However, all definitions have in common that lean management focuses on the elimination of waste, the creation of value for customers, an improved productivity and continuous improvement (Liker, 2004). Waste is everything that does not add value to the care process from the customer's point of view, such as waiting time, unnecessary movement of employees and unnecessary transport (Womack & Jones, 1996). A definition of lean management that captures this message well and therefore will be informing this thesis is as follows: "Lean management is a way to specify value, line up value creating actions in the best sequence, conduct these activities without interruption whenever someone requests them, and perform them more and more effectively" (Womack & Jones, 2003, p.15). In a healthcare setting, this definition makes clear that lean management contributes to the creation of value for the patient, by continuously eliminating waste (Womack & Jones, 1996). Healthcare organizations are often confronted with the above mentioned forms of waste. Since lean management helps to eliminate these forms of waste, lean management is considered a promising approach for creating (customer) value for healthcare organizations (de Sousa, 2009).

Since lean management has its origins in the car manufacturing industry, more and more healthcare organizations are wondering whether a management philosophy developed in the (car) manufacturing sector is also applicable in the healthcare sector (Joosten, Bongers & Janssen, 2009). Especially because many lean management implementations in the healthcare sector fail since the beginning of this century (de Souza, 2009). Womack and Jones (1996) argue that lean management is applicable in multiple sectors, like the healthcare sector. However, an often used

quote by employees opposing the application of lean management in their healthcare organization is “people are not machines” (Luyster & Tapping, 2006). Their reasoning is based on the notion that the healthcare sector, in contrast to the manufacturing sector, is mainly depending on people and not on machines (Joosten et al., 2009). For evaluating whether the application of lean management in healthcare organizations can be considered ‘successful’ in the sense that value is created for the customers, it is interesting to identify informative indicators for measuring lean performance in healthcare organizations. Several authors have developed informative indicators to measure the lean performance in different sectors, like the business sector (Pakdil & Leonard, 2014), R & D sector (Da Costa, Oehmen, Rebentisch & Nightingale, 2014) and maintenance sector (Irajpour, Fallahian-Najafabadi, Mahbod & Karimi, 2014), but not for the healthcare sector yet. Several authors have measured the lean performance in the healthcare sector in many different ways, without consensus among them. Therefore, the following question is central in this thesis:

“Which indicators are most informative to measure lean performance in healthcare organizations?”

There is practical relevance for researching which indicators are most informative to measure the lean performance in the healthcare sector for two reasons. First of all, the lack of informative indicators is a problem for managers in healthcare organizations who have to decide whether to introduce lean management as a means to deal with the increased pressure on healthcare services (de Souza, 2009). They are not able to make an informed decision regarding the usefulness of lean management in their healthcare organization based on research conducted by scientists or organizations, in which information is gathered with a well-developed coherent measurement system of lean performance. Second of all, the lack of informative indicators is a problem for managers in healthcare organizations who have already adopted lean management in their healthcare organization and have to justify continued investments by providing evidence of benefits already achieved by lean management or identifying room for future or additional improvements to the board and employees of the healthcare organizations, in order to gather the needed commitment. If managers from healthcare organizations know which indicators have the most informative potential, they are better able to assess the effectiveness and efficiency of lean

management in their healthcare organization. It is important to notice that the informative indicators for measuring the lean performance have to exist next to indicators that are obliged by (healthcare) authorities. In following the regulation provided by the ministry of Public health, Welfare and Sport, Dutch healthcare organizations are obliged to provide information on indicators related to the employee turnover rate, absenteeism rate and the number of vacancies (Dutch Care Authorities, 2016).

In the management literature, it is ambiguous whether (lean) performance measurement has a positive (Behn, 2003) or negative influence (Kallio & Kallio, 2014) on intrinsic employee motivation. Lean performance measurement refers to measuring (through informative indicators) whether the application of lean management generates value for the organization (Da Costa et al., 2014). Intrinsic employee motivation exists when “esteem, feeling or growth are tied to performance” (Lawler & Hall, 1970). It is theoretically relevant to research which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance, since it helps defining informative indicators in such a way that they do not harm or even benefit the intrinsic employee motivation. This is important since the intrinsic employee motivation is the critical determinant of the creation of a continuous lean management improvement culture, which is necessary for the successful and sustainable application of lean management in healthcare organizations (and hence the successful and sustainable measurement of lean performance) (Antoni, 1996; Franco, Bennett & Kanfer, 2002). Therefore, in order to ensure a successful and sustainable lean performance measurement, the following (sub) question is also relevant in this thesis:

“Which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance in healthcare organizations?”

More information about how lean performance measurement, intrinsic employee motivation and continuous lean management improvement culture are taken to affect each other, is provided at the beginning of chapter two.

The research objective of this thesis is first of all to formulate recommendations for managers in healthcare organizations, regarding which indicators are most informative to measure lean performance in healthcare organizations. This will help managers to better assess the effectiveness and efficiency of applying lean management in their healthcare organization. Second of all, the research objective is to gain insight in which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance in healthcare organizations, in order to formulate informative indicators in such a way that they do not harm or even foster the intrinsic employee motivation and hence contribute to the successful and sustainable application of lean management in healthcare organizations. The outcome of this thesis will in this way contribute to the literature regarding the development of informative indicators which do not harm or even foster the intrinsic employee motivation and hence contribute to the literature regarding the successful and sustainable application of lean management in healthcare organizations (and hence successful and sustainable lean performance measurement).

This thesis is structured as follows. In the second chapter, relevant literature regarding how lean performance measurement, intrinsic employee motivation and continuous lean management improvement are taken to affect each other will be provided, and extant research discussing relevant approaches regarding the measurement of lean performance in healthcare organizations will be systematically reviewed and analysed. The systematic literature review will lead to a set of informative indicators, divided over several perspectives. In the third chapter, the methodology, will be explained how this set of informative indicators will be refined by means of focus groups to suit the context of healthcare organizations. In this thesis is tried to follow a research design which has also been used in prior research efforts focused on this or comparable ends. The methodology consists of the case description (Karakter), the research design, chosen methods of data collection and analyses, as well as considerations of research ethics. In chapter four, the findings of the three focus groups will be presented and compared. Finally, in chapter five, the conclusion and discussion of this research will be provided.

2. Literature Review.

2.1. Impact of lean performance measurement on intrinsic employee motivation.

As indicated in chapter one, the impact of lean performance measurement on intrinsic employee motivation is of central focus in this thesis because of the crucial role of intrinsic employee motivation in ensuring a sustainable and successful application of lean management in healthcare organizations (Antoni, 1996). The employees are the ones who have to suggest improvements regarding their current work as part of their daily routines, so that a continuous lean management improvement culture can be developed (Womack & Jones, 1996). A low level of intrinsic employee motivation can reduce the willingness to suggest improvements, whereby it is hard to create a continuous lean management improvement culture (Antoni, 1996). If a continuous lean management improvement culture has been developed, lean management will be integrated in the daily routines of the employees, which makes a successful and sustainable application of lean management (and hence lean performance measurement) in healthcare organizations more likely (Womack and Jones, 1996). Radnor (2011) has empirically proven that the creation of a continuous lean management culture is needed for the successful and sustainable application of lean management in healthcare organizations, whereby employees will be more committed to measure the lean performance. Since the research of Radnor (2011) explicitly focused on the healthcare sector, the results of the study of Radnor (2011) are relevant for this thesis. An intrinsic employee motivation is also crucial in healthcare organizations because of the intense contact between employees and clients in the healthcare sector (Franco, Bennett & Kanfer, 2002). If the intrinsic motivation of employees in a specific healthcare organizations is low, their service provision is likely to be of lower quality, which decreases the satisfaction of the customers regarding the care service provision (Franco, Bennett & Kanfer, 2002). This can lead to a lower demand for care services of customers, which can harm the viability of the healthcare organization in the long run (Franco et al., 2002).

In the management literature, it is ambiguous whether (lean management) performance measurement has a positive or negative influence on intrinsic employee motivation. In figure 1, two different kind of dynamics are proposed regarding the impact of lean performance measurement on intrinsic employee motivation and hence the creation of a continuous lean management improvement culture.

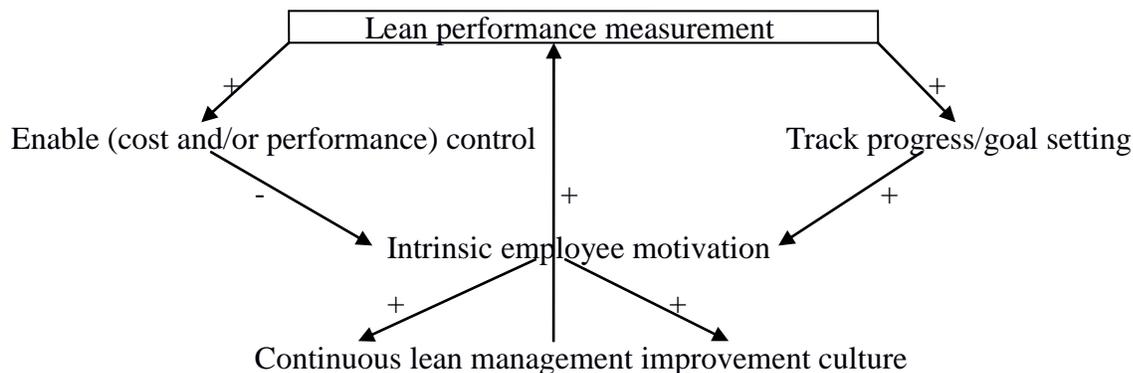


Figure 1. Model of how performance measurement, intrinsic employee motivation and continuous lean management improvement culture are mutually interrelated.

The first dynamic proposed is that lean performance measurement enables (cost and/or performance) control. This may in turn have a negative influence on intrinsic employee motivation. This is shown in the study of Kallio & Kallio (2014), regarding the negative influence of performance measurement on intrinsic motivation of Finnish university employees, when the employees felt mistrust about being controlled or thought that they were not performing well enough because they were being controlled. Since in both healthcare organizations and universities, the motivation to perform the job is typically intrinsic (whereby the employees do not appreciate it that their performance is controlled) (Serra, Serneels & Barr, 2010), the finding of the study of Kallio and Kallio (2014) might be relevant for this thesis as well. A low level of intrinsic employee motivation in turn is expected to have a negative influence on the creation of a continuous lean management improvement culture (and hence the measurement of lean performance), because of the aforementioned role employees have in the creation of a continuous lean management improvement culture (Radnor, 2011).

The second dynamic proposed is that lean performance measurement allows for tracking progress and setting new goals regarding the score on indicators to be reached, which can increase intrinsic employee motivation. Tracking progress can increase the intrinsic employee motivation by showing employees that they are doing a good job regarding the scores on the indicators (Behn, 2003). Since the research of Behn (2003) focused on the intrinsic motivation of employees in the non-profit sector like the healthcare sector, the results of the research of Behn

(2003) might be relevant for this thesis as well. From previous research, we know that smart (specific, measurable, acceptable, realistic and time bound) new goals with respect to the scores on the indicators, can increase intrinsic employee motivation in multiple settings, like the healthcare sector (Latham & Locke, 2007). A high intrinsic employee motivation will hence foster the creation of a continuous lean management improvement culture (and consequently the measurement of lean performance), because of the aforementioned important role of employees in creating a continuous lean management improvement culture (Radnor, 2011; Antoni, 1996). Relevant to notice is that these two proposed dynamics are not the only possible dynamics resulting from lean performance measurement. However, prior research has found these two dynamics to be central (Kallio & Kallio, 2014; Behn, 2003).

Figure 1 indicates the concepts of interest in this thesis. The core focus will be on identifying informative indicators to measure lean performance from extant research and integrating them in a viable measurement approach for lean performance in healthcare organizations, taking both the possible positive and negative impact on intrinsic employee motivation into account.

2.2. Framework of systematic literature review: measuring lean performance in healthcare organizations.

As a starting point for developing a set of informative indicators to measure the lean performance of healthcare organizations, first a small-scale systematic literature review was conducted. In this systematic literature review, articles that discuss the measurement of lean performance in both healthcare and other organizations were identified and analysed with regard to their respective propositions about how to measure lean performance in healthcare organizations. Although the focus of this thesis is on the healthcare sector, it is chosen to also consult and assess research conducted in organizations other than healthcare organizations on their informative value regarding the measurement of lean performance in healthcare organizations. Lean management in healthcare organizations is a relatively new phenomenon and therefore could learn from research conducted in other sectors with regard to measuring lean performance (Joosten, Bongers & Janssen, 2009).

When articles met the inclusion criteria (see appendix one on page 73 for the inclusion criteria), they were read in detail in order to assess the respective propositions about how to measure lean performance in healthcare organizations. None of the articles fulfilled the inclusion criteria

concerning the influence of lean performance measurement on the motivation of employees. As aforementioned, this is also of central focus in this thesis.

166 articles were identified with the search terms and 31 articles met the first three inclusion criteria described in appendix one. After an initial reading, seven articles were identified as most informative for the systematic literature review. Although the other articles did pass the first three inclusion criteria, they did not focus on discussing relevant indicators for measuring the lean performance, which is the central focus in this thesis, and where therefore not considered to be relevant to discuss in this systematic literature review. Six of the seven articles focused on measuring lean performance in other than healthcare organizations. Only one article was found that tried to develop a generally accepted approach for the measurement of lean performance in healthcare organizations (Kemper & de Mast, 2013). However, Kemper and de Mast (2013) have only focused on operational indicators, without considering financial indicators. It is important to also consider financial indicators, since financial indicators provide tangible insights needed for top managers in healthcare organizations regarding the decision to continue applying lean management or not.

Two additional articles written by Kaplan and Norton (1992) and Moraros, Lemstra and Nwankwo (2015) were included in the systematic literature review which were not found with the search terms in the Web of Science described in appendix one. The article of Kaplan and Norton (1992), discussing the Balanced Scorecard (BSC), is included since the BSC incorporates aspects which are also important in lean management, like the central focus of the customers (customer perspective), the creation of a flow (internal business perspective) and continuous improvement (innovation and learning perspective), as becomes clear from the aforementioned leading definition of lean management, discussed in chapter one of this thesis (Womack & Jones, 1996). The article of Moraros et al. (2015) is included since the article systematically illustrates how the lean performance in healthcare organizations has been measured up to now. The article of Moraros et al. (2015) did not focus on the creation of a generally accepted approach to measure the lean performance. Given the fact that only one article is found that attempted to develop a generally accepted approach for measuring lean performance in healthcare organizations (Kemper & de Mast, 2013), the article of Moraros et al. (2015) is a particularly

valid starting point for at least knowing how lean performance is measured in healthcare organizations up to now.

Meta-data on the articles which were included in the systematic literature review are shown in table one of appendix two (page 74). In the same appendix is also explained why exactly these meta-data is gathered.

-Insert here Table one, which is visualized in appendix two on page 74-

In this systematic literature review, the five principles developed by Womack and Jones (1996) to capture the philosophy of lean management, are leading in selecting perspectives and informative indicators for the measurement of lean performance in healthcare organizations. The five principles are:

- Specifying the value from the standpoint of the end customer.
- Identifying the value stream and eliminating waste.
- Creating a flow.
- Establishing pull.
- Seeking perfection.

In appendix three (page 76), more information is available on the five lean management principles and the application of them in the healthcare sector.

The literature review made clear that there is a shortage of research focused on the development of an accepted set of informative indicators for measuring the lean performance in the healthcare sector. In other sectors than the healthcare sector, research is conducted on the development of a set of informative indicators for measuring the lean performance. In the next sections, the articles of this literature review are broadly grouped as such and discussed in more detail in order to identify perspectives and indicators which are most informative to measure the lean performance in healthcare organizations. The indicators and related perspectives found to be informative in this systematic literature review can be tested in empirical research regarding the suitability for measuring the lean performance of healthcare organizations.

2.3. Measuring lean performance in healthcare organizations.

2.3.1. A measurement plan for measuring lean performance in the service (healthcare) sector.

Kemper and de Mast (2013) have developed a measurement plan that facilitates the measurement of lean performance through operational measures, which could identify improvement opportunities in the service- and healthcare sector. The measurement plan consist of three elements. The first element consists of the process flow indicators: total resource time, processing time, rework, first time right ratio, capacity, availability, workload, throughput (utilization), waiting time and throughput time (work in process). These indicators are developed especially for the service and healthcare sector. However, Kemper and de Mast (2013) neglected financial indicators and an indicator focused on the employee commitment, which are important in lean management, as explained before (Kaplan & Norton, 1996; Sanford, Maureen & Martha, 1981). The second and third element are focused on four adequate measurement systems to measure scores on indicators. More information on the measurement systems can be found in appendix four on page 79. The four proposed measurement systems can be used to suggest a method of measurement for an indicator, when it is not clear how a particular indicator can be measured (Kemper & de Mast, 2010).

2.3.2. The application of lean management in healthcare organizations: successful or not?

Moraros et al. (2016) have provided a valuable literature review about whether lean management interventions in healthcare organizations actually work. They did not focus on developing informative indicators for the measurement of lean performance in the healthcare sector, but systematically reported how the lean performance in healthcare organizations has been measured up to now and whether the application of lean management in healthcare organizations is considered to be successful. According to Moraros et al. (2016), researchers have mainly focused on the effect of lean management on health outcomes and process outcomes. 15 of the 22 reviewed articles focused on process outcomes (Moraros et al., 2016, p.3). Examples of process outcomes are waiting times, patient flow and productivity. Four of the 22 reviewed articles focused on health outcomes (Moraros et al., 2016, p.3). Health outcomes refer to the occurrence of a disease, like the MRSA infections rate. Only three of the 22 reviewed articles focused on both health- and process outcomes (Moraros et al., 2016, p.11). None of the reviewed articles by Moraros et al. (2016) focused on financial outcomes and only one on employee satisfaction. The

Saskatchewan Union of Nurses (SUN), which represents and supports nurses in their job performance, researched the impact of lean management on employee satisfaction through a survey. In the survey, the effect of lean management on employee engagement, patient care, time for patient care, workplace issues, availability of supplies, workload, stress and patient safety was central. The study made clear that the nurses think that the application of lean management in the business processes (like the logistic department) of healthcare organizations might be valuable, but that it is not valuable for optimizing the direct patient care. According to SUN, there are two main reasons why the application of lean management for optimizing the direct patient care negatively influences the employee satisfaction of the nurses. First of all, workforce redesigns in accordance with the philosophy of lean management, are often used to reduce the number of nurses working at the healthcare organization, which will lead to a fear of losing the job among the nurses and hence a lower satisfaction of the nurses. Second of all, the nurses think that the workforce redesigns will reduce the time and quality available for fulfilling the customer needs. This is expected to reduce the employee satisfaction, since the employees can not do what they like to do: providing optimal care for the customers. This study provides an important lesson for the application of lean management (and hence lean performance measurement) in healthcare organizations: it is important to measure whether the application of lean management in healthcare organizations creates value for the customers, when measuring the lean performance of healthcare organizations.

The review article of Moraros et al. (2016) makes clear that there is no consensus on a generally accepted way of measuring lean performance in a healthcare context, given the different measurement methods of the performance of lean management (Moraros et al., 2016). Again, like in the article of Kemper and de Mast (2013), there is a strong emphasis on indicators in the process perspective to measure the lean performance. For example, the customer satisfaction, as part of the customer perspective, is neglected. It is important to take into account the interests of the customers in measuring lean performance in healthcare organizations, since they are of central focus in lean management, as indicated in the first principle of Womack and Jones (1996).

2.4. Measuring lean performance in other organizations.

2.4.1. The fuzzy logic method: calculating the score on indicators.

Anvari, Zulkifli and Yusuff (2013) have developed an innovative approach to measure the lean performance in the manufacturing sector. They have used the fuzzy logic method to calculate a lean management score, so that managers and decision makers know how they can improve their application of lean management (see appendix five on page 79 for an explanation of the fuzzy logic method). The literature review of Anvari et al. (2013) indicated that lead time, cost (per patient), defect rate and (customer) value are the most important components of lean management and therefore valuable indicators for assessing the application of lean management in organizations (Li, 2011; Wilson, 2010). Although these indicators are certainly relevant, again the employee motivation and customer value, as important aspects of lean management in healthcare organizations, are neglected (Womack & Jones, 1996). Also the financial indicators, are once again neglected (Sanford et al., 1981).

2.4.2. The Balanced Scorecard (BSC).

Bhasin (2008) argues that the BSC can be used for measuring the performance of lean management in different kind of organizations. The BSC consists of the customer perspective, internal business perspective, innovation and learning perspective, and financial perspective. The customer perspective of the BSC is important for measuring the performance of lean management in healthcare organizations, because of the aforementioned central focus of customers in lean management (Womack & Jones, 1996). The internal business perspective provides managers insights in the critical internal operations of an organization, enabling them to satisfy customer needs and design a flow, which are respectively the first and third principle of lean management (Womack & Jones, 1996). The innovation and learning perspective indicates that organizations should continuously improve their activities, so that they are able to survive the intense global competition (Kaplan & Norton, 1992). This is important for lean management in the healthcare sector given the emphasis on continuous improvement in lean management, as indicated by the fifth principle of lean management discussed by Womack and Jones (1996). The financial perspective provides tangible evidence of what lean management has delivered for an organization. In appendix six on page 80, more information can be found about the BSC and related perspectives and indicators.

When comparing the four perspectives discussed by Kaplan and Norton (1992) and the components discussed by Anvari et al. (2013), I conclude that the four perspectives of the BSC of Kaplan and Norton (1992) are more suitable for measuring the lean performance in healthcare organizations than the components proposed by Anvari et al. (2013). Anvari et al. (2013) neglect the aforementioned important role customers and continuous improvement have in lean management, while the BSC does take into account these facets by means of respectively the customer perspective and the innovation and learning perspective. Besides, in contrast to Anvari et al. (2013), the BSC takes into account the aforementioned important role of the financial perspective in measuring the lean performance (Kaplan & Norton, 1992; Sanford et al., 1981).

Although Bhasin (2008) argues that the BSC could be used for measuring the performance of lean management in organizations, he argues that the BSC falls short in three ways. The BSC first of all neglects the contribution employees and suppliers make regarding the achievement of organizational goals (Bhasin, 2008). Secondly, Bhasin (2008) argues that the BSC does not (sufficiently) recognize the role of the community in monitoring the environment of an organization. Flak and Dertz (2005) agree with Bhasin (2008) that the BSC has a too narrow stakeholder focus. They argue that the stakeholder theory can complement the BSC and propose to perform a stakeholder analysis before developing a strategy based on the BSC (Flak & Dertz, 2005). They argue that the goals of the most important stakeholders of the organization should be taken into account when formulating a strategy based on the BSC, since the interests of the most important stakeholders can have a significant influence on the performance of the organizations (Flak & Dertz, 2005). An important stakeholder to take into account when measuring the lean performance is the inspection. The inspection controls whether by law obliged indicators like the absenteeism rate and employee turnover rate, are registered (Dutch Care Authorities, 2016). The absenteeism rate and employee turnover rate are lower when lean management is applied well. A proper lean management application improves the pleasure in work since the employees can focus on what they like to do: taking care of the patient. This will lead to lower sickness levels and lower levels of employee turnover according to Lowe, Delbridge and Oliver (1997). Thirdly, the BSC does not provide clear long-term indicators according to Bhasin (2008). Clear long-term indicators of lean performance are important for getting information regarding the sustainable application of lean management in healthcare organizations.

2.4.3. The Dynamic Multi-dimensional Performance (DMP) framework.

Bhasin (2008) prefers the dynamic multi-dimensional performance (DMP) framework for measuring the lean performance, since the DMP framework does not have the disadvantages of the BSC discussed before. The DMP takes into account various timeframes and stakeholders (Maltz, Shenhar & Reilly, 2003). The five dimensions of the DMP are the financial dimension, customer/market dimension, process dimension, people dimension and future dimension. Maltz et al. (2003) argue that organizations should focus on preferably 12 indicators divided over five dimensions of the DMP. Examples of indicators are profit after interest and tax (financial dimension), customer satisfaction (customer/market dimension), cycle time (process dimension), employee commitment (people dimension) and new market development (future dimension) (Bhasin, 2008). The DMP of Maltz et al. (2003) is different from the BSC of Kaplan and Norton (1992) in the sense that the people dimension is added and that the innovation and learning perspective is replaced by the so-called future dimension. The people dimension is important because of the aforementioned important role of employees in the application of lean management (Forza, 1996). Although highly respected, the future dimension is comparable to the innovation and learning perspective of the BSC, since the innovation and learning perspective already incorporates the importance of taking into account long-term considerations. For example by setting specific rates for improvement regarding the scores on the indicators, to be reached in a future timeframe (Kaplan & Norton, 1992).

2.4.4. The ‘program objectives and requirements category’.

Da Costa et al. (2014) have developed 153 indicators for measuring the lean performance in a research and development context. They conducted a systematic literature review in order to get insights in informative indicators of lean performance. Consequently, they investigated whether the set of indicators they have developed were actually used in practice. When the indicators were not used, the question was asked whether the organization would like to use the indicators in the future. The 153 indicators are divided over the following categories: stakeholder value and benefits, program objectives and requirements, results from product, results from process and people (Da Costa et al. (2014). Examples of indicators found to be most often used by practitioners were growth in sales from new products (results from product) and project met revenue goals (stakeholder value and benefits). An example of an indicator the organizations did not use but stated they would like to use is the accuracy of interpretation of customer requirement

(Project objectives and requirements) (Da Costa et al. (2014)). The authors state that they are not sure whether the indicators are transferable to other sectors, like the healthcare sector (Da Costa et al. (2014)). An interesting category Da Costa et al. (2014) add in comparison to the categories/perspectives of the former discussed authors in this systematic literature review, is the ‘program objectives and requirements category’. This category makes clear that it is very important to take into account the goals set by the healthcare organizations themselves in applying lean management, when one wants to develop a set of informative indicators to measure the lean performance. This requires that in developing a set of indicators for measuring the lean performance in a specific healthcare organization, it is important to enter in dialogue with the organization regarding the goals set in applying lean management.

2.4.5. Measuring the lean performance regarding maintenance.

Irajpour et al. (2014) have developed components to measure lean performance in the maintenance sector. They made use of a survey, the Shannon entropy method (mathematics approach) and a pilot test in order to develop informative components of lean performance in the maintenance sector. By means of the Shannon entropy method, nine components were identified. The nine components are: 5S, Computerized Maintenance Management Systems, Training and Learning, Condition Based Maintenance, Reliability Centered Maintenance, Preventive Maintenance and Corrective Maintenance. No specific indicators for each component are developed. The maintenance sector is clearly different from the healthcare sector. However, the idea of maintenance might be relevant for the healthcare sector as well. For example a regular maintenance of the MRI Scan machine can prevent a breakdown and consequently a longer waiting time, which is a form of waste in lean management (Womack & Jones, 1996).

2.4.6. An instrument to assess lean service adoption.

Malmbrandt and Ahlström (2013) have conducted the first comprehensive attempt to develop an instrument for assessing lean management service adoption. Their instrument is developed and validated in an iterative process between theoretical and empirical insights. They made a list of indicators based on an intensive literature review, which they have empirically validated by semi-structured interviews with experts, workshops with expert practitioners and scientists, a pilot test and a large scale survey. The resulting instrument suggested by Malmbrandt and Ahlström (2013)

consists of 34 items divided over three sections: enablers, practices and performance. An example of an indicator in the ‘enablers section’ is the employee commitment. Examples of indicators in the ‘practices section’ are degree of customer value, customer involvement and standardization. Examples of indicators in the ‘performance section’ are increased productivity, lead time reduction and inventory turnover rate. Malmbrandt and Ahlström are aware that the service sector they have focused on consists of different types, such as for example healthcare and financial services. They are not sure whether their instrument is applicable in all the different types of services and call for this to be tested (Malmbrandt & Ahlström, 2013). What Malmbrandt and Ahlström (2013) add in comparison to the former author’s perspectives discussed in this systematic literature review, is the importance of measuring the improvement on the lean management practices used, like the standardization score. A lean management practice is a tool used to conform to the five lean management principles discussed by Womack and Jones (1996). An example is the Value Stream Mapping (VSM) practice, which allows to identify value and waste as part of the second principle of lean management (Womack & Jones, 1996). An improved score on lean management practices can contribute to for example process improvements, financial improvements, a higher customer satisfaction and a higher employee motivation (Malmbrandt & Ahlström, 2013). An increase in (intrinsic) employee motivation can be reached when the employees see an improvement on the score of the practices. The research of Malmbrandt and Ahlström (2013) made clear that especially the visualization of the improvements on the score of all the indicators contributes to a higher intrinsic employee motivation. The improvements on the scores can be visualized in a common room, like the cafeteria (Malmbrandt & Ahlström, 2013).

2.4.7. The Leanness Assessment Tool (LAT): quantitative and qualitative indicators.

Pakdil and Leonard (2014) have developed a comprehensive tool to measure the success of lean management implementation in business firms. They call it the leanness assessment tool (LAT). The LAT consists of eight quantitative performance dimensions: time effectiveness, quality, process, cost, human resources, delivery, customer and inventory. Examples of indicators in the eight quantitative performance dimensions are cycle time (time effectiveness), defect rate (quality), capacity utilization rate (process), average cost per unit (costs), absenteeism rate (human resources), order processing time (delivery), customer satisfaction index (customer) and total inventory/total sales (Inventory). In addition, the LAT comprises five qualitative

performance dimensions: quality, process, customer, human resources and delivery, with in total 51 evaluation indicators. Examples of questions in the five qualitative performance dimensions are ‘measuring is done after each process’ (quality) and ‘our customers are directly involved in current and future product offering’ (customer). Pakdil and Leonard (2014) are questioning whether their LAT is applicable in service industries, given the possible manufacturing bias in the LAT. According to Pakdil and Leonard (2014), it is important to include both quantitative and qualitative indicators to get a ‘richer’ measurement of the lean performance, since quantitative assessment can show an acceptable leanness level, while stakeholders’ perceptions about leanness level may result in an opposite result. However, qualitative indicators might also deliver difficulties. Qualitative indicators, like the perceptions of individuals on a five-point Likert Scale, can be confronted with social desirable answers. Individuals might be willing to more favourable fill in for example a numerical five-point Likert Scale than is actually the case, because they think that the researcher wants to hear that they are doing a good job regarding lean management (Symon & Cassell, 2012). Besides, the scores on qualitative indicators are also more difficult to compare. For example, for one individual, a score of four on a numerical five-point Likert Scale represents ‘good’, while for another individual ‘good’ represents a score of five. In order to deal with these difficulties, it is important to emphasize that you are only interested in what they think and to respect the anonymity of the individuals, to prevent social desirable answers. Besides, the individuals should be made clear what the scores on a numerical five-point Likert Scale indicate, to make the results more easily to compare (Symon & Cassell, 2012).

2.5. Important lessons learned from the systematic literature review.

The systematic literature review in this thesis provides a couple of important lessons for selecting perspectives and indicators for measuring lean performance in healthcare organizations. Firstly, a more balanced overview of the lean performance can be reached when both operational and financial perspectives and related indicators are selected (Kaplan & Norton, 1992; Bhasin, 2008). Secondly, it is important to consider the ‘program objectives and requirements category’ developed by Da Costa et al. (2014) when selecting perspectives and indicators for measuring the lean performance in healthcare organizations. This category indicates that it is important to enter a dialogue with an organization regarding the goals set in applying lean management when selecting perspectives and indicators for measuring lean performance in healthcare organizations. It is also important to identify relevant stakeholders and related goals in this dialogue, to ensure

that the set of informative indicators and related perspectives to measure the lean performance, both fit the goals set by the healthcare organization and relevant stakeholders (like the inspection) (Flak & Dertz, 2005). Thirdly, both qualitative and quantitative indicators should be developed to get a richer measurement of the lean performance (Pakdil & Leonard, 2014). Fourthly, it might be relevant to measure the improvement on lean management practices used and to measure the lean performance regarding the degree of maintenance (Malbrandt & Ahlström, 2013; Irajpour et al., 2014).

The first lesson will be used by proposing both operational and a financial perspective and related indicators for measuring the lean performance in healthcare organizations. The second lesson will be used to inform the methodology section of this thesis. When developing a set of informative indicators and related perspectives, a dialogue will be kept with a healthcare organization, as will be elaborated on in the methodology section of this thesis. The third lesson will be used by proposing both qualitative and quantitative indicators. The fourth lesson will be used to add indicators to the list that focus on measuring the use of lean management practices and the degree of maintenance.

2.6. Selected perspectives and indicators for measuring lean performance in healthcare organizations.

Perspectives:

Based on the literature review, it can be concluded that certain perspectives are often used by researchers to measure the lean performance and should therefore inform an integrated approach for measuring lean performance in healthcare organizations. The first perspective is the customer perspective, discussed by the authors Bhasin (2008), Kaplan and Norton (1992), Malbrandt and Ahlström (2013), Pakdil and Leonard (2014) and Da Costa et al. (2014). The customer perspective is relevant for measuring lean performance in healthcare since, because of the aforementioned important role customers have in lean management (D'Andreamatteo, Ianni & Lega, 2015).

The second perspective is the employee perspective, discussed by the authors Bhasin (2008), Pakdil and Leonard (2014), Malbrandt and Ahlström (2013) and Da Costa et al. (2014). The employee perspective is relevant because of its aforementioned important role in lean management (Forza, 1996).

The third perspective is related to process outcomes, discussed by the authors Moraros et al. (2016), Kaplan and Norton (1992), Kemper and de Mast (2013), Bhasin (2008), Malmbrandt and Ahlström (2013), Pakdil and Leonard (2014), Da Costa et al. (2014) and Anvari et al. (2013). The process perspective is relevant for measuring lean performance in healthcare organizations, since an improvement in process efficiency can contribute to the development of a flow, which is the third principle of the lean management philosophy discussed by Womack and Jones (1996). Besides, an improvement in process efficiency contributes to customer satisfaction, which is also crucial in the application of lean management in healthcare organizations (Womack & Jones, 1996). An example is that a reduction in waiting times, as part of the process perspective, will make the customers more satisfied, since they do not have to wait that long anymore.

The fourth perspective is the continuous improvement perspective, discussed by Kaplan and Norton (1992), Malbrandt and Ahlström (2013) and Bhasin (2008). This is a valuable perspective for lean performance measurement in healthcare organizations, since as mentioned before, it is related to the fifth and last principle of the lean management philosophy: ‘seeking perfection’ (Womack & Jones, 1996).

The fifth and last of the selected perspectives is the financial perspective, discussed by Bhasin (2008), Kaplan and Norton (1992), Pakdil and Leonard (2014), Da Costa et al. (2014) and Anvari et al. (2013). As aforementioned, the financial perspective is relevant to take into account when measuring the lean performance. Besides, an important lesson of the systematic literature review was that it is important to include both operational perspectives and a financial perspective in measuring the lean performance.

Four of the five selected perspectives are also used in the original BSC developed by Kaplan and Norton (1992). In comparison with the original BSC of Kaplan and Norton (1992), the employee perspective is added because of the aforementioned important role employees have in lean management. The innovation part of the BSC is left out, since it was not suggested as informative for measuring the lean performance by the authors of this systematic literature review. It is important that the five selected perspectives are balanced, in order to reach both short term benefits and long term survival (Kaplan and Norton, 1992).

Indicators:

In table two below, all indicators discussed by the authors in this systematic literature review which are part of the five selected perspectives in this thesis are visualized. If applicable, information is also provided on how to measure the indicators. This information is important for assisting organizations in applying the indicators for measuring their lean performance. Both, qualitative and quantitative indicators are included, since from the systematic literature review it became clear that this is relevant (Pakdil & Leonard, 2014). Also, financial and operational indicators are included, as recommended by Kaplan and Norton (1992). Only one indicator (usage of pull system) is included that measures the use of a lean management practice, as recommend by Malbrandt and Ahlström (2013). Also only one indicator is added to the list that focuses on the degree of maintenance, as represented by the frequency of maintenance of machines indicator (Anvari et al., 2013).

-Insert here Table two, which is visualized in appendix seven on page number 82-

The indicators in table two are ranked in order of expected relevance for measuring the lean performance in healthcare organizations. The indicators are ranked to make the total number of proposed indicators for measuring the lean performance in healthcare organizations manageable and to be able to conclude which indicators are ‘most’ informative. Research has shown that managers of organizations are only able to manage between 12 and 20 indicators (Kaplan & Norton, 1992; Bhasin, 2008). Therefore, the ranking allowed to make a top three of each perspective, with in total 15 indicators. This falls between the proposed 12 until 20 indicators. In table three on the next page, the top three indicators per perspective is visualized. Although an important lesson learned from the systematic literature review was that indicators which measure the use of lean management practices and degree of maintenance are informative for measuring the lean performance, they scored not high enough to be part of the top three indicators per perspective. Also important to notice is that some indicators are so called lean management indicators, while other indicators are focused on measuring the general performance of an organization, but are influenced by the application of lean management. The indicators lead time, waiting time, employee training regarding lean management, specific rates of improvement for the indicators, total number of suggestions/total employees and total number of implemented

suggestions/total suggestions, are lean management indicators. The other indicators (customer satisfaction, service quality, frequency of meetings with customers for quality/service feedback, employee commitment, absenteeism, accuracy of interpretations of customer requirements, profit after interest and tax, return on investment and operating income per division) are general performance indicators which are influenced by the application of lean management. See appendix eight on page 93 for an explanation why the above described indicators are lean management indicators or general performance indicators (but influenced by the application of lean management). The return on investment indicator can be used in measuring the lean performance by calculating what the investments in lean have provided (in time/money). In the results section, illustrating examples of this are provided.

Table three: top three indicators per perspective

Perspective	Indicators
Customer perspective	Customer satisfaction
	Service quality
	Frequency of meetings with customers for quality/service feedback
Employee perspective	Employee commitment
	Absenteeism
	Employee training
Process perspective	Lead time
	Waiting time
	Accuracy of interpretations of customer requirements
Continuous improvement perspective	Specific rates of improvement for the indicators
	Total number of suggestions/total employees
	Total number of implemented suggestions/total suggestions
Financial perspective	Profit after interest and tax
	Return on investment
	Operating income per division

The chosen criteria for ranking were:

- The more often the indicator is proposed in the selected articles in this systematic literature review, the higher the rank. One point is provided for each time the indicator is proposed in an article.
- Two points are provided when the indicator is specifically developed for service organizations. One point is provided when the indicator is developed for other kind of organizations, but could be relevant for measuring lean performance in healthcare organizations. The decision whether an

indicator developed for other organizations could be relevant for measuring lean performance in healthcare organizations is based on the application of the five lean management principles of Womack and Jones (1996) to the healthcare sector described in appendix three.

-The more specific the measurement of the indicator, the higher the rank. When explicitly is made clear how the indicator can be measured in an article, one point is given.

Consider for example the customer satisfaction index in table two. The customer satisfaction index is proposed by Bhasin (2008), Leonard and Pakdil (2013) and Da Costa et al.(2014), whereby three points are given to the customer satisfaction index. None of these three authors specifically developed the indicator for the service industry. However, the importance of the customer satisfaction is expressed in the first principle of the lean management philosophy applied to the healthcare sector (Womack & Jones, 1996). Therefore, the indicator is considered to be promising for measuring lean performance in healthcare organizations and another point is provided. Finally, Bhasin (2008) argues that the customer satisfaction can be measured by means of a numerical five-point Likert Scale, whereby again one point is provided. In total, the customer satisfaction index therefore gets five points. Or consider the ‘total number of suggestions/total employees’ indicator in table two. Only Pakdil and Leonard (2014) proposed this indicator, whereby one point is provided. The indicator is not specifically developed for the service industry, but for the business sector. However, the importance of the indicator is linked to the fifth lean management principle of Womack and Jones “seeking perfection’. A high number of suggestions per employee indicates that the employees are busy with continuous improvement, which is linked to the ‘seeking perfection’ principle (Womack & Jones, 1996). Therefore, another point is provided. As shown in table two, Pakdil and Leonard also made clear how the indicator can be measured, whereby again a point is provided. In total the ‘total number of suggestion/total employees’ indicator therefore gets 3 points.

The proposed perspectives and informative indicators visualized in table three for measuring the lean performance, enable to enter a dialogue with healthcare organizations regarding the suitability of the proposed perspectives and informative indicators for measuring their lean performance. All other informative indicators proposed in the literature are not deleted, and can still be proposed as valuable to discuss in the focus groups by the participants.

3. Methodology.

3.1. Case description and research design.

In this thesis, Karakter was used as a case to study which indicators are most informative to measure the lean performance in healthcare organizations and to research which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance. Karakter is a Dutch healthcare institution specialized in child and youth psychiatry (long-term care). Children and youth (0-23 years) are diagnosed and treated of ADHD, autism, depressions, anxiety and obsessive compulsive disorder, behavioural disorders and other psychiatric problems (Karakter, 2016). Most children and youth are treated from home and follow special programs at Karakter. However, sometimes a temporary stay of the child at Karakter is needed (Karakter, 2016). Pressure is imposed on Dutch healthcare organizations like Karakter to perform more efficiently since the beginning of this century (de Souza, 2009). On the one hand, less financial support is provided by the Dutch government to Dutch healthcare organizations in order to deliver the care to the patients (Rijksoverheid, 2016). On the other hand, the customers demand a higher service quality against lower costs (de Souza, 2009). In order to deal with the increased pressure to perform more efficiently, Karakter decided to apply lean management at the end of the year 2013. They call it ‘continuous improvement’.

Consultancy group process improvement and innovation (PVI) supports Karakter in the process of applying ‘continuous improvement’. Consultancy group PVI provides lean management training for employees of Karakter and also advises the lean coaches of Karakter regarding the application of continuous improvement. Since consultancy group PVI is closely involved in the application of continuous improvement at Karakter, it also plays a supporting role in this research.

Although Karakter is a specific kind of healthcare organization, Karakter is extremely interested and willing to cooperate in a research regarding the measurement of their lean performance, and therefore provided a concrete empirical setting to research as a first step whether the selected indicators and perspectives identified in chapter two suit the context of a healthcare organization and which impact of lean performance management on intrinsic employee motivation should be taken into account when measuring the lean performance.

In this thesis, a qualitative research design is used, because of the in-depth information a qualitative research design generates. An in-depth understanding about the context of Karakter is necessary, in order to be able to develop a set of informative indicators that suit the context of healthcare organizations like Karakter. A qualitative research design is also frequently used by the authors discussed in the systematic literature review who focused on developing a set of informative indicators to measure the lean performance, because of the in-depth information a qualitative research design generates (Da Costa et al., 2014; Malmbrandt & Ahlström, 2013). For example, Malmbrandt and Ahlström (2013) have conducted semi-structured interviews with experts, workshops with expert practitioners and scientists, and a pilot-test, in order to develop a set of informative indicators for lean performance measurement in the service industry. Da Costa et al., (2014) also advised to enter a (qualitative) dialogue with a healthcare organization when developing a set of informative indicators for organizations.

Also, a qualitative research design can help to collect the rich and detailed information, required for getting an in-depth understanding of which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance (Symon & Cassell, 2012). It is important to have an in-depth understanding of this impact, since as mentioned before, it helps to define the indicators in such a way that they do not harm or even foster the intrinsic employee motivation.

3.2. Data collection.

In this thesis, three focus groups were organized. A focus group is a form of a group interview that builds on the interaction between the participants in order to gather data (Kitzinger, 1995). A focus group can be used for different purposes, like gathering opinions and experiences, defining problems, reaching consensus, and solving problems (Basch, 1987). The three focus groups in this thesis were conducted to reach consensus regarding which indicators and perspectives are informative to measure the lean performance of Karakter. Compared to an one-to-one interview, a focus group is an excellent stage to enter a rich (qualitative) dialogue with multiple members of Karakter regarding which indicators (and related perspectives) are most informative for measuring the lean performance and to research which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance, in which the participants can build on each other's arguments (Da Costa et al., 2014).

A first potential disadvantage of a focus group is the possibility that one or two participants will dominate the discussion, whereby some valuable insights of other participants can be missed (Smithson, 2000). A second disadvantage of a focus group might be the reduced time for the participants to express their thoughts in a focus group in comparison to an one-to-one interview. However, although less time is available for the participants to express themselves in a focus group, the data is richer through the interactions between the participants, in comparison to an one-to-one interview (MacDougall & Baum, 1997). A third potential disadvantage of a focus group might be group thinking. Group thinking can occur when groups have developed a high level cohesiveness whereby the participants are inclined to reach consensus at the cost of realistic challenges to the consensus (MacDougall & Baum, 1997). Finally, social-desirability effects might be a potential disadvantage of focus groups. This means that participants are inclined to provide answers they think the researcher or a manager in the group wants to hear instead of expressing what they really feel and think (MacDougall & Baum, 1997). Because of the above mentioned (potential) disadvantages of focus groups, in focus group one, two and three, measures were proposed to prevent such a situation from occurring.

The first focus group was conducted with lean management experts of Karakter and consultancy group PVI, and an external lean management expert, to determine whether the perspectives and indicators selected through desk research in the former chapter suit the context of Karakter. The second and third focus group were conducted to further refine the selected indicators and related perspectives for measuring the lean performance of Karakter. In all three focus groups, the question which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance, was of central focus. The second focus group is kept with participants working for a project. A project is a temporary work organization with the aim to reach concrete results within the limits of time, money and quality (Bos & Harting, 2006). The third focus group is kept with participants working for a care line. The biggest difference between a care line and project group is that a care line, in contrast to a project group, has no pre-defined timeframe with a specific goal (Bos & Harting, 2006). At first, it was only planned to conduct a second focus group with members of a project group. However, it was concluded that it was important to further refine the set of selected indicators and related perspectives with both members of a project and care line, since in general healthcare organizations only apply lean management in projects and/or in care lines and not system wide. Mazzocota (2010) and

Poksinska (2010) have shown that healthcare organizations only apply lean management in care lines and/or on project basis, since they just started to apply lean management. Therefore, by further refining the set of indicators and related perspectives in a focus group with both members of a project and care line of Karakter, it is more likely that the results of this thesis are at first informative for other child and youth psychiatric institutions, and even for other psychiatric institutions and healthcare organizations.

Preliminary research for focus group one.

In order to prepare for focus group one, first of all an open unstructured interview of about one hour with the responsible manager of the lean management project of Karakter and an external lean management expert was conducted, in order to get insights in the program objectives regarding lean management of Karakter, as recommended by Da Costa et al. (2014). The program objective of continuous improvement was mainly about reducing the waiting time and creating customer value. The external lean management expert is working for a Dutch consultancy organization specialized in process optimization in healthcare organization, and has substantial expertise in measuring the lean performance in healthcare organizations since the beginning of this century. The lean management expert guides Karakter in the application of continuous improvement. Also the goals of relevant stakeholder(s) (customers) were identified in the open unstructured interview, in order to know which stakeholders (and goals) the participants can refer to when arguing whether a proposed indicator or perspective is informative or not for measuring the lean performance of Karakter (Flak & Dertz, 2015; Bhasin, 2008). An important stakeholder is the customer, who wants a pleasant treatment with a short waiting time and lead time. In the focus group, the customer is indeed often referred to by the participants, in order to indicate that the customer perspective and related indicators, and the lead time and waiting time indicator are informative for measuring the lean performance of Karakter. I have chosen to conduct an open interview, since only two main questions were central: ‘which goals are to be reached in applying lean management?’ and ‘who are relevant stakeholders of Karakter and what are their goals?’. Depending on the answers, further questions were asked to further elucidate the goals to be reached in applying lean management and to further identify relevant stakeholders and their related goals. The open interview is not a method of data collection but was used to assist in better understanding the discussion during the first focus group regarding the suitability of the indicators and related perspectives for measuring the lean performance at Karakter. The transcript of the interview can be found in appendix nine on page 96.

Focus group one: Suitability of indicators and related perspectives selected through desk research for measuring lean performance at Karakter.

The first objective of focus group one was reaching consensus about whether the proposed indicators and related perspectives were informative, should be adapted, or that even new indicators or perspectives should be added. The second objective of the focus group was specifying how the indicators could be measured at Karakter based on which data. This information could help healthcare organizations in applying the proposed perspectives and indicators for measuring their lean performance. The third objective of the focus group was to find out which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance.

The participants of focus group one were all experts in the field of lean management. There were six employees (head of HR, information expert 1, information expert 2, project owner, care line manager and a coordinator) of Karakter present, two lean management employees of consultancy group PVI, and the aforementioned external lean management who guides Karakter in the application of continuous improvement. One lean management employee of consultancy group PVI had to leave the focus group in the break due to another appointment. The focus group composition had participants from more or less the same hierarchical level, which benefited the quality of the discussion. It is important to have participants of more or less the same hierarchical level, since when there is substantial hierarchy in the group composition, the participants lower in the hierarchy might be inhibited to express their honest thoughts (Kitzinger, 1995). All the participants also had a substantial understanding of the concept of lean management, which is a condition for a rich discussion. The group composition also allowed the subject to be discussed by experts from different perspectives (Karakter, consultancy group PVI and a lean management expert), which fostered the discussion (Hatch & Schultz, 2010). The six participants from Karakter also had their own expertise, from which they could discuss the topic. For example a HR expertise and information expertise. The nine participants in total were enough to foster the discussion and prevented that people felt intimidated to contribute to the discussion because of the sheer numbers involved (Symon & Cassell, 2012).

In order to prevent that one or two participants dominated the discussion and to ensure that everyone participated, the participants were provided with props in form of a green, orange, and red card. The green card was used by the participants to indicate that the indicator or

perspective is suitable for measuring the lean performance of Karakter, while a red card indicates the opposite. The orange card was used by the participants to indicate that they were undecided about whether the indicator or perspective is valuable to for measuring the lean performance of Karakter, so that a discussion was needed on the usefulness of the indicator. Of course, also a discussion was kept when the participants were divided about the suitability of the indicators for measuring the lean performance at Karakter, or when even all participants used a green or red card. When 50% or more of the participants used a orange card or red card for the perspective or indicator, the perspective or indicators should be adapted or even left out, in order to minimize negative effects on intrinsic employee motivation. The participants were asked by name to express their thoughts regarding the colour choice of their card. In this way I was able to ensure that everyone could give his or her input and I prevented that one or two participants dominated the discussion. Of course, participants were free to react on arguments provided by other participants, but in this way I could at least ensure that all participants were able to express their thoughts. In order to prevent group thinking, sometimes I acted as a 'devil's advocate', by providing a critical look at a statement, in order to prevent that consensus was reached at the cost of ignoring valuable challenges to the consensus (MacDougall & Baum, 1997). For example, when a participant indicated in focus group one that the customers are always central in lean management and in their organization, I asked if that is indeed always the case in their healthcare organization. The final conclusion was that the customers are central in lean management and in their organization. However, by questioning the statement, I forced the participants to think of the statement of the participant and to not only take it for granted. In order to prevent social desirable answers and increase the credibility of the research, the participants were told at the beginning of the focus group that I am only interested in what they think (Symon & Cassell, 2012).

The focus group took about two hours and 15 minutes. After an hour and 15 minutes, a break of ten minutes was kept, in order to prevent cognitive overload. The focus group started with an introduction, in which the goal of the focus group was explained and in which was emphasized that the input of the participants is highly appreciated and that it is very valuable to react on each other's arguments to enrich the discussion. The program of the focus group and the reasons why the participants were invited for the focus group was also explained (Kitzinger, 1995). The tables and chairs in the room in which the focus group took place were placed in an U-Form, since research has shown that this will stimulate the interaction (Basch, 1987). After the introduction, the five perspectives were discussed. The participants assessed

the suitability of the perspective for measuring the lean performance in Karakter by means of the green, red and orange cards. Thereafter, first the top two indicators of each perspective was discussed on their suitability for measuring the lean performance at Karakter. It was planned to discuss the top three indicators of each perspective with the participants. However after an intervision of about one hour with colleagues of consultancy group PVI, I reflected on my first plan to discuss the top three indicators per perspective and decided that it is better to first discuss in more detail the top two indicators per perspective, and in case time was left, the number three of each perspective could be discussed as well. An intervision (peer debriefing) was kept in order to increase the credibility of this thesis (Symon & Cassell, 2012). Based on the provision of table three of this thesis at the beginning of the focus group to the participants, two additional indicators were discussed at the request of the participants (training of employees and first time right ratio). No indicators related to lean management practices and the degree of maintenance were suggested as informative for measuring the lean performance of Karakter. This means that in total 12 indicators were discussed, which is in line with researchers like Kaplan and Norton (1992), Bhasin (2008) and Maltz et al. (2003), who indicate that a set of indicators should consist of 12 till 20 indicators, in order to make it manageable for managers. Again, the green, red, and orange cards were used by the participants to express their thoughts regarding the suitability of the indicators for measuring the lean performance of Karakter. If an indicator was found to be valuable for measuring the lean performance of Karakter, the adequate method to measure the indicator was discussed.

The focus group was audio recorded with permission of all the five participants. I have chosen to audio record the focus group in order to be able to focus on the process of questioning and listening rather than making notes. A disadvantage of recording the focus group is that the participants might not be willing to express their honest thought since they feel restricted by the recorder (Britten, 1995). Therefore, an informed consent (see appendix 10 on page 122) was provided to the participants, in which I guaranteed the participants to conduct ethical research.

Focus group two (with a project group) and focus group three (with a care line):

The participants of focus group two were seven employees (project owner, policy advisor, care line manager, head of HR, lean coach 1, lean coach 2 and a coordinator) of a project of Karakter, who all have experience with the application of lean management. The project was focused on reducing a gap in a budget by means of applying lean management, in order to be

able to deliver the promised quality care to the customers. The participants of focus group three were seven employees of a care line (care line manager 1, care line manager 2, financial expert, secretary, therapist 1, therapist 2 and a lean coach), which were also all experienced with the application of lean management. Since the employees of both focus groups work for Karakter and were familiar with the application of lean management, the focus groups were homogeneous, which fostered a sense of commonality that resulted in a better discussion (Krueger & Casey, 2000). The participants of both focus groups were also of about the same hierarchical level, to prevent that one lower ranked employee was discouraged to express his or her thoughts. The seven participants in both focus groups were enough to foster the discussion and prevented that people felt intimidated to contribute to the discussion because of the sheer numbers involved (Symon & Cassell, 2012).

The first objective of focus group two and three was to find out whether the refined set of indicators (related to perspectives) was informative for measuring the lean performance of the project and care line. The second objective was to find out which impact of measuring the lean performance on intrinsic employee motivation should be taken into account when measuring the lean performance.

Both focus groups took about one hour and 15 minutes. The focus groups started with an introduction, in which the goals of the focus group were explained and in which was emphasized that the input of the participants is highly appreciated and that it is very valuable to react on each other's arguments to foster the discussion. Thereafter, the perspectives (and related indicators) that followed from the first focus group were discussed in detail for whether they allowed an accurate measurement of the lean performance of their project and care line. In focus group two and three, there was special attention for which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance.

In order to prevent participants from dominating the focus group, participants were called by name to share their thoughts to ensure that everyone was heard. Again, in order to prevent group thinking, sometimes I acted as a 'devil's advocate', in order to prevent that consensus was reached at the cost of ignoring valuable challenges to the consensus (MacDougall & Baum, 1997). For example, while discussing the training of employees indicator in focus group three, the participants were quite enthusiastic about the indicator. Consequently, I

played the role of devil's advocate by questioning whether training of employees is enough to ensure a proper application of lean management. The participants reacted on this statement and agreed on that the general knowledge of lean management is more likely to ensure a proper application of lean management than the training of employees. Like in the first focus group, in order to prevent social desirable answers and increase the credibility of the research, the participants were told at the beginning of the focus group that I am only interested in what they think and feel (Symon & Cassell, 2012).

The focus group is recorded with permission and transcribed and the same advantage and disadvantage (and proposed measure to deal with the disadvantage) of recording and transcribing the focus group apply in this case.

3.3. Data analyses.

The data from the three different focus groups was analysed separately, as advised by Symon and Cassell (2013). The advantage of analysing the data of the focus groups separately was that it enabled to compare the results of the focus groups. This was especially relevant for comparing the results of focus group two (with members of a project) and focus group three (with members of a care line), since it was expected that there might be a difference between the two when measuring the lean management performance. A difference was expected since as aforementioned, a project group, in contrast to a care line, has a pre-defined timeframe and a specific goal to be reached within that timeframe (Bos & Harting, 2006). Therefore, first of all, it was doubtful whether it was feasible to gather the data on all the indicators in the different perspectives for the project group, given the on general short pre-defined timeframe of projects. Second of all, it was doubtful whether the indicators in the process perspective were informative for the project group, since a project has normally a specific goal, which can deviate from the indicators proposed in the process perspective.

In the results section of focus group one, the number of green cards, orange cards and red cards for reach perspective and indicator was registered based on the audio recording. Quotes were used to support the card choice of the participants regarding the adequacy of the indicator or perspective for measuring the lean performance of Karakter. Quotes were also used to illustrate the discussions regarding the definition of the indicators and perspectives, and to express which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance.

In the results section of focus group two and three, quotes were used to express the informative value of the perspectives and indicators for measuring the lean performance of the project and care line and to express which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance.

3.4. Research ethics.

Before starting the focus groups, an informed consent form was provided to the participants (which they all signed) in which was explained that ethical research will be conducted (see appendix ten on page 115 for the informed consent form). The purpose of the focus groups, the reason why the participants have been chosen and the practicalities and logistics of both the focus groups were made clear beforehand to prevent ambiguities. It is frustrating for the participants to be part of a time-consuming focus group without knowing the above mentioned facets (Symon & Cassell, 2012; Krieger & Casey, 2000).

At the beginning of the focus groups, I have emphasized that I am glad with the attendance of the participants and that their inputs are highly appreciated. I also emphasized that I am only interested in their opinions and that there are no good or wrong answers and that the participants have the freedom to withdraw from the research at any time. This was done in order to provide the participants a feeling that their honest inputs are highly appreciated (Oliver, 2010).

The names of the participants of the focus groups were not used in this thesis to respect their anonymity (Oliver, 2010). Of course, it was not possible to guarantee the anonymity of the participants towards the other participants of the focus group, since they knew from each other who said what. However, the anonymity is guaranteed towards people who were not part of the focus group. This is important since when the anonymity is not respected, respondents might be punished by their superiors in case they reveal negative (but valuable) information about their organization or superiors (Symon & Cassell, 2012). For example, when a participant of focus group one indicated that she felt a lack of support from the top of the organization in applying lean management. She could get punished by the top of the organization when her anonymity is not respected. Respecting the anonymity will also contribute to the prevention of social desirable answers, since the participants are more likely

to provide answers that represent their honest thoughts when they know that their anonymity is respected (Symon & Cassell, 2012). The confidentiality in this thesis is respected by ensuring the participants of the focus groups that the data will only be used in this thesis and that only my supervisors and fellow students are able to read this thesis (Oliver, 2010). Next to respecting the perspective of the participants, a valuable side effect of respecting the confidentiality is that the participants might be more willing to reveal their real thoughts if their confidentiality is respected (Oliver, 2010). Since Karakter is specialized in child and youth psychiatry and during the focus group it might be the case that information about patients may be discussed, it is very important to guarantee anonymity and confidentiality.

The participants is promised that all data will be analysed accurately and that a general feedback of the results of this thesis will be provided to them (Oliver, 2010).

4. Results.

The results section of this thesis consists of two parts. In the first part, the results of focus group one are discussed, while in the second part the results of focus group two (with participants of a project) and three (with participants of a care line) are discussed and compared. In general, the information provided in this section presents the central message of the participants.

4.1. Results focus group one.

Customer perspective and related indicators:

Table 4: Customer perspective

Perspectives and indicators	Number of green cards 	Number of red cards 	Number of orange cards 
Customer perspective	9	0	0
Customer satisfaction	8	0	1
Service quality	9	0	0

The participants are positive about measuring the lean performance of Karakter through indicators in the customer perspective, as shown by the nine green cards in table four. The following quote of a participant, which nobody objected to, illustrates this: *“I think there is no discussion about the usefulness of this perspective. You are doing it for the customer in every organization”* (FG 1, Head of HR, 15:10-15:18). This quote is chosen since it represents the central message of the participants.

The indicator customer satisfaction is also found to be valuable for measuring the lean performance of Karakter, given that eight green cards are used by the participants and only one orange card is used, as shown in table four. One participant indicated that the creation of customer value is central in lean management and healthcare organizations, and that the customer satisfaction represents the creation of value for the customers well. Therefore, the indicator is informative for measuring the lean performance of Karakter according to this participant (FG 1, Lean management expert PVI 1, 32:44-32:51). Nobody objected to this statement. However, regarding the definition of the indicator, the participants were not satisfied with the proposed definition visualized in table two of this thesis. The definition of customer satisfaction used in this thesis: *“the perceptions of customers about whether the products or services they received are worth more than the price they paid”* (Tracey, 1996), is

too much focused on the profit sector according to a participant, since the focus in the definition is on a cost-benefit analysis. Nobody objected to the statement of the same participant that the satisfaction of the customers regarding whether their goal is reached or whether their question is answered better represents the concept of customer satisfaction (FG 1, Information expert 1, 33:15-33:29). One participant indicated that 'the degree to which customers recommend Karakter to other customers' is more specific and therefore more informative than the broad concept of customer satisfaction (FG 1, Head of HR, 33:59-34:15). Nobody objected to this statement. The indicator is therefore tested in focus group two and three.

Currently, it is only possible to answer the questions regarding the customer satisfaction with yes or no. One participant argued that it is better to have a broader scale, like a numerical five-point Likert Scale. The norm value and critical value should be four in that case according to the participant (FG 1, Head of HR, 36:02-36:25). Nobody objected to this proposal.

When showing the service quality as an indicator, the participants indicated that they think that this indicator is valuable for measuring the lean performance of Karakter (nine green cards). The discussion made clear that the service quality is one of the five themes of customer satisfaction. This means that the measurement and related norm value and critical value are the same as in the former indicator (score of four).

Employee perspective and related indicators:

Table 5: Employee perspective

Perspectives and indicators	Number of green cards 	Number of red cards 	Number of orange cards 
Employee perspective	9	0	0
Employee commitment	8	0	1
Absenteeism	4	1	4
Employee training	5	0	4

The employee perspective received nine green cards of the participants for measuring the lean performance of Karakter, as shown in table five. The following quote illustrates the satisfaction of a participant with the employee perspective in measuring the lean performance

of Karakter: *“We are talking about service provision. The relationship with the customer is extremely important because of the direct contact between the employees and customers. In the product sector, the relationship with the customer is of less importance since there is no direct contact with the customer”* (FG 1, Head of HR, 16:35-16:50). This quote is chosen since it represents the average opinion, because all participants were aware of the important role of employees in healthcare organizations. The important role of employees in the application of lean management is stressed as well, as illustrated by the following quote: *“If the employee do not feel, see or do it, the application of lean management is not going to work”* (FG 1, Project owner, 15:59-16:06). This quote is chosen since it is the most passionate quote. The quote illustrates that the participant is passionate about the role of the employees in the successful application of lean management and that it is therefore informative to take the employee perspective into account when measuring the lean performance of Karakter.

The employee commitment as an indicator is also found to be valuable for measuring the lean performance of Karakter, since eight participants used a green card and only one participant used an orange card, as shown in table five. Nobody objected (even not the participant with the orange card) to the statement of a participant that if lean management is applied well, the employees do not have to perform unnecessary and invaluable tasks anymore and can do what they like to do: taking care of the patient. This in turn positively influences the employee commitment according to the participant. Therefore, employee commitment is considered to be a valuable indicator for measuring the lean performance of Karakter according to this participant (FG 1, lean management expert PVI 2, 52:04-52:21). The following quote clarifies the importance of a high score on the level of employee commitment: *“I think that both the norm value and critical value should be four. The employee commitment is really crucial”* (FG 1, Project owner, 54:00-54:11). This quote is chosen since it once again represents the central message of the participants. By emphasizing that the critical value should have the same score (four) as the norm value on a numerical five-point Likert Scale, it indicates how important a high score on the employee commitment is. Nobody objected to this statement.

Regarding the absenteeism indicator, four participants used a green card, four participants used an orange card and one participant used a red card, as shown in table five. One participant who used a green card argued the following: *“If you apply lean management well, the employees will have more fun in performing their job since they can focus more on taking care of the customers, whereby the absenteeism level is expected to go down”* (FG 1, Lean

management expert PVI 2, 57:22-57:30). This quote is chosen since it represents the average opinion. Because a proper application of lean management contributes to a lower absenteeism level, it is informative to measure the lean performance of Karakter with this indicator. However, almost 50 percent of the group is doubting whether the indicator is informative for measuring the lean performance of Karakter, as indicated by the following quote: *“It might be a good indicator. However, the indicator is a ‘negative’ indicator since it indicates that you are not able to do your work and therefore it will not have my preference. I also see the level of training of employees as an indicator, which is more informative in my opinion”* (FG 1, Care line manager, 59:28-59:39). This quote is chosen since it represents the critical central point of the participants using a orange or red card regarding the indicator. The quote shows that the absenteeism indicator is not preferred since the participant argues that absenteeism sounds negative, since it measures that you are not able to do your work. The participants with orange and red cards did not object to this statement.

One participant suggested another indicator of the list which was provided to the participants at the beginning of the focus group: training of employees. Consequently, I asked the participants to use the green, orange and red card to express their opinion regarding the informative value of the training (in lean management) of employees indicator for measuring the lean performance of Karakter. Five participants used a green card and four an orange card, which again indicates mixed feelings regarding the informative value of this indicator for measuring the lean performance of Karakter. One participant argued that the indicator is valuable since a successful application of lean management is depending on the development of the employees (FG 1, Head of HR, 60:05-60:12). However, a participant who used a red card argued that training of employees does not guarantee a proper application of lean management. Therefore, the participant is not excited about this indicator (FG 1, Lean management expert PVI 1, 60:20-60:31). The training of employee indicator is tested in focus group two and three.

Process perspective and related indicators:

Table 6: Process perspective

Perspectives and indicators	Number of green card cards 	Number of red cards 	Number of orange cards 
Process perspective	6	1	2
Lead time	5	0	3
Waiting time	8	0	0

At first, the participants were not all convinced about the informative value of the process perspective for measuring the lean performance of Karakter. Six participants used a green card, but two participants used an orange card and even one a red card, as shown in table six. However, after asking why some participants had some doubts about this perspective, it became clear that they thought the perspective was focused on how they are performing their processes at the moment. At the moment, the participants are not satisfied with the processes and therefore two participants used an orange card and even one participant a red card. After explaining to the participants that the perspective is aimed at measuring the performance regarding the processes and not on how the current processes are performed, all participants agreed on that the perspective is valuable for measuring the lean performance of Karakter.

There was a valuable discussion regarding the definition of the indicator lead time visualized in table two of this thesis: “The lead time is about the time an organization receives an order to the time it actually delivers the product or service to the customer” (Kaplan & Norton, 1996). Nobody objected to the statement of a participant that the timeframe from when the organization receives a service till the end of the service better represents the concept of lead time, than the definition used in table two of this thesis (FG 1, Information expert 1, 64:02-64:10).

At first, five participants used a green card and three participants used a orange card for the indicator lead time, as shown in table six. A participant who used a green card argued that measuring the lead time provides the organization insights on how the current processes are performed, which is a valuable starting point for improvement (FG 1, External lean management expert, 66:10-66-21). The participants who used a orange card argued that there might be external factors that influence the lead time which are out of their control. Therefore, they were not intrinsically motivated in performing their job, to measure the lean performance with this indicator (FG 1, Information expert 1, 67:27-67:35). An example of a participant regarding how to deal with those external factors was crucial in convincing the doubting participants and ensured that the participants were highly intrinsically motivated in performing their job, to measure the lean performance with the indicator. The example was about a patient who had to start chemotherapy. The patient wanted to go on a holiday before starting the treatment. This extended the lead time, but also created value for the patient. This extra vacation time could be taken into account by for example extracting the vacation time from the total lead time in order to calculate the actual lead time according to the participant

(FG 1, Lean management expert 1 PVI, 68:45-68:55). The indicator allowed the participants to focus on in their job what is important in lean management: (reducing) the lean time.

Nobody objected to the statement of a participant that no general norm value and critical value of the indicator lead time can be provided (FG 1, Lean management expert PVI 2, 69:05-69:10).

The waiting time is considered to be informative for measuring the lean performance of Karakter by all the participants, as shown by the eight green cards visualized in table six. Nobody objected to the statement of a participant that currently the waiting time is registered insufficiently, but that it is valuable to measure it (FG 1, Project owner, 70:02-70:12). Nobody also objected to the statement of a participant that it is valuable to take into account both the waiting time on a list and the and the waiting time in a ‘waiting room’ (FG 1, Information expert 2, 70:31-70:39). Again, it is relevant to take into account external factors that extend the lead time in order for the participants to be intrinsically motivated in performing their job, to measure the lean performance with this indicator. Also, like with the lead time indicator, the norm value and critical value are depending on each patient group or care line (FG 1, Project owner, 71:30-71:40).

One participant indicated that the ‘first time right ratio’ also might be a valuable indicator for measuring the lean performance of Karakter. Karakter can book a lot of progress in doing something the first time right according to this participant (FG 1, Project owner, 72:51-73:01). All participants agreed with this notion and therefore this indicator is tested in focus group two and three.

Continuous improvement perspective and related indicators:

Table 7: Continuous improvement perspective

Perspectives and indicators	Number of green cards 	Number of red cards 	Number of orange cards 
Continuous improvement perspective	6	0	3
Specific rates of improvement for the indicators	4	1	3
Total number of suggestions/total employees	2	2	4

There were some doubts about the informative value of the continuous improvement perspective for measuring the lean performance of Karakter. Six participants used a green card, but three participants used an orange card, as shown in table seven. The following two quotes are chosen since they again represent the central message of the participants. A participant who used a green card argued the following: *“Continuous improvement is central in lean management and therefore it is important to measure whether continuous improvement takes place”* (FG 1, lean management expert PVI 2, 24:01-24:13). The following quote illustrates the opinion of a participant who used an orange card: *“I think that continuous improvement should be a norm in the organization. If you only focus on the other four perspectives, you have already incorporated continuous improvement by setting new targets for yourself.... I am getting itchy from judging employees whether they have reached new targets in continuous improvement”* (FG 1, Care line manager, 19:34-20:05). The last quote represents an opinion nobody objected to and even convinced the participants that used a green card at first. The participants with a green card agreed on that continuous improvement should only be a norm in the organization since they do not like to measure whether new targets are reached as well. By using the word ‘itchy’, it can be concluded the intrinsic motivation of the participant in performing his job is negatively influenced, since the participant does not feel comfortable by judging employees on whether they have reached new targets. This reasoning is in line with the research of Kallio and Kallio (2014), who have empirically shown that employees do not feel comfortable in being controlled in their performance. The participant emphasized that in the other perspectives the continuous improvement can also be taken into account and that it is possible to set new to be reached targets in the other perspectives. Therefore, it can be concluded that the participants think that it is unnecessary to measure the score on this indicator in their daily work.

The indicator ‘specific rates of improvement for the indicators in the other perspectives’ received four green cards, three orange cards and one red card, as shown in table seven. The following quote represents the opinion (which represents the central message of the participants using a green card) of a participant who used a green card: *“The indicator stimulates to continuously improve your current processes and is therefore relevant in my opinion”* (FG 1, External lean management expert, 75:08-75:14). However, one participant did not agree with this notion, as indicated by the following quote: *“I am becoming itchy from measuring whether new targets on the indicators are reached. I agree that it is valuable to set*

targets, but you should not focus on measuring whether those new targets are reached”(FG 1, Care line manager, 82:50-83:00).

The ‘total number of suggestions/total employees’ indicator is also not considered to be valuable for measuring the lean performance of Karakter, given that only two participants used a green card, four participants used an orange card and even two participants a red card. A participant who used a green card argued that he expects from each employee to suggest improvements and that it is therefore fair to judge each single employee on the number of improvement suggestions proposed (FG 1, Head of HR, 87:35-87:48). However, the following quote (which is chosen since it represents the average opinion) of a participant indicates that this indicator is not informative at the moment, but might be informative for measuring the lean performance of Karakter in the future: *“Again we arrive at the 2.0 indicator. If we have reached a certain culture in which people are not afraid to admit mistakes and share them among colleagues, this indicator might be valuable. But at this moment, I feel uncomfortable to judge people on the number of suggestions they have provided”* (FG 1, Lean management expert PVI 2, 95:00-95:12).

Financial perspective and related indicators:

Table 8: Financial perspective

Perspectives and indicators	Number of green cards 	Number of red cards 	Number of orange cards 
Financial perspective	5	1	3
Operating income	0	3	5
Return on investment	5	0	3

At first, there were mixed feelings regarding the informative value of the financial perspective for measuring the lean performance of Karakter. Five participants used a green card, but three participants used an orange card and even one a red card, as shown in table eight. A participant who used a red card argued the following: *“I personally think that the benefits of lean management can be better measured in non-financial benefits”* (FG 1, Information expert 1, 26:44-26:53). Consequently, a participant with a green card reacted (and represented the other participants with a green card) and argued that non-financial benefits are already incorporated in the other perspectives and provided an informative example to explain how the financial benefits of lean management can be measured at Karakter, which convinced the other participants about the informative value of this perspective for measuring the lean

performance of Karakter. The example was about registration forms. The registration forms are often not completed and therefore the employees have to contact the customers again for additional information. This extra work of the employees can be expressed in 'lost' time and money, which could possibly be spent in other valuable tasks (FG 1, Project owner, 27:33-28:00).

The operating income indicators was not found to be valuable for measuring the lean performance of Karakter. Five participants used an orange card and three participants even used a red card, as shown in table eight. The following quote illustrates why a participant thinks that this indicator is not informative for measuring the lean performance of Karakter: *"I really think that this is a profit sector indicator. In our sector, the financial picture is a means to an end and not the other way around"* (FG 1, Information expert 1, 98:50-99:01). Again, the quote is chosen since it represents the central message of the participants who doubted the informative value of this indicator for measuring the lean performance. The quote clarifies that calculating the operating income does not suit healthcare organizations like Karakter, since the goal is not about generating income.

At first, there were some doubts about the informative value of the 'return on investment' indicator for measuring the lean performance of Karakter. Five participants used a green card, but three participants used an orange card, as shown in table eight. The three participants used an orange card since they had some doubts in measuring the lean performance in money, as illustrated by the following quote (which represents the average opinion): *"I hesitate since I think that the benefits can also be measured in other facets than only in money. Not everything can be measured in money"* (FG 1, Information expert 1, 107:00-107:10). The quote illustrates that the participant is not excited about only measuring the performance in money. Consequently, again a participant (who used a green card) reacted and argued that the non-financial benefits are already incorporated in the other perspectives. Thereafter, the same participant provided an informative example in how the return on investment can be calculated, to which no participant objected. The example was about the return on an investment regarding a project, which was planned to deliver a return on investment of 300 percent (FG 1, Project owner, 107:30-108:05). This means that in measuring the lean performance of Karakter, the return on investment indicator should be interpreted as the financial benefits an investment in lean management delivers.

4.1.6. Input for focus group two and three

Table nine, which is visualized below, represents the refined set of perspectives and related indicators for measuring the lean performance of Karakter. In comparison to the set of perspectives and related indicators visualized in table three of chapter two, there are a couple of differences. First of all, the continuous improvement perspective has a different role. In table nine, continuous improvement should constantly take place in the other perspectives and related indicators, but the indicators of the continuous improvement perspective are left out, in order to minimize negative effects on intrinsic employee motivation. Therefore, the perspective is placed vertical next to the other perspectives instead of horizontal like the other perspectives. Second of all, the degree to which customers recommend Karakter to other customers, the employee training and first time right ratio are added to respectively the customer perspective, employee perspective and process perspective, since they were suggested as relevant in the first focus group for measuring the lean performance of Karakter. These are called to be tested in the second and third focus group. Fourth of all, the absenteeism indicator and operating income indicator are left out, in order to minimize negative effects on intrinsic employee motivation.

Table 9: Refined set of perspectives and related indicators

Perspectieven		Indicatoren
Continuous improvement	Customer perspective	The degree to which customers recommend Karakter to other customers
		Service quality
	Employee perspective	Employee commitment
		Training of employees
	Process perspective	Lead time
		Waiting time
		First time right ratio
	Financial perspective	Return on investment

4.2. Results focus group two and three.

4.2.1. Results focus group two: the application of the indicators and related perspectives in a project.

Customer perspective and related indicators:

While discussing the customer perspective and related indicators with the participants, an interesting discussion emerged among the participants regarding who the customers are of their project. Normally, the patients are the customers of Karakter, but in their project, the

participants came to the conclusion that also the municipality and general practices are customers. A participant indicated that it is important to measure the lean performance by means of the customer perspective and related indicators for all three kind of customers, as illustrated by the following quote, to which nobody objected: *“I think that it is very important to take into account all three customers in measuring the lean performance, since the customers are central in our organizations and in the philosophy of lean management”* (FG 2, Project owner, 09:15-09:21). The quote is chosen since it represents the average opinion of the participants in the focus group. Each project can have multiple customers, whereby it is important to take them all into account according to the participants.

One participant indicated that the service quality indicator is informative but might be more specific, by subdividing it in multiple items (FG 2, Financial expert, 11:03-11:10). No participant objected to this proposal.

'The degree to which customers recommend Karakter to other customers' indicator is also informative for measuring the lean performance of their project according to a participant, since when customers recommend Karakter to other customers, it is a sign of a high satisfaction of the customers (FG 2, Head of HR, 12:21-12:30). Nobody objected to this statement.

There were some doubt about the feasibility to measure the scores on the indicators for the municipality and general practices as customers, given that the current customer survey of Karakter is only focused on patients. This means that time and money is needed to ensure that this data can be gathered. A participant indicated that this is worth the time and money, as illustrated by the following quote, to which nobody objected: *“I think that it is worth it. You can have a nice project, but if the customer is not satisfied, you have a problem. So I would invest in ensuring that the insights of the municipality and general practices can be gathered”* (FG 2, Policy advisor, 13:05-13:15). This quote is chosen since it represents the average opinion of the participants. This quote made clear that although there is consensus among the participants that it is valuable to gather the data for all three customers, time and money is needed to realize this.

In general, the participants are intrinsically motivated in performing their daily job when the lean performance is measured with the customer perspective and related indicated, as

illustrated by the following quote: *“It stimulates me to go on when I see progression on the customer indicators”* (FG 2, Care line manager, 20:10-20:14). This quote is chosen because it again represents the average opinion of the participants. All participants were excited about the foresight to continuously improve the scores on the indicators in the customer perspective and to see this. This finding is in line with the research of Behn (2003).

Employee perspective and related indicators:

The employee perspective is important to take into account when measuring the lean performance of the project according to a participant, as illustrated by the following quote, to which nobody objected: *“The employees are the instruments to make this lean project successful. So therefore it is also very important to measure the lean performance in this perspective”* (FG 2, Project owner, 27:25-27:35). This quote is chosen since it was the most passionate quote. The participant was very passionate about the role of the employees in the application of lean management in a project and made the other participant also very passionate about the importance of their own role in the application of lean management.

When discussing the informative value of the training of employees indicator, a more informative indicator was suggested by a participant. A participant indicated that the training of employees indicator is certainly valuable, but that the general knowledge regarding lean management is more informative to measure, since the general knowledge says more about the ability to perform the tasks in the project than the amount of training. For example the experience, which is very important in conducting the tasks regarding lean management in a project, is not captured by the indicator training of employees. The experience is captured by an indicator focused on the general knowledge of the participants and therefore preferred by the participant (FG 2, Head of HR, 24:40-24:58). No participant objected to this suggestion.

One participant argued that the employee commitment is a valuable indicator for measuring the lean performance of their project, but that it is important to only measure the commitment of the employees regarding the project and not towards the organization Karakter in general (FG 2, Head of HR, 27:33-27:42). Nobody objected to this statement. The current survey list for measuring the employee commitment is too broad according to another participant. This participant indicated that a new and shorter list should be searched or developed, as illustrated by the following quote: *“We have to invest in a new tool that measures the employee commitment, but I think that it is valuable to invest time and money in it. The employee*

commitment is crucial in the success of the project” (FG 2, Lean coach 1, 32:20-32:30). This quote is chosen since it once again represents the average opinion. By using the word ‘crucial’, it becomes clear that the participant thinks that it is only valuable to measure the lean performance with this indicator when time and money is invested in a new shorter employee commitment survey. Nobody objected to this proposal. The participants indicated to be intrinsically motivated to perform their job when the lean performance is measured with the indicators of the employee perspective, because of the progression on the scores of the indicators which can be tracked and because it allows them to focus on the important role of employees in lean management in their job (FG 2, Project owner, 34:01-34:11).

Process perspective and related indicators:

The participants had some doubts about measuring the lean performance of their project by means of the process perspective and related indicators. In their project description, the participants have explicitly described that although the waiting time and lead time are interesting to measure, the waiting time and lead time are not of central focus in their project. They want to focus on the waiting time and lead time in a future project. One participant indicated that the ‘first time right ratio’ is valuable for measuring the lean performance of their project and any other project, as illustrated by the following quote: *“The first time right ratio is applicable in every project in my opinion. However, the relevance of the waiting time and lead time indicator is depending on the kind of project”* (FG 2, Policy advisor, 38:55-39:05). The quote is chosen since it represents the average opinion. Multiple participants indicated that the first time right ratio is applicable in every project, in contrast to the waiting time and lead time indicator. The indicator is found to be valuable to track in the daily jobs of the participants, since it can help to design a flow. The same participant provided an example regarding the application of the first time right ratio to the registration forms, in which it is very important to fill in those forms correctly the first time. The participants agreed on that it is only valuable to apply this indicator to the administrative part of the organization.

There was a discussion among the participants whether it might be valuable to measure if the deadline of a project is met. As mentioned before, an important characteristic of a project is the presence of a pre-defined timeframe (Bos & Harting, 2006). One participant indicated that this indicator might provide valuable insights for the planning of future projects (FG 2, Head of HR, 40:05-40:14). However, only one participant slightly doubted this suggestion and argued that it is more important to adjust while performing the project than measuring

whether a deadline is reached or not (FG 2, Policy advisor, 42:13-42:20). It is therefore doubtful whether this indicator is informative for measuring the lean performance of Karakter.

The participants were only intrinsically motivated in performing their daily jobs, when they could see the progress made on the process indicators (Behn, 2003), as indicated by the following quote: *“The process indicators are very frustrated when it does not work to realize improvements. However, if you realize improvement and you can see that, it really motivates”* (FG 2, Head of HR, 44:57-45:10). This quote is chosen since it represents an opinion all participants could identify with. All participants indicated that it is hard to improve the score on the process indicators like the waiting time, and that it intrinsically motivates in performing their job when progress is booked on the score of the process indicators.

Financial perspective and related indicator:

The return on investment indicator is informative for measuring the lean performance of their project, as indicated by the following quote of a participant: *“Our whole project is focused on what the benefits and costs are. We have calculated the return on investment beforehand”* (FG 2, Project owner, 46:33-46:39). This quote is chosen to show that the participants of the focus group already agreed on the informative value of this indicator for measuring the performance of their lean management project before this research was started. This shows that this indicator has a high informative value for measuring the lean performance of healthcare organizations.

The participants were also intrinsically motivated in performing their daily jobs when the score on the return on the investment regarding lean management indicator can be tracked, as indicated by the following quote: *“If not enough benefits are captured by an investment, we can loss our job. So therefore it is important to measure what each investment delivers”* (FG 2, Lean coach 2, 50:01-50:10). This quote is chosen since it was the most ‘freak’ opinion. In contrast to other participants who indicated to be intrinsically motivated to measure the lean performance with this indicator, the participant was only motivated to measure this indicator with the aim to secure its own job.

Continuous improvement perspective:

All participants indicated that it is valuable to ensure continuous improvement in their project. However, it was to a large extent unclear how it can be ensured that continuous improvement will take place. One participant suggested the idea to make one employee of a team responsible for ensuring that continuous improvement will take place, but to also ensure that

the other members of the team do feel responsible for continuous improvement. No participant objected to this proposal (FG 2, Care line manager 1, 57:03-57:14).

4.2.2. Results focus group three: the application of the indicators and related perspectives in a care line.

Customer perspective and related indicators:

The customer perspective and related indicators are informative for measuring the lean performance of the care line, as indicated by the following quote of a participant, to which nobody objected: *“You are doing it for the customers at Karakter and in lean management”* (FG 3, Secretary, 16:10-16:19). The quote is chosen since it represents the average opinion of the participants. The participants indicated that the customers are central in lean management and in Karakter and therefore important to take into account. Another participant also indicated that it is very important to measure the lean performance with the customer perspective and related indicators, since the insights of the customers can be a valuable starting point for improving the current processes (FG 3, Care line manager 1, 20:03-20:13).

All participants indicated that the degree to which customers recommend Karakter to other customers and service quality indicator are informative for measuring the lean performance of their care line. One participant indicated that the service quality indicator could be made more specific and was not intrinsically motivated in performing his job to measure the lean performance with this indicator when it is formulated so broadly (FG 3, Financial expert, 21:13-21:24). No participant objected to this statement.

A concern was expressed by a participant regarding the low response rate of the customer survey (FG 3, Care line manager 2, 23:15-23:24). Consequently, an intense discussion emerged regarding how the response rate can be improved. One participant proposed to put the survey on an Ipad, in which the customer can fill in the survey at the latest treatment. The idea is that customers are probably more willing to fill in the survey when they are waiting for their last treatment, than at home when their treatment is already finished (FG 3, Secretary, 24:22-24:30). No participant objected to this proposal.

One participant was also intrinsically motivated in performing its daily job when the scores on the indicators in the customer perspective are tracked. The following quote, to which no participant objected, illustrates this: *“The insight that I can continuously improve the processes motivates me. Especially when those improvements are visualized”* (FG 3, Care line manager 2, 25:33-25:45). The quote is chosen because it represents the average opinion of all

participants. The quote shows that the opportunity to see progress on the score of the indicators intrinsically motivates the participant in performing their job to measure the lean performance in this way. Again, this finding is in line with the research of Behn (2003).

Employee perspective and related indicators:

The employee perspective and related indicators are informative for measuring the lean performance of the care line according to a participant, as illustrated by the following quote: *“The employees are the ones who have to apply lean management and are therefore very important to take into account”* (FG 3, Care line manager 2, 38:00-38:06). Again, the quote is chosen since it represents the average opinion of the participants.

The employee commitment indicator was also considered to be informative for measuring the lean performance of the care line. However, according to a participant, the survey list of the employee commitment is too long and not often enough divided among the employees of Karakter. According to this participant, time and money should be invested in producing a shorter survey list. This list should be more often divided among the employees (FG 3, Financial expert, 40:01-40:16). No participant objected to this proposal.

At first, not all participants were convinced about the informative value of the training of employees indicator, as indicated by the following quote: *“I do not see the connection between lean management and employee training”* (FG 3, Care line manager 1, 41:33-41:45). This quote is chosen since it shows a critical point regarding the proposed training of employees indicator. However, when a participant suggested that it is important to take into account this indicator since a sustainable applications of lean management is only possible when the employees have opportunities to develop themselves regarding lean management, no participant objected to the statement that the indicator is informative for measuring the lean performance of their care line (FG 3, Care line manager 1, 42:35-42:45). Consequently, I played the role of devil’s advocate by questioning whether training of employees is sufficient for a proper application of lean management. A participant reacted on my statement and argued that the general knowledge regarding lean management is more likely to ensure a proper application of lean management. However, the participants indicated that the broad concept should be specified in order to be intrinsically motivated in performing their daily job to measure the lean performance with this indicator (FG 3, Care line manager, 43:10-43:20).

Process perspective and related indicators:

It is valuable to measure the lean performance of the care line with the process perspective and related indicators according to the participants. One participant was also intrinsically motivated in performing his daily job to do this, as illustrated by the following quote: *“I am becoming very enthusiastic about measuring the lead time. Shall you (care line manager) and I together spend more time on gathering data on the lead time? I can sent you the data on the lead time each month if you want?”* (FG 3, Financial expert, 43:40-43:51). This quote and the next quote are chosen since they are the most passionate quotes. Because the participant suggested a concrete appointment to gather data on the lead time indicator, it shows that the participant is extremely intrinsically motivated and passionate in performing his job, to measure the lean performance of their care line in this way. Especially when the improvements on the lead time are visualized, as illustrated by the following quote: *“I really motivates me to go on when the progress on the lead time indicator will be visualized”* (FG 3, Care line manager, 44:48-45:02). The quote is in line with the research of Maier (2004), in which is shown that the visualization of results can help motivating the employees to go on.

One participant indicated that the waiting time is a valuable indicator for measuring the lean performance of the care line. However, some information about the waiting time in the current processes is hard to gather. Therefore, time and money is needed to be able to gather this data, which is valuable to do, as illustrated by the following quote: *“If we decide to invest time and money to gather more data about the waiting time, it will be worth will, since it provides a starting point for shortening the waiting time”* (FG 3, Lean coach, 46:27-46:37). This quote is chosen since it presents the central message of the participants.

One participant also suggested to count how many times customers have to wait in the waiting room more than ten minutes. Consequently, a concrete appointment was made to register this information, which again clarifies that the participants are intrinsically motivated in their daily job to measure the lean performance of their care line in this way (FG 3, Secretary, 47:10-47:19). Finally, a participant indicated to be more intrinsically motivated in performing its daily job when the broad concept of waiting time is specified (FG 3, Care line manager 1, 49:00-49:11). No participant objected to this advise.

The first time right ratio was also considered to be valuable according to a participant, since performing something right the first time can deliver the care line a lot of extra time. This

extra time can be spent in other valuable tasks according to the participant (FG 3, Therapist, 52:03-52:14).

Financial perspective and related indicator:

The financial perspective and related return on investment (financial benefits achieved through investment in lean management) indicator are informative for measuring the lean performance of the care line according to a participant. The participant indicated that the investments in the program of continuous improvement have delivered valuable financial benefits in the last two years. However the care line has not explicitly calculated these financial benefits, as shown by the following quote: *“The investment in continuous improvement has delivered a lot of financial benefits. However, we have not calculated these benefits and this indicator stimulates to do so. Therefore the score on the indicator might convince doubters about the importance of the program of continuous improvement”* (FG 3, Financial expert, 60:51-61:03). The quote is chosen since it is the most passionate quote. The participant indicated to be intrinsically motivated (passionate) in performing her job to calculate the score on this indicator, since it can help convince doubters about the value of continuous improvement for their care line.

One participant was at first not convinced about the return on investment indicator since the participant argued that not all benefits of an investment can be expressed in financial benefits. Another participant reacted on this statement and argued that in the other perspectives the non-financial benefits are already incorporated, which convinced the doubting participants (FG 3, Financial expert, 62:03-62:15).

Continuous improvement perspective:

One participant indicated that continuous improvement should be a norm within their organization and care line (FG 3, Care line manager, 63:15-63:29). The participant sees an important role for the supervisors, who have to stimulate employees of the care line to continuously improve their own processes, since the employees have a proper insight in their daily processes (FG 3, Care line manager 2, 64:55-65:03).

One participant indicated that it is hard to measure the degree of continuous improvement, since it is a culture within the organization (FG 3, Care line manager 1, 65:30-65:40). The same participant proposed to count how many improvement suggestions are provided by the

employees to measure the degree of continuous improvement. However, this idea was not embraced by the other participants, since they are becoming itchy from the idea to measure whether the proposed improvements are reached (FG 3, Secretary, 66:30-66:45). This illustrates that the participants are not intrinsically motivated in performing their job, to measure the degree of continuous improvement, since it feels like being controlled (Kallio & Kallio, 2004).

Finally, a participant indicated that it is valuable to have continuous improvement time for each employee. However, the participants do realize that this is part of an optimal situation and is something for the future to think about (FG 3, Care line manager 1, 72:33-72:45).

4.2.3. Comparing the results of focus group two and three.

In both a project setting and care line setting, it became clear that it is manageable to gather the scores on the indicators. There are a couple of differences between the results of focus group two and three. The first and biggest difference is related to the process perspective and related indicators. Based on the discussions in focus group two, it is decided that the lead time and waiting time indicator are only optional indicators for the project, while they are obliged in the care line. The reason is that the first time right ratio is always informative for measuring the lean management performance of a project according to the participants, while the informative value of the lead time and waiting time indicator is depending on the self-determined aim of the project, as was expected. The second difference is related to the definition of the indicators of the customer perspective. In a care line, the customer is a patient (external customer). However, the customer of a project is often an internal customer, like a care line. For example when a project is aimed at supporting the managers of a care line in how to perform as a lean management leader. A project can also have an external customer, as for example was the case in the project of focus group two, in which the municipality and general practices were important external customer to take into account. This means that in defining the indicators related to the customer perspective, it is important to focus on internal customers for the care line, and both internal and external customers for the project. The third difference is that in focus group two it is proposed to measure whether the deadline of the project is reached, while this was not proposed in focus group three. It is important to notice that not all participants in focus group two agreed on the informative value of an indicator focused on whether the deadline of a project is met. This is called to be tested in future research.

5. Conclusion and Discussion.

5.1. Conclusion.

The central question “*Which indicators are most informative to measure lean performance in healthcare organizations?*”, and sub question of this thesis “*Which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance in healthcare organizations?*” are answered by an interplay between theoretical and empirical research. The empirical research is conducted through three focus groups at the organization Karakter.

The central question “*Which indicators are most informative to measure lean performance in healthcare organizations?*” can be answered as follows. Table 10, 11, 12 and 13 below present the indicators (related to perspectives) which are informative for measuring the lean performance in a project setting and care line setting in healthcare organizations. Central in the indicators is the creation of customer value, as recommended by the research of the SUN, discussed on page 11 in chapter two. It was relevant to develop a set of informative indicators for measuring the lean performance in a project setting and care line setting, since as mentioned before, in general healthcare organizations only apply lean management in projects and/or care lines. Therefore, by developing a set of informative indicators for both a project group and care line, it is more likely that the results of this thesis are informative for other healthcare organizations (especially child and youth psychiatric institutions) next to Karakter. When there was a difference regarding the application of the indicator in a project or care line setting, this is expressed in the tables 10, 11, 12 and 13.

It is recommended to gather the scores on the indicators each month. Poiesz and Welling (2012) argue that it is important to frequently measure the score on the indicators, in order to be able to undertake appropriate measures and thereby continuously improve the scores on the indicators. After starting to gather the data on the indicators each month, the healthcare organization can evaluate the frequency of gathering the data on the indicators and decide to gather the data on the indicators more often or less often.

Table 10: Indicators related to the customer perspective.

Name indicator: Degree to which customers recommend the healthcare organization to other customers.		Name indicator: Level of service quality.	
Definition: The indicator represents the satisfaction of the customers regarding the service provided by the healthcare organization. Given that customers can choose among different healthcare organizations in the selection made by the local municipality, a recommendation of the healthcare organization can be a stimulation for a customer to choose that specific healthcare organization.		Definition: The indicator represents the satisfaction of the customers regarding the quality of the service delivered. The indicator is a broad concept and therefore some participants were not intrinsically motivated in performing their job to measure the lean performance through this indicator when it is formulated as such. Therefore, in order to minimize negative effects on intrinsic employee motivation or even foster the intrinsic employee motivation, the indicator is specified in multiple themes according to the SERVQUAL scale. The themes of this scale are chosen since the scale is found to be a reliable and valid scale for measuring the service quality in a healthcare setting (Babakus & Mangold, 1992). The themes are reliability (ability to perform the promised service accurately), assurance (knowledge level of employees and their ability to built trust), tangibles (like cleanness of the healthcare organization), empathy (providing individual attention for the customers) and responsiveness (willingness to help customers).	
Project: Definition is focused on internal and external customers.	Care line: Definition is focused on internal customers.	Project: Definition is focused on internal and external customers.	Care line: Definition is focused on internal customers.
Link to LM: Indicator represents the customer satisfaction well, which is central in lean management.		Link to LM: Indicator represents the customer satisfaction well, which is central in lean management.	
Data source: The information regarding the score on this indicator can be gathered from a customer satisfaction survey, in which a question is formulated regarding whether the customers recommend the healthcare organization to other customers.		Data source: The information regarding the score on the indicator can be gathered from a customer satisfaction survey, in which questions are formulated about the service quality.	
Calculating score: The score on this indicator can be calculated by dividing the amount of customers that recommend the healthcare organization to other customers, by the total number of customers.		Calculating score: The score on the indicator can be gathered by calculating the average score the customers provided on for example a numeric Likert-Scale (from one till five) regarding the service quality themes.	
Norm and critical value: The critical and norm score of the indicator should be four (in case a numeric five-point Likert Scale is used) according to the participants, given the important role of the customers in lean management and healthcare organizations.		Norm and critical value: The critical and norm score of this indicator should be four (in case a numeric five-point Likert Scale is used) according to the participants, given the important role of the customers in lean management and healthcare organizations.	

Table 11: Indicators related to the employee perspective.

Name indicator: Level of employee commitment.		Name indicator: level of general knowledge regarding lean management.	Name indicator: Absenteeism rate (only monitored and not actively measured).
Definition: The indicator refers to the psychological attachment of employees to the care line or project and not to the organization in general, since the commitment to the whole organization does not per definition guarantee a proper application of lean management in a project or care line. A proper employee commitment is expected to benefit the creation of value for customers, because committed employees are expected to perform a better job in treating the customers, which creates customer value.		Definition: The indicator represents the ability of the employees to apply lean management well. A proper general knowledge regarding lean management is expected to assist the employees in more efficiently performing their jobs, whereby it is more likely that customer value is created. The level of general knowledge regarding lean management is a very broad indicator and thereby difficult to measure for the employees in their job. Therefore, in order to minimize negative effects on intrinsic employee motivation or even foster the intrinsic employee motivation, the following two questions (which can for example be measured on a numerical five-point Likert scale from 1-5) are formulated to capture the broad concept of general knowledge regarding lean management. 1: Would you like to have more training regarding lean management? 2: Would you like to have more experience regarding the application of lean management?	Definition: The indicator refers to the rate of employees which does not come to work when scheduled. To minimize the negative effects on intrinsic employee motivation, it is recommended to only monitor the absenteeism level instead of actively measuring the indicator, since the participants did not prefer to actively measure the lean performance with this indicator in performing their job. When a high level of absenteeism is monitored, it can be a sign that the application of lean management should be changed in the healthcare organization.
Project: Definition of the indicator is focused on commitment of employees towards a project.	Care line: Definition of the indicator is focused on commitment of employees towards a care line.		
Link to LM: The indicator is informative for measuring lean performance, since committed employees are crucial in the sustainable and successful application of lean management in healthcare organizations.		Link to LM: The indicator is informative for measuring the lean performance, since the knowledge of the employees regarding lean management is a critical factor in the sustainable and successful application of lean management.	Link to LM: A proper application of lean management is expected to reduce the stress level of employees and to increase the pleasure of working. This in turn is expected to reduce the absenteeism level and in turn expected to increase the customer value. If employees have more pleasure and less stress in performing their job in an customer-intensive contact sector, it is more likely that the employees will perform a better job in treating the customers, which will create value for the customers
Data source: The information regarding the score on this indicator can be gathered from an employee commitment survey (specified on either a project or care line).		Data source: The information regarding the score on this indicator can be gathered from the above formulated questions.	Data source: The information regarding the score on this indicator can be gathered from an IT-system.
Calculating score: The score on the indicator can be calculated by calculating the average score the employees provided on for example a numerical five-point Likert Scale regarding their		Calculating score: The score on the indicator can be calculated by calculating the average score the employees provided on for example a numerical five-point Likert Scale regarding these two	Calculating score: The score on this indicator can be calculated by dividing the total number of absenteeism hours

commitment towards a project or care line.	questions.	through the total number of working hours.
Norm and critical value: A score of four on a numerical five-point Likert Scale is the critical and norm value according to the participants, given the critical role of employees in lean management.	Norm and critical value: A score of four on a numerical five-point Likert Scale is the critical and norm value according to the participants, given the critical role of employees in lean management.	Norm and critical value: a rate of 5.8% is the norm and critical value (CBS, 2016).

Table 12: Indicators related to the process perspective.

Name indicator: First time right ratio.	Name indicator: Lead time.		Name indicator: Waiting time.	
Definition: The indicator refers to the percentage of services that is provided right the first time. In healthcare organizations, the indicator is only applicable to the administrative part of the organization, in for example the percentage of registration forms which is correctly filled in by the customers the first time. Performing something right the first time will reduce the timeframe of the care process of the customer, whereby it is more likely that value is created for the customers.	Definition: The indicator refers to the timeframe from when an organization receives a service till the end of the service. Important to notice is that external factors that extend the lead time can be taken into account when calculating the lead time. This is important since at first, some participants were not intrinsically motivated in performing their job when they had to measure the lead time indicator, because of external factors which extend the lead time and are out of their control. Through a shorter lead time, value is created for customers, which is important given the important role of the customers in lean management. ¹		Definition: The indicator refers to the time a customer has to wait before receiving the treatment. One participant indicated to be more intrinsically motivated in performing its job when the waiting time concept is more specified, which is done by the facets waiting time on a list and waiting time in a room. Important to notice is that external factors that extend the waiting time can be taken into account when calculating the waiting time. This is important, since at first, some participants were not intrinsically motivated in performing their job when they had to measure the waiting time, because of external factors which extend the lead time and are out of their control ¹ . Through a shorter waiting time, value is created for customers, which is important given the important role of the customers in lean management.	
	Project: The indicator is optional for measuring the lean performance in a project,	Care line: The indicator is informative for measuring the lean performance in a care	Project: The indicator is optional for measuring the lean performance in a project,	Care line: The indicator is informative for measuring the

¹ It is valuable to track both increases and decreases on the scores of the lead time indicator and waiting time indicator, since an increase (extension of lead time or waiting time) on the score of both indicators can be a valuable starting point to improve the processes, while a decrease (lower lead time and waiting time) on the score of both indicators can be a motivation to continue improving the scores on the indicators.

	because the indicator may not be in line with the aim of the project.	line.	because the indicator may not be in line with the aim of the project.	lean performance in a care line.
Link to LM: The indicator is informative for measuring the lean performance of healthcare organizations, because performing something right the first time right contributes to the creation of a flow, which is the third principle of lean management.	Link to LM: The indicator is informative for measuring the lean performance in healthcare organizations, since the indicator is one of the main targets (to reduce) in lean management.		Link to LM: The indicator is informative for measuring the lean performance in healthcare organizations, since the indicator is one of the main targets (to reduce) in lean management.	
Data source: The information on the score of the indicator can be subtracted from a management system, in which for example information is gathered regarding whether the registration forms are filled in correctly by the customers the first time.	Data source: An employee ((through following a patient, as recommended by Kemper and de mast (2013) in appendix four) or IT-system that registers the time from when an organization receives an order till the end of the service.		Data source: An employee ((through following a patient, as recommended by Kemper and de mast (2013) in appendix four) or IT-system that registers the time from a patient is placed on a list or has to wait in a waiting room.	
Calculating score: The score on the indicator can be calculated by dividing the number of services that is delivered correctly the first time through the total number of services delivered.	Calculating score: The score on the indicator can be calculated by adding up the months, weeks, days, hours, minutes it takes from the moment an organization receives an service till the end of the service.		Calculating score: The score on the indicator can be calculated by adding up the months, weeks, days, hours, minutes a patient is placed on a list or has to wait in a waiting room.	
Norm and critical value: Depending on the care line or project, a critical and norm value of this indicator can be formulated.	Norm and critical value: Depending on the care line or project, a critical and norm value of this indicator can be formulated.		Norm and critical value: Depending on the care line or project, a critical and norm value of this indicator can be formulated.	

Table 13: indicator in the financial perspective.

Name indicator: Return on lean management investment.
Definition: Refers to the benefits reached from an investment conducted in lean management.
Link to LM: Calculating the return on investment in lean management can provide managers of healthcare organizations insides in whether the application of lean management in their healthcare organization is successful or not.
Data source: An employee, who can calculate the benefits and costs of an investment conducted in lean management.
Calculating score: The score on the indicator can be calculated by subtracting the costs of the investment from the gains of the investment regarding lean management, and dividing this value through the costs of the investment. The costs can be calculated by the wage of employees and all other material needed for an investment in lean management, while the benefits of an investment can be expressed in the saved working hours (wage) of employees, which can be used for other valuable tasks.

In answering the sub question “*Which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance in healthcare organizations?*”, it can be concluded that the participants were intrinsically motivated in performing their job when the lean performance is measured with the following seven indicators: degree to which customers recommend the healthcare organization to other customers, the level of service quality, the level of employee commitment, the level of general knowledge regarding lean management, the first time right ratio, the lead time and the waiting time. The participants argued that these seven indicators helped to focus them in their job on what is important in lean management (the creation of customer value, a proper level of employee knowledge and commitment, and the creation of a flow) and where therefore intrinsically motivated in performing their job to measure the lean performance with these seven indicators. Especially the foresight to track the progress on these seven indicators intrinsically motivated the participants in performing their job. The participants were critical about the absenteeism rate indicator, since they were not intrinsically motivated to measure the score on a ‘negative’ indicator in their daily job. However, as aforementioned, the absenteeism rate can provide valuable information about whether lean management is applied well. Therefore, in order to minimize negative effects on intrinsic employee motivation, the absenteeism rate indicator is only monitored instead of actively measured. The participants were both extrinsically (keeping the job) and intrinsically motivated in performing their job (convincing the doubters about the value of continuous improvement), when the lean performance is measured by means of the return on lean management investment. The participants were not intrinsically motivated in performing their job to measure the lean performance with the indicators in the continuous improvement perspective, since it delivered a feeling of being controlled in their job. Besides, the participants argued that continuous improvement can already be incorporated in the other perspectives and related indicators, and therefore argued that tracking the scores on these indicators is only extra work in performing their job. Therefore, the continuous improvement perspective is only placed as a central factor in all the other perspectives and related indicators. In this way, continuous improvement stays central in measuring the lean performance of healthcare organizations, but at the same time, the risk of reducing intrinsic employee motivation is minimized. The managers/lean coaches have an important job in ensuring that the scores on the indicators are continuously improved, by stimulating the employees to continuously improve. Visualization of the scores on the indicators by the managers/lean coaches can help to motivate the employee to continuously improve the scores on the indicators, without providing the employees a feeling that new set

targets have to be reached (which provides a feeling of being controlled in their job according to the participants).

By providing a set of informative indicators (related to perspectives) for measuring the lean performance of healthcare organizations, managers of healthcare organizations are better able to assess the effectiveness and efficiency of applying lean management in their healthcare organization. By providing insights on which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance, the indicators could be defined in such a way that they minimize negative effects on intrinsic employee motivation or even foster intrinsic employee motivation, whereby the literature regarding the development of informative indicators which stimulate the successful and sustainable application of lean management in healthcare organizations, is enriched.

5.2. Discussion.

5.2.1. Theoretical reflection.

The insight that measuring the lean performance through indicators in the customer perspective, employee perspective, process perspective and financial perspective positively impacts intrinsic motivation of the employees in performing their job, is in line with the second dynamic proposed in figure one of this thesis (Behn, 2003). Measuring the lean performance enables to track the progress made on the scores of the indicators, which intrinsically motivates the participants in performing their job (Behn, 2003). Especially the visualization of the improvements on the scores of the indicators contributes to a higher intrinsic motivation of the employees in performing their job, as also empirically shown by Maier (2004). This in turn contributes to the sustainable and successful application of lean management (and hence the lean performance measurement) (Antoni, 1996; Radnor, 2011). However, it is interesting whether the participants are also intrinsically motivated in performing their job to measure the lean performance with the four perspectives and related indicators when no increase on the scores of the indicators is booked. This is called to be tested in future research. The insight from the literature that setting smart goals (as part of the second dynamic proposed in figure one) can also intrinsically motivate the employees, is not mentioned by the participants.

The insight that measuring the lean performance through indicators in the continuous improvement perspective negatively impacts the intrinsic motivation of the employees in performing their job, is in line with the first dynamic proposed in figure one of this thesis (Kallio and Kallio, 2014). Measuring the lean performance with the indicators in the continuous improvement perspective delivers a feeling of being controlled. Therefore, the indicators of the continuous improvement perspective are left out and continuous improvement has a central role in the other perspectives and related indicators (Antoni, 1996; Radnor, 2011).

This research provided two new dynamics from the impact of lean performance measurement on intrinsic employee motivation. First of all, several participants have indicated to be intrinsically motivated to measure the lean performance with the proposed indicators (in the customer perspective, employee perspective and process perspective), since it enabled them to focus on in their job what is important in lean management. Second of all, the participants indicated to be not intrinsically motivated to measure the lean performance with the indicators in the continuous improvement perspective, since it is seen as unnecessary extra work.

5.2.2. Practical reflection.

Recommendations for Karakter

The first recommendation for Karakter is to use a broader scale in measuring the score on the indicators in the customer perspective. At this moment, only a two-point scale is used. However, Preston and Colman (2000) have empirically tested the reliability and internal consistency in the number of response categories (from a two-point Likert Scale to a 11-point Likert Scale) and have shown that a two-points scale provides the lowest reliability and internal consistency score. Preston and Colman (2000) advice to use at least a three-point Likert Scale or five-point Likert Scale in case there is time pressure to fill in the survey list, since these scales are perceived as quick and easy to fill in. The seven, eight, nine, and ten-point Likert Scale provide the highest reliability and internal consistency score (Preston & Colman, 2000). Given the current low response rate Karakter is facing (probably through time pressures of the respondents), it is recommended to expand the current survey list to a three-point Likert Scale or five-point Likert Scale.

The second recommendation is to put effort in increasing the aforementioned low response rate of the customer survey. Currently, the survey is sent to the respondents when their

treatment is finished. According to the participants, this is probably the reason for the low response rate. It could be a possibility to ask the respondents to fill in the survey during their latest treatment on an I-pad. For example when they are waiting for their appointment. If the respondents have no time at that moment, a request to fill in the survey can be sent afterwards to the respondents.

The third recommendation is to use a shorter employee commitment survey and to distribute the survey more often (currently the survey is only distributed once in the two years). The revised version developed and empirically tested by Meyer, Allen, and Smith (1993) to measure the employee commitment, is a valuable survey to use (see appendix 11 on page 116 for the survey list). In the scale three kind of commitments are distinguished, since research has shown that commitment can be characterized by three different forms (Meyer & Allen, 1991). The first one is affective commitment, which refers to the emotional attachment to the organization. The second one is continuance commitment, which refers to commitment based on the costs linked to leaving the organization. The third one is normative commitment, which indicates that a employee stays at the organization because he or she feels that it is the right thing to do (Meyer & Allen, 1991). An advantage of the scale is that it contains only 18 items, which is considerably less than the number of items in the current employee commitment survey, which will save participants time in filling in the survey. The revised version is preferred over the original version, since the revised version is shorter and thereby more likely to be filled in (18 versus 24 items), and also has a high reliability and internal consistency score. Instead of the employee commitment towards the organization, the employee commitment towards the project or care line should be used in measuring the employee commitment, as mentioned before.

A fourth recommendation is to make free time for the employees to adequately measure the scores on the indicators. This thesis has shown that it is valuable to invest time in measuring the lean performance in the proposed way, since the indicators are defined in such a way that they do not harm or even benefit the intrinsic employee motivation. Following the recommendation of Maier (2004) and Malmbrandt and Ahlström (2013), it is also important that the employees have time to visualize the improvements on the scores of the indicators, in order to further increase the intrinsic motivation of the employees in performing their job.

Recommendation for healthcare organizations

The set of indicators (related to perspectives) developed in this thesis and visualized in tables 10, 11, 12 and 13, should be seen as the common thread for measuring the lean performance in healthcare organizations, from which can be deviated given the circumstances of a healthcare organization. For example, when an explicit goal of a care line or project in a healthcare organization in applying lean management is to increase the market share, the indicator market share (financial perspective) can be added to the list of indicators visualized in tables 10, 11, 12 and 13. Importance to notice is that not too many indicators should be added, in order to prevent cognitive overload of the employees who have to gather the information on the indicators. As mentioned before, research has shown that employees of organizations are able to manage between 12 and 20 indicators, including lean performance indicators, other performance indicators and indicators which are obliged by care authorities (Kaplan & Norton, 1996). A healthcare organization can also choose to remove an indicator, when the circumstances of a healthcare organization demand so.

5.2.3. Methodological reflection

A limitation of this research might be that it is hard to say that the results of this thesis are applicable to all healthcare organizations, since only one specific case (Karakter) has been studied. However, this research was only a first step in identifying informative indicators for measuring the lean performance of healthcare organizations. Since this research has focused on Karakter (child and adolescent psychiatry), the results are at first likely to be informative for Karakter and other child and youth psychiatric institutions. The results of this thesis might also be informative for other psychiatric institutions and healthcare organizations in general, especially when they have more or less the same context as Karakter. For example healthcare organizations that also just started to apply lean management and focus on long-term care like Karakter. However, more research is needed in order to being able to conclude this.

For reasons of time, only the top two indicators per perspective is discussed in focus group one, while it was planned to discuss the top three indicators per perspective. This has only affected the data in so far that it was not guaranteed that the number three indicator of each perspective was discussed in focus group one, two and three. However, the complete list of indicators (related to perspectives) has been provided to the participants at the beginning of the focus group, so that the participants were able to discuss an additional informative indicator for measuring the lean performance of Karakter. The participants also made use of

this opportunity. At the request of a participant, for example the training of employees indicator (number three of employee perspective), was discussed.

A first potential disadvantage of conducting focus groups is that one or two participants dominate the discussions in the focus group. There is no reason to conclude that domination of the focus group has taken place, as shown by the numerous informative quotes of several different participants, shown in the results section of this thesis.

A second potential disadvantage of conducting focus groups is the presence of group thinking, in which consensus is reached at the cost of realistic challenges to the consensus. However, given the numerous intense discussions that has taken place in all three the focus groups before consensus was reached, there is no reason to concluded that group thinking has taken place in one of the three focus groups. Consider for example the discussion regarding the informative value of the indicator lead time in focus group one on page 41 of this thesis. Only when a participant explained to the doubting participants that external factors can be taken into account when calculating the lead time, consensus was reached about the informative value of the indicator for measuring the lean performance of Karakter.

A third potential disadvantage of conducting focus groups is that the participants provide socially desirable answers. Socially desirability could have taken place because the head of HR/the continuous improvement program was present at two of the three focus groups. It might be the case that the participants said what they thought the head of HR/the continuous improvement program wanted to hear. This has maybe taken place only one time, when the indicator whether the deadline of a project is met was suggested as informative by the head of HR/the continuous improvement program (see page 52 of this thesis). Only one participant dared to slightly doubt the suggestion and the rest of the participants did not react, while I could feel that not everyone agreed on the informative value of the proposed indicator. However, in all other times, the participants dared to object a suggestion of the head of HR/the continuous improvement program. For example, when in focus group two (page 42), the head of HR/the continuous improvement perspective suggested that it is fair to judge each single employee on the number of improvements suggestions provided. One participant reacted and argued that he did not agree with this notion. It was also possible that the participants provided answers they thought I wanted to hear. That means that they would agree to all indicators I proposed as informative for measuring the lean performance for

Karakter. However, in all three focus groups, the participants dared to doubt the proposed indicators for measuring the lean performance of Karakter. Consider for example the discussion regarding the informative value of the training of employees indicator on page 49 of this thesis. The discussion shows that the participants were not afraid to express their real thoughts instead of telling me what I wanted to hear. Since in that case, the participants did not dare to object the proposed indicator.

Finally, by playing the role of devil's advocate, I as a researcher might have affected the data. For example by questioning whether the training of employees is enough for a proper application of lean management in focus group three on page 49. The participants reacted and argued that the training of employees is indeed not sufficient for a proper lean management application, and that it is better to focus on the general knowledge of the employees regarding lean management. This result may not have come forward, when I not played the role of devil's advocate.

5.2.4. Recommendations for future research.

As indicated in the methodological reflection, it is hard to generalize the results of this thesis to all healthcare organizations. Therefore, in order to be able to generalize the findings of this thesis, the proposed indicators (related to perspectives) can be surveyed to managers of healthcare organizations, regarding the informative value of the proposed set of indicators (related to perspectives) for measuring the lean performance of their healthcare organization. A numerical five-point Likert Scale can be used, in which a score of five indicates that the indicator is informative for measuring the lean performance of the healthcare organization, while a score of one indicates the opposite (Preston & Colman, 2000). Extra attention should be paid to the 'deadline of a project met' indicator, since it was doubted whether the indicator is informative for measuring the lean performance. A delay of the deadline can be a sign that lean management is not applied properly in the project, which may be a starting point for reflecting on the application of lean management in the project. The extra attention can be ensured by for example providing the participants the opportunity to write down their motivation for their choice on the five-point Likert Scale regarding 'deadline of a project met' indicator.

The second recommendation for future research is to research which impact of lean performance measurement on intrinsic employee motivation should be taken into account

when no progress on the scores of the indicators is booked. This research has only shown that the participants were intrinsically motivated in performing their job to measure the scores on the indicators, when progress is booked on the scores of the indicators. It is interesting to research this, since it will provide managers of healthcare organizations a richer insight regarding which impact of lean performance measurement on intrinsic employee motivation should be taken into account when measuring the lean performance, which is important since the intrinsic employee motivation is the critical determinant in the creation of a sustainable and successful application of lean management (and hence lean performance measurement).

References

- Allen, N.J. & J.P. Meyer (1996). Affective, continuance, and Normative commitment to the organization: an examination of construct validity. *Journal of Vocational Behavior*, 49, (3), 252-276.
- Almeida-Santos, F. & K.A. Mumford (2004). Employee training in Australia: Evidence from AWIRS. *Economic Record*, 80, 53-64.
- Anvari, A., N. Zulkifli & R. M. Yusuff (2013). A dynamic modeling to measure lean performance within lean attributes. *International Journal Advanced Manufacturing Technology*, 66, 663-677.
- Antoni, C. (1996). Lean production in Europe: A matter of technical adjustment or cultural change. *Applied Psychology*, 45, (2), 139-142.
- Ax, C. & T. Bjørnenak (2005). Bundling and diffusion of management accounting innovations-the case of the balanced scorecard in Sweden. *Management Accounting Research*, 16, (1), 1-20.
- Babakus, E. & W.G. Mangold (1992). Adapting the SERVQUAL scale to hospital services: an empirical investigation. *Health Services Research*, 26, (6), 767-786.
- Basch, C.E. (1987). Focus group interview: an underutilized research technique for improving theory and practice in health education. *Health Education & Behaviour*, 14, (4), 411-448.
- Behn, R.D. (2003). Why measure performance? Different purposes require different measures. *Public Administration Review*, 63, (5), 586-606.
- Bhasin, S. (2008). Lean and performance measurement. *Journal of Manufacturing Technology Management*, 19, (5), 670-684.
- Boeije, H. (2005). *Analyseren in kwalitatief onderzoek*. Den Haag: Boom.

Bos, J. & E. Harting (2006). *Projectmatig creëren 2.0*. Schiedam: Scriptum.

Britten, N. (1995). Qualitative interviews in medical research. *BMJ*, 311, 251-253.

CBS (2016). Homepage (www.cbs.nl), August 1.

Dabholkar, P.A. (1996). Consumer evaluations of new technology-based self-service options: an investigation of alternative models of service quality. *International Journal of Research in Marketing*, 13, (1), 29-51).

Da Costa, J. M. H., J. Oehmen, E. Rebentisch & D. Nightingale (2014). Toward a better comprehension of lean metrics for research and product development management. *Management R&D*, 44, (4), 370-383.

D'Andreamatteo, A., L. Ianni & F. Lega (2015). Lean in the healthcare: A comprehensive review. *Health Policy*, 119, 1197-1209.

Davey, M.M., G. Cummings, C.V. Newburn-Cook & E.A. Lo (2009). Predictors of nurse absenteeism in hospitals: a systematic review. *Journal of Nursing Management*, 17, (3), 312-330.

Davidson, M.C.G., N. Timo & Y. Wang (2010). How much does labour turnover cost?: a case study of Australian four-and five-star hotels. *International Journal of Contemporary Hospitality Management*, 22, (4), 451-466.

De Souza, L. (2009). Trends and approaches in lean healthcare. *Leadership healthcare services*, 22, (2), 121-139.

Duggirala, M., C. Rajendran & R.N. Anantharaman (2008). Patient-perceived dimensions of total quality service in healthcare. *Benchmarking: An International Journal*, 15, (5), 560-583.

Forza, C. (1996). Work organization in lean production and traditional plants. *International Journal of Operations & Production Management*, 16, (2), 42-62.

- Flak, L.S. & W. Dertz (2005). *Stakeholder theory and Balanced Scorecard to improve IS strategy development in public sector*. Seminar: University of Agder.
- Fomundam, S. & J. Herrmann (2007). *A survey of queuing theory applications in healthcare. Maryland*. The Institute for Systems Research.
- Franco, L.M., S. Bennett & R. Kanfer (2002). Health sector reform and public sector health worker motivation: a conceptual framework. *Social Science & Medicine*, 54, (8), 1255-1266.
- Goodman, J. (1999). Basic facts on customer complaint behavior and the impact of service on the bottom line. *Competitive Advantage*, 1-5.
- Hador, D.C. (2000). Setting priorities for waiting lists: defining our terms. *Canadian Medical Association Journal*, 163, (3), 857-860.
- Hansen, P. M., D. H. Peters, H. Niayesh, L. P. Singh, V. Dwivedi & G. Burnham (2008). *International Journal of Health Planning and Management*, 23, (2), 107-117.
- Hatch, M.J. & M. Schultz (2010). *Organizational Identity*. New York: Oxford University Press.
- Holweg, M. (2007). The genealogy of lean production. *Journal of Operations Management*, 25, 420-437.
- Irajpour, A., A. Fallahian-Najafabadi, M. A. Mahbod & M. Karimi (2014). A framework to determine the effectiveness of maintenance strategies lean thinking approach. *Mathematical Problems in Engineering*, 1-11.
- Joosten, T., I. Bongers & R. Janssen (2009). Application of lean thinking to health care: issues and observations. *International Journal for Quality in Health care*, 21, (5), 341-347.
- Kallio, K. & T.J. Kallio (2014). Management-by-results and performance measurement in universities – implications for work motivation. *Studies in Higher Education*, 39, (4), 574-589.

- Kaplan, R.S. & D. Norton (1992). The Balanced Scorecard: Measures that Drive Performance. *Harvard Business Review*, 70, (1), 71-79.
- Kemper, B. & J. de Mast (2013). Measurement plans for process flow improvement in services and healthcare. *Quality Engineering*, 25, 437-450.
- Kitzinger, J. (1995). Qualitative research: introducing focus groups. *British Medical Journal*, 29, 299-302.
- Krueger, K.A. & M.A. Casey (2000). *Handbook of Practical Program Evaluation*. Thousand Oaks: Sage Publications.
- Latham, G.P. & E.A. Locke (2007). New developments in and directions for goal-setting research. *European Psychologist*, 12, (4), 290-300.
- Lawler, E. & D.T. Hall (1970). Relationship of job characteristics to job involvement, satisfaction, and intrinsic motivation. *American Psychological Association*, 54, (4), 305-312.
- Li, C. (2011). A customized lean model for a Chinese Aerospace OEM. Thesis (MS). Cranfield University School of Applied Sciences.
- Liker, J. (2004). *The Toyota way: 14 management principles from the world's greatest manufacturer*. New York: McGraw-Hill.
- Lowe, J., R. Delbridge & N. Oliver (1997). High-Performance manufacturing: evidence from the automotive components industry. *Organization Studies*, 19, (5), 783-798).
- Luyster, T. & D. Tapping (2006). *Creating your lean future state: how to move from seeing to doing*. Boca Raton: Taylor & Francis Group.
- Luxford, K., D. G. Safran & T. Delbanco (2011). Promoting patient-centered care: a qualitative study of facilitators and barriers in healthcare organizations with a reputation for improving the patient experience. *International Journal for Quality in Health Care*, 23, (5), 510-515.

MacDougall, C. & F. Baum (1997). The devil's advocate: a strategy to avoid groupthink and stimulate discussion in focus groups. *Qualitative Health Research*, 7, (4), 532-541.

Maier, R. (2004). *Knowledge Management Systems*. Berlin: Springer Berlin Heidelberg.

Meyer, J.P. & N.J. Allen (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review*, 1, (1), 61-89.

Meyer, J.P., N.J. Allen & C.A. Smith (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. *Journal of Applied Psychology*, 78, (4), 538-551.

Malmbrandt, M. & P. Ahlström (2013). An instrument for assessing lean service adoption. *International Journal of Operations & Production Management*, 33, (9), 1131-1165.

Maltz, A., A. Shenhar & R. Reilly (2003). Beyond the balanced scorecard: refining the search for organizational success measures. *Long Range Planning*, 36, 187-204.

Mazzocato, P., C. Savage, M. Brommels & J. Thor (2010). Lean thinking in healthcare: a realist review of the literature. *Quality Safety Healthcare*, 19, 376-382.

Moraros, J., M. Lemstra & C. Nwankwo (2016). Lean interventions in healthcare – do they actually work? A systematic literature review. *International Journal for Quality in Health Care*, 1-16.

Dutch Care Authorities (2016). Homepage (www.nza.nl), May 25.

Oliver, P. (2010). *The student's guide to research ethics*. Maidenhead: McGraw-Hill.

Pakdil, F. & K. M. Leonard (2014). Criteria for a lean organization: development of a lean assessment tool. *International Journal of Production Research*, 52, (15), 4587-4607.

Pegels, C.C. (1984). The Toyota production system – lessons for American management. *International Journal of Operations & Production Management*, 4, (1), 3-11.

Poiesz, T.B. & N. Welling (2012). *Help, mijn patiënt is tevreden*. Den Haag: Boom Lemma Uitgevers.

Poksinska, B. (2010). The current state of lean implementation in health care: literature review. *Quality management in Health Care*, 19, (4), 319-329.

Preston, C.C. & A.M. Colman (2000). Optimal number of response categories in rating scales: reliability, validity, discriminating power, and respondent preferences. *Acta Psychologica*, 104, (1), 1-15.

Ryan, R.M. & E.L. Deci (200). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 25, 54-67.

Rijksoverheid (2016). Homepage (www.rijksoverheid.nl), April 1.

Schwenk, C. R. (1990). Conflict in organizational decision making: An exploratory study of its effects in for-profit and not-for profit organizations. *Management Science*, 36, (4), 436-448.

Serra, D., P. Serneels & A. Barr (2010). Intrinsic motivations and the non-profit health sector : evidence from Ethiopia. *Personality and Individual Differences*, 51, (3), 309-314.

Smithson, J. (2000). Using and analysing focus groups :limitations and possibilities. *International Journal of Social Research Methodology*, 3, (2), 103-119.

Symon, G. & C. Cassell (2012). *Qualitative Organizational Research*. London: SAGE Publications Ltd.

Thomas, L., J. MacMillan, E. McColl, C. Hale & S. Bond (1995). Comparison of focus group and individual interview methodology in examining patient satisfaction with nursing care. *Social Sciences in Health*, 1, 206-219.

Wilson, L. (2010). *How to implement lean manufacturing*. New York: Mc Graw-Hill.

Womack, J.P. & D.T. Jones (1996). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*. New York: Simon & Schuster.

Womack, J.P. & D.T. Jones (2003). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*. New York: Free Press.

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Appendix 1: Searching and selecting articles for systematic literature review

Searches were carried out in the 'Web of Science' database, using the following search terms:

- 'Lean Management' AND 'Performance Measurement'.
- 'Performance measurement' AND 'Lean Management' AND 'Health'.
- 'Lean Management' AND 'Success Measurement'.
- 'Lean Management' AND 'Results Measurement'.

Articles had to satisfy the following inclusion criteria in order to be considered:

- Published in an academic journal.
- Search term appeared in either the publication's abstract, title or key words.
- The publication takes into account the influence of lean performance measurement on the motivation of employees.

The latter criteria was considered important since the effectiveness of lean management in healthcare organizations is depending on the motivation of employees (Womack & Jones, 1996).

Appendix 2. Table one: Meta-data on the articles of the systematic literature search

In table one, the names of the authors, the name of the instrument used for lean performance measurement and the methods used are listed to inform readers of the source of the information. The contribution to the current state of literature is listed in order to make clear what the added value of the article is in comparison to what was already known regarding the development of a set of informative indicators to measure the lean performance. This knowledge provided insights on what is especially important to take into account when developing a set of informative indicators to measure the lean performance in healthcare organizations. Finally, the target industry, representing the industry for which the set of indicators has been originally developed, and whether the findings are transferable to the healthcare sector, are listed for making a decision which perspectives and informative indicators found in the various studies might be relevant for measuring the lean performance in healthcare organizations.

Table 1: Detailed list of articles from the systematic literature search

Names of the authors & year of publication.	Name of instrument used for lean performance measurement.	Methods used as indicated by the authors.	Contribution to current state of literature.	Target industry.	Findings transferable to the healthcare sector.
Anvari et al. (2013)	No instrument name.	Fuzzy logic method.	The article presents an innovative approach to measure the value of applying lean management in manufacturing systems. The Fuzzy Logic Method is not often used.	Manufacturing sector.	Transferable to other sectors according to Anvari et al. (2013). However no argument is provided for this statement by Anvari et al. (2013).
Bhasin (2008)	DMP.	Conceptual research.	Development of a measurement system that includes various time horizons and the interests of multiple stakeholders.	Not one specific sector.	Yes, according to Bhasin (2008). The DMP is developed for organizations in general and not for

					organizations in a specific context.
Da Costa et al. (2014)	No instrument name.	Systematic literature review, focus-group discussion and survey.	Importance of taking into account the goals set by organizations themselves in applying lean management, when one wants to develop a set of informative indicators to measure the lean performance.	R & D sector.	Unknown according to Da Costa (2014).
Irajpour et al. (2014)	No instrument name.	Survey, Shannon entropy method, TOPSIS technique, pilot test.	Article empirically examines the effect of multiple dimensions of lean production programs simultaneously.	Maintenance sector.	Unknown according to Irajpour (2014).
Kaplan and Norton(1992)	Balanced Scorecard.	Empirical qualitative research.	Providing organizations the opportunity to measure performance with both financial and operational indicators.	Not one specific target sector.	Yes. used in for example the healthcare sector (Hansen, 2008).
Kemper and de Mast (2013)	No instrument name.	Conceptual research.	Article provides insights in how to measure the current performance in terms of operational performance indicators in service and healthcare context. Special focus on throughput time and resource utilization.	Service and healthcare sector.	Transferable to other sectors according to Kemper (2013). Again, this is only a statement and not supported with arguments.
Malmbrandt and Ahlström (2013)	Lean service assessment instrument.	Pre-test, workshops, pilot study and large-scale survey.	The first comprehensive attempt to develop an instrument for assessing lean management service adoption.	Service industry.	Unknown according to Malmbrandt (2013).
Moraros et al. (2016)	No instrument name.	Systematic literature review.	Systematic assessment of the effectiveness of LM in healthcare.	Healthcare sector.	-
Pakdil and Leonard (2014)	Lean assessment tool (LAT).	Systematic literature review.	First article that concentrates on overall lean management implementation, distinguishing between a qualitative and quantitative perspective.	Business sector.	Unknown according to Pakdil (2014).

Appendix 3: The lean management principles and the application of them in the healthcare sector

Lean management principles.	Definition of principle in healthcare context.	Link of principle to lean management definition ² used in this thesis.	Is principle rewarding or challenging in the healthcare sector?
1. Specifying the value from the standpoint of the end customer	This principle refers to specifying the value from the standpoint of mainly the patients, but also the family members and caregivers (all customers in a healthcare context).	Although the important role of customers is not explicitly mentioned in the working definition of lean management shown in the footnote of this table, the first part of the working definition of lean management ‘lean management is a way to specify value’, implicitly makes clear that lean management is aimed at creating value for the customers (Womack & Jones, 1996).	Luxford, Safran & Deblanco (2011) have shown that healthcare organizations which have succeeded in creating customer focused care, are more likely to produce quality improvements. In this regard, the principle might be considered to be rewarding in the healthcare sector. However, Poksinska (2010) indicates that the term customer is not straightforward in healthcare organizations. The primary customer is the patient, but family members, caregivers and taxpayers can also considered to be customers. This ambiguity about the patient as customer and the dynamics involving the relations between the different ‘kind’ of customers can be seen as a challenge in the process of lean management implementation in healthcare organizations (Poksinska, 2010).
2. Identifying the value stream and eliminating waste.	In the healthcare sector, the value stream refers to making visible the whole process that is needed to deliver the care to the patients (Poksinska, 2010). The elimination of waste refers to removing all non-value added steps in the process, such as	This principle is linked to the ‘line up value creating actions in the optimal sequence’ part of the working definition of lean management (Womack & Jones, 1996), since in both the importance of the identification of value and the elimination of non-value adding steps is emphasized.	Healthcare organizations are complex systems with many interdependent units. Therefore, it might be a challenge to identify value and to eliminate waste in the entire organization, and not just only in individual departments (Poksinska, 2010).

²“Lean management is a way to specify value, line up value creating actions in the optimal sequence, conduct these activities without interruption whenever someone requests them, and perform them more and more effectively” (Womack & Jones, 2003, p.15).

	waiting time and unnecessary movement of employees (Womack & Jones, 1996).		
3. Creating a flow.	This principle refers to ensuring that the patient (and other customers) 'flow' fluently through all the value adding steps.	This principle is linked to the 'conduct these activities without interruptions' part of the working definition of lean management (Womack & Jones, 1996), as both indicate that a patient (and other customers) should 'flow' through the process without interruptions.	Again, since healthcare organizations are complex systems with many interdependent units, it might be a challenge to ensure that patients who have to be treated in different units flow fluently to all value adding steps.
4. Establishing pull.	The principle of pull can be applied in the healthcare sector in two ways. The first way is about only ordering new inventory when the customers demand so. For example, only ordering new medicines when the inventory is almost empty and the customers demand for new medicines (Poksinska, 2010). The second way is about only delivering the care to the customers when they demand so. For example, some customers are not willing to be treated immediately and want to go on a holiday before	The importance of only delivering the care when the patients demand so is also emphasized in the 'whenever someone requests them' part of the working definition of lean management (Womack & Jones, 1996).	Poksinska (2010) has shown that there is only limited research on the application of the principle of pull in healthcare organizations, whereby it might be concluded that the implementation of pull in the healthcare context has not reached its potential yet (Poksinska, 2010). Therefore it might be considered a challenging principle in the healthcare context.

	the treatment (Poksinska, 2010).		
5. Seeking perfection.	This principle refers to continuously improving the former four principles, to enable a sustainable application of lean management in the healthcare sector.	The principle is linked to the 'perform them more and more efficiently' part of the working definition of lean management (Womack & Jones, 1996).	There are few people in healthcare organizations who are specialized and able to train other employees in the organizations in the principles of lean management, whereby it is more difficult for the employees to accept lean management and make it sustainable in healthcare organizations. Therefore this principle is considered to be challenging.

Appendix 4: Explanation of the four measurement systems of lean performance proposed by Kemper and de Mast (2013).

Measurement systems	Explanation measurement systems
1. Output-input design.	In this system, the input or output metrics of a process are measured on a high level. Consider for example the cost per patient.
2. Resource measurement design.	In this design, a resource is followed, to for example measure the process time. When following a patient, one can also focus on where the patient has to wait unnecessary.
3. Job measurement design.	This design is about following a job through the process to capture job-specific indicators like waiting time. Although this method is proposed by Kemper and de Mast (2010) as separate of the resource measurement design, in a healthcare context, both are focused on following a patient to gather data about the waiting time and process time.
4. Quality inspection design.	This measurement system is especially relevant for measuring delays or quality. For example, inspecting whether a resignation call with a patient is conducted by a nurse or doctor when the patient is allowed to go home.

Appendix 5: Explanation of the fuzzy logic method.

The fuzzy logic method builds on a set of human language rules which are converted to their mathematical equivalents (values between 0 and 1). The values between 0 and 1 are calculated based on the insights of lean management experts. A value closer to 1 indicates a higher degree of leanness. Anvari et al. (2014) have chosen to calculate a score on the leanness of an organization with a fuzzy logic method to provide a more concrete answer on whether an organization applies lean management well (Anvari et al., 2013). A score between 0 and 1 provides a more concrete answer because one can link the score to an overall conclusion regarding the leanness of an organization. For example, a score of 0.6 represents a sufficient degree of leanness, while a score of 0.8 represent a good degree of leanness.

Appendix 6: Explanation of the four perspectives and related indicators of the BSC.

The BSC is a performance measurement system that focuses on multiple domains instead of only one outcome domain, like most of the articles in the review of Moraros et al. (2016) (Kaplan & Norton, 1992). The BSC consists of four perspectives, which are the customer perspective, internal business perspective, innovation and learning perspective and financial perspective. Kaplan and Norton (1992) argue that the four perspective are interrelated with each other in the sense that the operational indicators in the customer perspective, internal business perspective and innovation and learning perspective are the drivers of future financial performance, and vice versa. An important facet of the BSC is balancing the above mentioned four perspectives. Kaplan and Norton (1992) argue that it is important to balance the scores on the indicators in the four perspective in order to ensure both, short term profits and long term sustainability. Focusing too much on the financial perspective can cause problems in the customer perspective in the long run. An emphasis on selling as much as possible regardless the quality of the products or services sold, for example, can increase the operating income in the short run as part of the financial perspective, but can cause problems regarding quality satisfaction as part of the customer perspective in the long run. This can consequently harm the financial position of the organization in the long run (Kaplan & Norton, 1992). The BSC can be applied as a means of monitoring whether an organization has improved in one perspective at the expense of another. This will protect organizations from suboptimal performance (Kaplan & Norton, 1992). Kaplan and Norton (1992) argue that only a limited number of indicators in each perspective should be used, in order to prevent information overload (maximum of 15-20 indicators divided over the 4 perspectives).

Table: Perspectives of BSC and related indicators.

Perspectives.	Categories.	Examples of indicators.
Customer perspective.	Time.	Lead time.
	Quality.	Defect level of products/services.
	Performance and service.	Service quality
	Costs.	Cost per patient.
Internal business perspective		Waiting time.
		Productivity.
		First time right ratio.

The innovation and learning perspective		Process time to maturity.
		Specific rates of improvements regarding other indicators.
Financial perspective		Quarterly sales.
		Operating income.
		Return on investment.
		Cash flow.
		Quarterly sales growth.

Appendix 7. Table two: Selected indicators and perspectives to inform empirical research.

Table 2: list of indicators in each of the selected perspectives.

Perspectives.	Lean management principle (Womack & Jones, 1996) coupled to perspective.	Indicators per perspective	Working definition of indicator	Suggested measure of indicator	Ranking score
Customer perspective	Lean management principle one.	Level of customer satisfaction	The perceptions of customers about whether the products or services they received are worth more than the price they paid (Tracey, 1996).	The customer satisfaction can be measured by the perceptions of the customers on a numerical five-point Likert Scale (Pakdil & Leonard, 2013).	5
		Level of service quality	The perceptions of customers regarding the service performance (Bhasin, 2008; Dabholkar, 1996).	The service quality rate can be measured by the perceptions of the customers on a numerical five-point Likert Scale (Babakus & Mangold, 1992).	4
		Frequency of meetings with customers for quality/service feedback	The number of times a meeting with customers is conducted with the aim to get	The frequency of meetings with customers for quality/service feedback can be measured by counting the number of meetings with customers	4

			quality/service feedback.	kept on a yearly basis (da Costa et al., 2014).	
		Customer retention rate	Is about the absolute percentage of customers that are retained (Bhasin, 2008).	The customer retention rate can be measured by looking weekly, monthly or yearly how many of the total number of customers are retained and dividing this through the total number of customers in that specific period. (De Souza, 1992).	3

		% of customers involved in current and future product offering	Is about the percentage of customers who is asked their opinion regarding the current and future product offering (Pakdil & Leonard, 2013).	The % of customers involved in current and future product offering can be calculated by dividing the number of customers involved in current and future product offering through the total number of customers.	3
		Customer complaint rate	Refers to the percentage of customers which has complained at least one time regarding the service provision.	The customer complaint rate can be measured by dividing the number of customers who have complained through the total number of customers (Goodman, 1999).	2
		Accuracy of interpretations of customer requirements	Refers to whether an organization is able to adequately interpret what customers demand (Da Costa et al., 2014).	The accuracy of interpretations of customer requirements can be measured by asking the perceptions of customers regarding this on a numerical 5-point Likert Scale.	2
Employee perspective	Not applicable.	Level of employee commitment	Refers to the psychological attachment of employees to their workplaces (Allen & Meyer, 1990).	The level of employee commitment can be measured by the perceptions of the employees on a numerical five-point Likert Scale (Malmbrandt and Ahlström, 2013).	5
		Absenteeism	Is about not coming to work when scheduled	The absenteeism can be measured by counting the work days missed on a	4

			(Pakdil & Leoard, 2013)	yearly basis (Davey, Cummings, Newburn-Cook & Lo, 2009).	
		Level of employee training	Refers to how much training, facilitated by the employer, the employees have on a yearly basis (Almeida-Santos & Mumford, 2004).	The level of employee training can be filled in by employees on a numerical five-point Likert Scale (Malmbrandt & Ahlström, 2013). A possibility is to express the number of hours for each bullet point in the numerical five-point Likert Scale.	4
		Total number of employees involved in lean practices / total employees	Refers to the percentage of employees that is involved in the application of lean practices (Pakdil & leonard, 2013).	The total number of employees involved in lean practices / total employees can be measured by counting the employees that apply lean practices and dividing this through the total number of employees.	3
		Labour turnover rate	Refers to the voluntary and involuntary exiting of employees from the organization (Davidson, Timo & Wang, 2010).	The labour turnover rate can be measured by dividing the number of employees that has voluntary or involuntary left the organizations through the total number of employees working at the organization in a specific period.	3
		Quality of leadership development	Refers to how good an organization is in leadership development	The quality of leadership development can be measured by the perceptions of leaders on a numerical five-point	2

			(Bhasin, 2008)	Likert Scale regarding the quality of leadership development	
		Retention rate of top employees	Is about the percentage of top employees that remains working at the organization (Bhasin, 2008).	The retention rate of top employees can be measured by dividing the number of top employees that stayed at the organization through the total number of top employees. It is important to establish what a top employee is for this indicator.	2
		The number of hierarchal levels	Refers to the number of layers an organization has (Pakdil & Leonard, 2013).	The number of hierarchical levels can be measured by studying the organization chart of an organization.	1
		Total number of managers/total employees	Is about the span of control in an organization.	The total number of managers/total employees can be measured by counting the managers versus non-managers in an organization and dividing this through each other.	1
Process perspective	Lean management principle three.	Lead time/cycle time	Is about the time an organization receives an order to the time it actually delivers the product or service to the customer (Kaplan & Norton, 1992).	The lead time/cycle time can be measured by an employee who counts the weeks, days, hours, minutes it takes from the time an organization receives an order to the time it actually has delivered the service to the customer (Kaplan & Norton, 1992). Another possibility is an IT-system that records	8

			this information.		
		Waiting time	The time a customer is placed on a list or has to wait in a waiting room before he or she receives the service (Kemper & de Mast, 2013).	The waiting time can be measured by an employee of a department who records the number of months, weeks, days, hours, or minutes customers have to wait until they receive the service. Another possibility is an IT-system that records this information (Hador, 2000).	4
		Percentage of on-time delivery of service	Is about the percentage of customers that received the service on the specified date (Bhasin, 2008).	The percentage of on-time delivery of service can be measured by counting how many times a service is delivered on time and dividing this through the total number of delivered services (Martin, Givens & Kuttler, 1998).	4
		Labour productivity rate	Is about the amount of goods and/or services produced by one hour of labour (Bhasin, 2008).	The labour productivity can be measured by for example the number of customers treated a hour by an employee.	3
		Capacity utilization rate	Refers to the extent to which an organization actually uses its productive capacity (Pakdil & Leonard, 2013).	The capacity utilization rate can be measured by dividing the actual number of delivered services through the number of services which could potentially be delivered	3

		workload	Refers to the amount of work an employee has to do (Kemper & de Mast, 2013).	The workload can be measured by the perceptions of employees on a numerical 5-point Likert Scale.	3
		Defect rate	Refers to the percentage of wrongly delivered services (Kaplan & Norton, 1992).	The defect rate can be measured by counting the number of services with a defect and dividing this through the total number of services delivered.	3
		Time to market for new products/services	Is about the time it takes to bring a new service or product to a market (Bhasin, 2008).	The time to market for new products/services can be measured by counting the years, months, weeks, days or hours it takes to bring a product or service to the market.	3
		Inventory turnover rate	Refers to how many times an organization's inventory is sold and replaced over a period (Pakdil & Leonard, 2014).	The inventory turnover rate can be calculated by dividing the total sales through the inventory.	3
		Usage of Pull system	Refers to the use of a lean practice aimed at only delivering a service or product when the customer's demand so (Malmbrandt and Ahlström, 2013).	The usage of a pull system can be measured by the perceptions of employees on a numerical five-point Likert scale regarding the use of pull in their daily operations.	3

		First time right ratio	Is about the percentage of services that is provided right the first time (Kemper & de Mast, 2013).	The first time right ratio can be calculated by dividing the number of services that is provided right the first time through the total number of services.	2
		Actual versus target time for project completion	Refers to the time needed to complete a project versus the time it was planned to complete the project (Da Costa et al., 2014).	The actual versus target time for project completion can be measured by comparing the number of months, weeks, hours or minutes it was planned to complete the project versus the actual time.	2
		Frequency of maintenance of machines	The number of times on a yearly basis maintenance is conducted on a machine (Irajpour et al., 2014)	Counting the number of maintenance procedures of a machine on a yearly basis.	2
		Total resource time	Refers to the sum of deployed time of a resource devoting its capacity to a particular activity (Kemper & de Mast, 2013).	The total resource time can be measured by calculating the months, weeks, days, hours, minutes a resource deploys its capacity to a particular activity.	2
Continuous improvement perspective	Lean management principle five.	Specific rates of improvement for the indicators	Is about setting new targets to be reached regarding the scores on the indicators in the	The specific rates of improvement for an indicator can be measured by concluding whether the new set target is reached or not (Kaplan & Norton,	3

			other perspectives (Kaplan & Norton, 1992).	1992).	
		Total number of suggestions/total employees	Refers to how many improvement suggestions an employee does on average (Pakdil & Leonard, 2013).	The total number of suggestions/total employees can be measured by counting how many improvement suggestions are done in total and dividing this through the total number of employees working at the organization (Pakdil & Leonard, 2013). The number of improvement suggestions can possibly be noticed on an 'improvement board'.	3
		Total number of implemented suggestions/total suggestions	Is about how many of the total number of suggestions are actually implemented (Pakdil & Leonard, 2013).	The number of implemented suggestions/total suggestions can be measured by dividing the number of implemented suggestions through the total number of suggestions (Pakdil & Leonard, 2013).	3
		The level of focus on improvement work	Refers to the importance placed on continual improvement in the organization.	The level of focus on improvement work can be measured by the perception of employees on a numerical five-point Likert Scale (Malmbrandt and Ahlström, 2013)	3

Financial perspective	Not applicable	Profit after interest and tax.	Refers to the profit after subtracting the operational expenses, interest and tax (Bhasin, 2008).	The profit after interest and tax can be measured by subtracting the operational expenses, tax and interest from the profit.	4
		Return on investment	Refers to the benefits reached from an investment (Bhasin, 2008).	This can be measured by subtracting the costs of the investment from the gains from the investments and dividing this through the costs of the investment (Bhasin, 2008).	3
		Operating income per division	Refers to the operating efficiency of an organization (Kaplan & Norton, 1992).	The operating income per division can be measured by subtracting the operating expenses from the benefits (Kaplan & Norton, 1992).	3
		Market share	Is about the percentage of a market's total sales that is earned by a specific organization in a specific period (Kaplan & Norton, 1992).	The market share can be measured by dividing the total sales of the organization through the total sales of the market.	1
		Cash Flow	Is about the difference between benefits and costs in a specific period (Kaplan &	The cash flow can be measured by subtracting all costs from the benefits in specific period.	1

			Norton, 1992).		
		Average cost per unit	Refers to the cost per patient in healthcare organizations (Pakdil & Leonard, 2013).	The average cost per unit can be calculated by dividing the total costs through the total number of patients.	1

Appendix 8: lean management indicators versus general performance indicators.

Perspective	Indicators	General performance indicator or lean management indicator.
Customer perspective	Customer satisfaction	General performance indicator. Indicator is not specially developed for measuring lean performance, but relevant since the customer (satisfaction) is central in lean management (Womack & Jones, 1996).
	Service quality	General performance indicator. Indicator is not specially developed for lean management, but relevant since the satisfaction of the customers (regarding the service quality) is central in lean management (Womack & Jones, 1996).
	Frequency of meetings with customers for quality/service feedback	General performance indicator. Indicator is not specially developed for lean management, but relevant since the customers (frequency of meetings with customers for quality/service feedback) is central in lean management (Womack & Jones, 1996).
Employee perspective	Employee commitment	General performance indicator. Indicator is not specially developed for lean management, but relevant since the employee (commitment) is central in lean management (Womack & Jones, 1996).
	Absenteeism	General performance indicator. Indicator is not specially developed for lean management, but relevant since the employee (absenteeism) is central in lean management (Womack & Jones, 1996).
	Employee training regarding lean management	Lean management indicator. Indicator only measures information regarding (training of) lean management.

Process perspective	Lead time	Lean management indicator. Although the indicator can also be a general performance indicator, in the literature it is discussed as a lean management indicator, since it is one of the main targets (to reduce) in lean management (Moraros et al., 2016).
	Waiting time	Lean management indicator. Although the indicator can also be a general performance indicator, in the literature it is discussed as a lean management indicator, since it is one of the main targets (to reduce) of lean management (Moraros et al., 2016).
	Accuracy of interpretations of customer requirements	General performance indicator. Indicator is not specially developed for lean management, but relevant since the customer (interpretations of customer requirements) is central in lean management (Womack & Jones, 1996).
Continuous improvement perspective	Specific rates of improvement for the indicators	Lean management indicator. Indicator is related to continuous improvement, which is central in lean management (Womack & Jones, 1996).
	Total number of suggestions/total employees	Lean management indicator. Indicator is related to continuous improvement, which is central in lean management (Womack & Jones, 1996)
	Total number of implemented suggestions/total suggestions	Lean management indicator. Indicator is related to continuous improvement, which is central in lean management (Womack & Jones, 1996)
Financial perspective	Profit after interest and tax	General performance indicator. Indicator is not specially developed for lean management, but relevant since a proper application of lean management can increase the profit after interest and tax.
	Return on investment	General performance indicator. Indicator is not specially developed for lean management, but relevant since can be used to calculate the financial benefits of an investment regarding lean management.
	Operating income per division	General performance indicator. Indicator is not specially developed for lean management, but relevant since a proper application of lean

		management can increase the operating income per division.
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Appendix 9: Interview with head of continuous improvement program and one lean management expert)

K1 = Hoofd van continue verbeteren programma.

K2 = Lean management expert.

Sjors: Is het goed als ik gesprek opneem?

K2:Prima

Sjors: Mooi

K1: Gelukkig is er geen beeldopname haha, want je ziet er niet echt uit. Heb je gerend ofzo?

K2: Nog niet.

Sjors: Haha.

K1: Uuhm, we zouden voorbereiden. We hebben in mei een bijeenkomst wat we vandaag gaan voorbereiden. Ik was aan het vertellen aan Sjors dat we afgelopen dinsdag de leiderschap trainingen hebben gehad met een externe organisatie. En toen was de opmerking dat ze heel uitgebreid hebben verteld hoe VSM werkt en hoe je daar resultaten inzichtbaar kan maken. Met taktijden en dan kijken waar verspillingen zitten. Maar als je bij ons naar de behandelprocessen kijkt, zijn die lang, met een relatief korte behandeltijd.

K2: Ja

K1: En dan is het best wel lastig om dat te vertalen denk ik steeds. Is toch iets anders dan een doorloopproces van bestraling... of pijnbestraling was het.

K2: Waarom denk je dat dat anders is?

K1: Dat was een simpeler proces. Dus echt simpel van intake, diagnose, werkbehandeling klaar. En bij ons zit er een heel zorgpad achter met verschillende soorten behandelingen. We hebben nooit 1 discipline. En dus ik zag ook wel iedereen zuchten van dit is wel prachtig, maar hoe doen we dat nu. En ook omdat zij nog eens bepleiten ga niet op een te klein niveau de analyse doen, want dan krijg je suboptimalisatie. Ik zie ook, om het maar behapbaar te maken, weet je wat we doen, alleen wachttijd van diagnose tot behandeling. Dan heb je dus suboptimalisatie. Dan heb je dat stuk wel, maar misschien zit bottleneck weer ergens anders. Dus dat was ik aan Sjors aan het vertellen.

Prive gesprek....

K2: Ik heb gister nog met 2 werknemers van jouw organisatie gesproken over het stukje wat jij net aanhaalde, over van intake tot start behandeling, dat hoe je het ook went of keert, het zijn opeenvolgende stappen van activiteiten en dat noemen we een proces. En uhm daar kun je een VSM mee doen. Wat bij een proces heel belangrijk is, is dat je gebruik kan maken van standaarden in het proces. Die standaarden heb je nodig. Een standaard...

K1: Nu snap je waarom hij zo heet hé.

Sjors: Haha.

K2: Standaard, als je daar een 'what if' in krijgt, dan moet je in ieder geval dieper. Daar is het ontzettend belangrijk om processen te optimaliseren tot op het moment dat je voelt dat het goed is. Dat er allemaal zijpaadjes gaan ontstaan. Of je maakt modules op klein stukje van proces en dan sluit je als het ware... als proces dan splitsing heeft, dan komt daar een nieuwe standaard onder. Dan floep je als het ware een nieuwe standaard eruit. Je kunt het eigenlijk vergelijken met een autofabriek die op dezelfde productielijn rode

groene en gele auto's maakt met 3 verschillende type motoren en 5 verschillende soorten velgen. En toch lukt het ze steeds. Ze hebben niet een standaard dat ze vandaag alleen groene en morgen gele maken. Standaard maak je in de vorm van kaders.

K1: Oké. Ik ben bij Scania geweest en daar zie je dat ook mooi. Ik snap het, maar het was voor mij meer een opmerking. Is waardevol wat die externe organisatie doet, maar is hier nog een puzzel. Ben met je eens dat je eerst een deelproces moet maken, want anders wordt het te ingewikkeld. Dan maak je grovere analyse, waar wij denken dat de belangrijkste bottlenecks zitten. En dat is bijvoorbeeld hier nu, oké het lukt ons om met mensen intake te doen, maar dan moeten ze te lang wachten voor behandeling. Daar overschrijden we de norm! Dan denken we laten we daarmee beginnen. Als dat goed is, komt dan het volgende deelproces. Dus je moet steeds schakelen tussen niveaus. Soms moet je weer de diepte in, tot 'what if'. Goed nu weer even terug. Jij hebt een idee.

Sjors: Ik zou graag meer feeling krijgen van wat deze organisatie en lean met elkaar te maken hebben. Waarom is deze organisatie lean gaan toepassen? Hoe doen ze dat nu? Gebruiken ze standaarden? Doen ze op alle vestigingen hetzelfde? Is handig voor mijn focusgroep die ik wil organiseren. Ik had gevraagd of jullie willen deelnemen aan de focusgroep. Moet ik nog plannen.

K1: Ik dacht dat we dat al gepland hadden in mei.

Sjors: Nee. 10 mei is van commissie. En ik wilde graag halverwege mei als het kon die focusgroep organiseren. Met jullie en 2 vertegenwoordigers van een adviesgroep, en nog iemand van uw organisatie

K1: Ik heb al wel een idee wie ik daar bij wil hebben van deze organisatie. Die zal ik maandag ook even met een collega doornemen. Ik moet het even opschrijven. Focusgroep. Want het plannen is hier een gigantisch probleem.

Sjors: Daarom ik vraag eerst of jullie interesse hebben. Het liefst ongeveer half mei.

K1: Dat hebben we zeker.

K2: Idem.

Gesprek planning focus groep...

K1: Uhm, dan even wat jij hebt een doel. Dus pak de leiding.

Sjors: Ja ik had de vraag waarom deze organisatie precies lean is gaan toepassen?

Waarom Lean?

K1: Uhm, dat is een goede. Uhm, waarom lean. Tsjonge jonge.

K2: Zal ik een kopje koffie gaan zetten haha.

K1: Is altijd grappige. Ik ben hier 5 jaar geleden begonnen. De tweede dag had ik een overleg en toen was er een presentatie van zorgprogrammering en een presentatie vanuit CBO: beter bij standaard. Met die doorstromen. Doorbraakmethode ging het over! Toen was de vraag, dat is leuk, we zien dat het soms wel en soms niet werkt. Hoe gaan we nu verder. Toen hebben we voorgesteld van goh zullen we dat niet combineren en toen kwam ook ergens lean naar voren. En toen was er toevallig een extern bureau die aangaf dat ze dat goed konden en zeiden wij begeleiden het wel. Die heb ik gauw afgeserveerd want dat leek me helemaal niks. En uiteindelijk zijn we bij een ander bureau gekomen. Dus waarom, voordat ik hier was, was er al een aanleiding. Het loopt toch niet helemaal lekker. Dat had vooral te maken met dat er grote wachtlijsten waren. We moesten iets doen aan die wachtlijsten. De klanten vonden dat ook te lang. Ook de behoefte van moeten we niet meer standaardiseren? Zat ook in die zorgprogrammering. We zagen dat elke locatie het apart doet. Ik ben dus met externe organisatie begonnen, waar we zijn meegenomen in lean gedachte, waar zij heel erg in de analyse zitten, zoals die VSM.

Daarna kwam jouw stage organisatie als begeleider naar voren. Toen zijn we het anders gaan aanpakken. Veel meer zelf het eigen maken.

Sjors: Oké. Want eerst noemen jullie lean en nu continue verbeteren?

K1: Eerst heette het innoverend organiseren. We hebben steeds een naam bedacht waar we een eigen betekenis aan konden geven. Innoverend organiseren had ook zo iets van we moeten vernieuwen. Huidige behandelconcept moeten we vernieuwen. Continue verbeteren hebben we letterlijk overgenomen van lean. En daar zat die gedachte in van we moeten voorkomen dat een analyse gemaakt wordt en dat plan ligt en dat het weer stil ligt. Het moet blijven lopen. Dus dat is continue verbeteren.

Sjors: Oké, duidelijk.

K1: Volgens mij was eerst niet zo zeer lean gedachtegoed. Ja zat er wel achter. Maar we hadden een andere term. Beweging krijgen in je organisatie rondom verbeteren. We merken heel vaak dat als we een project beginnen met continue verbeteren als uitgangspunt... Lean komt dan toch vaak om de hoek als begrip. Is bijna niet te voorkomen. Continue verbeteren heeft heel veel te maken met processen en waarde van de klant en kijken naar verspillingen en flow. Dan zit je vaak in die terminologie van lean. Wat interessant is, we hebben gekozen voor deze naam. Nu valt mij op dat lean steeds vaker wordt genoemd. Waar ondertussen... het gaat ons meer om de lean filosofie dan de instrumentale benaming. Gaat niet alleen om efficiency bij ons, maar meer om toegevoegde waarde. 2/3 jaar geleden was lean ook meer een besmet woord.

Sjors: Ja daarom vroeg ik ook waarom jullie het continue verbeteren hebben genoemd.

K1: Het was echt een naam om de sprong van innoverend organiseren, hebben we gehad, nu moet anders. En daar hebben we passende naam bij gevonden.

Sjors: Hebben jullie ook voor jezelf doelen gesteld van wat jullie met lean willen bereiken?

K1: Nou sowieso dat het onlosmakelijk verbonden moet zijn met onze bedrijfsvoering. Dus dat we het echt in DNA willen hebben. En dan steeds omdat, want daar zit die toegevoegde waarde, want we willen dat de patiënt daar beter van wordt. Dus dat is een belangrijk punt.

Sjors: Oké. En nog niet iets specifiek waarom jullie lean wilden inzetten om iets te verbeteren?

K1: Nou er waren meerder problemen. Maar niet iets specifiek. De aanleiding is wachtlijstproblematiek geweest. Of de grote variatie en weinig standaard. Maar toen we gingen van innoverend organiseren naar continue verbeteren, was echt het motief van we moeten zorgen dat iedereen het gaat doen. Dat eigenaarschap vergroot wordt. Niet meer van buiten maar van binnen uit.

Sjors: En hebben jullie misschien nog doelen gezet K2?

K2: Wat Andre aangeeft; we wilden een beweging opgang krijgen. Ik was in de tussentijd al even naar onze offerte aan het kijken. Uhm, om daar de doelstelling duidelijk te krijgen. Is altijd goed, door de vragen die je stelt, om te kijken wat was nou specifiek de doelstelling. Het ging er vooral over om.... we noemden het toen continue verbeteren en hier staat het creëren van een goede leercultuur waardoor de organisatie in staat is zelf continue te verbeteren en om het probleemoplossend vermogen van de organisatie vergroten met behulp van de lean filosofie. Dan zie je ook dat we afscheid willen nemen van het komt van buiten.

Sjors: Oké duidelijk.

K2: Een tweede was ook wel, op zich zijn wij vanuit onze organisatie een soort collega organisatie van deze organisatie. Wij hadden ook nog zoiets van kunnen we nog een keer samenwerken, zodat we beiden leren.

Sjors: Oké.

K2: Dat was niet alleen om de filosofie goed op te pakken, maar ook om te leren en samenwerken. Dat was ook de aanleiding om het op deze manier aan te pakken.

K1: Hij vergeet de belangrijkste reden.

Sjors: Dat jullie vrienden zijn.

K1: Hahaha Ja dat we het leuk vonden om iets samen te doen.

Sjors: Haha ja dat had ik al begrepen.

K2: We kennen elkaar natuurlijk al van iets anders ja.

Sjors: Oké, maar hebben jullie misschien doelen gezet van over 5 jaar willen we dit hebben bereikt.

K1: Nee we hebben nog geen stip op de horizon. We hebben wel steeds gepleit voor de filosofie dat het jaren duurt om het goed te doen. Kijk naar Scania. We hebben onze werknemers daar ook laten zien dat het niet even iets eenmaligs is. Gaat over langdurig proces.

K2: Ja!

Sjors: Oké duidelijk. En hoe passen jullie nu precies lean toe. Per afdeling of organisatie breed?

K1: Goede vraag. Op het moment dat wij begonnen... er lagen associaties met innoverend vermogen. Zowel positief als negatief. Sommige vonden het goed. Maar er waren ook heel veel negatieve associaties. Van ja er wordt van alles gezegd maar er gebeurt niks. Dat is precies de reden, we hebben gezegd van het moet nu van binnen uit. Laten we beginnen waar de kansen liggen. De kansen zijn enthousiaste mensen. We hebben een lijstje gemaakt van we hebben zorglijnmanagers nodig. We hadden ontdekt dat we moesten zijn bij de managers die direct leiding geven. We konden ook de beleidsadviseurs gebruiken want die waren enthousiast. We hebben lijstje gemaakt voor wie daar in aanmerking voor zouden komen. Dus echt een spreidingsgedachte. Laten we beginnen met mensen die enthousiast zijn. Die moeten we faciliteren om kleine projecten te starten. Langzaam uitbreiden, en we blijven weg bij discussie dat moet van deze organisatie. Want moeten werkt niet.

Sjors: Nog steeds optioneel dus?

K1: Ja letterlijke speerpunt is nog steeds verspreiden, verbinden en nu resultaten inzichtelijk maken. Verspreiden is nog steeds mensen enthousiast maken. Gister hadden we een directie overleg(DO), en nu komt vanuit hen van moeten we het niet verplicht stellen voor alle zorglijnmanagers. Nu zie je behoefte bestaan van daar moet nog wel geld voor komen, dus dat nog meer mensen geschoold worden. Je ziet dat het nu een kritisch punt begin te bereiken waardoor een flow ontstaat. Dus daarom zeiden we van laten we maar klein beginnen.

K2: Aanvullend, kun je eigenlijk zeggen van er zijn organisaties die dat andersom doen. Die beginnen van bestuurachtige manier van werken. We hebben hier dan ook wel een soort... we hebben hier Daar zij K1 wel leading in geweest, om deze manier van denken te introduceren binnen deze organisatie. We zien dat vanuit midden naar twee kanten toe aan het uitbreiden is. Dat vind ik wel een grappige als ik zo nadenk over de vraag die je stelt. Wat is er aan gebeuren. Enerzijds hebben we mensen opgeleid van de

werkvloer of de begeleiders gecoacht. Hoe noemen jullie die ook alweer? De enthousiaste trekkers?

K1: Voor lean coaches hadden we een andere term... Dat is ook leuk. Die hebben we dus bij elkaar geroepen, daar was je ook bij. Toen hebben we gezegd, van denk is mee met ons, van hoe kunnen we het het beste opzetten. Toen kwamen ze met van mag geen project heetten, moet een proces zijn. We hadden werknaam voor die mensen.

K2: Aan de andere kant hebben wij... we hebben ook heel sterk ingezet op alle MD bijeenkomsten. Die werden door een collega georganiseerd. Daar hebben we meer de slag naar boven gezet, waar we mee bezig zijn. Dat maakte het steeds de reflectie zowel ... de leancoaches zijn echt sleutelfiguren geweest tot nu toe. De reflectie naar zowel boven als beneden hebben we gebruikt om mensen besmet te krijgen met dat denken.

Sjors: Oké.

K2: Ook tegen bestuur gezegd van als jullie niet gaan oppakken, dan komt ook naar beneden over van het is geëindigd en het is klaar. Het lijkt goed te gaan bij deze organisatie, want de directie/raad van bestuur pakt de principes op en ook de essentie van het denken proberen ze zich eigen te maken dan wel actief uit te dragen.

K1: Uh, je ziet dat het nu groeit. Er is steeds meer een draagvlak voor. En tegelijkertijd ziet ik ook elke keer risico's... bij deze organisatie hebben we soms de neiging om een mode verschijnsel te volgen. Bv, nu praten we over netwerkorganisatie. Moeten we netwerken. Of de zelforganisatie moet omhoog. En gister in DO heb ik ook gehad over verbinden. Continue verbeteren moet onlosmakelijk verbonden zijn in alles. Moet onderdeel van visie en strategie worden. En toen gezegd van goh laten we is met elkaar in debat gaan over hoe dit nu aansluit bij de zelforganisatie. Waarom continue verbeteren nu wel bijdraagt of niet aan zelforganisatie. En dan heb ik bewust gedaan om ook te voorkomen dat dat weer losse bewegingen zijn. En ook ze te dwingen van wat bedoelen we nu eigenlijk met zelforganisatie. Anders is het weer zo'n loze term. Een bedoelt het

uitbreiden van de span of control. Ander bedoelt meer creativiteit of meer eigen regie. Dus ik zie dat het wel groeit en steeds meer land, maar dat het risico dat het afgeleid wordt door andere thema's nog steeds aanwezig is.

Sjors: Oké duidelijk. Als ik dan kijk naar verschillende afdelingen, laat je de mensen gewoon zelf weten wat ze doen? Wachtijd verminderen of klantwaarde creëren? Is er een vast ritme hoe jullie daar in te werk gaan?

K1: Wat ik zie is dat we heel erg leancoaches stimuleren om vragen op te halen. Dan zie je ook, en daarom is fijn dat zorglijnmanagers erin zitten, die hebben een eigen afdeling. Vaak was dat ondersteuning wel primair de focus was. Je ziet ook meer spreiding in dat er verschillende onderwerpen komen. Eerst ging over ondersteuning. Nu zie je bijvoorbeeld thema als de wachttijd. Of het gaat over standaardisatie. Je ziet dus het ook daar spreiden. Van ondersteuning naar veel meer primair proces.

Sjors: Oké. En jij K2, heb jij ook projecten gedaan. Bijvoorbeeld een VSM?

K2: Ik ben nu betrokken bij een VSM bij 2 werknemers van deze organisatie. En dat gaat over een proces rondom wat ik net verteld heb... intake tot en met starten van behandeling. En heb ik in het verleden ook nog VSM gedaan? Uuh, bij deze organisatie niet nee. Maar wat we wel steeds doen, we betrekken de leancoaches. Die hebben we in de afgelopen 2 jaar begeleid door middel van bijeenkomsten en ook nog ondersteunt bij het rapporteren wat ze hebben gedaan in de tussentijd. We hebben wel VSMs getraind bij leancoaches. En verder is het nu vooral 'coaching on the job'. Daar hoort VSM bij. En coaching van de directie met de coach erbij over hun verdere aanpak van projecten. Zijn we nu ook regionaal mee gestart. Zijn ook in Almelo geweest. Binnenkort heb ik weer afspraak met de centrale club. Dus dat begint nu ook vorm en inhoud te krijgen.

Sjors: Oke. Ik heb begrepen dat we nu steeds meer op een punt komen dat er vanaf bovenaf een roep komt om een inzicht in de resultaten te krijgen. Klopt dit?

K1: Ja klopt. 2 keer per jaar moeten we verantwoording afleggen in het directieoverleg. Toen ontstond ook wel discussie. Want spanning is dat als je tijd vrij maakt, wat levert het dan op. En je ziet dat er nu... 5 jaar geleden... in vergelijking tot 5 jaar geleden staan we steeds meer onder druk. Spanningen worden duidelijker door transities naar gemeentes, dus echt druk. Ook dagelijks meer verantwoording. Dus resultaten zichtbaar maken wordt steeds belangrijker. We moeten kunnen verantwoorden wat we investeren maar ook opbrengen. Je hebt de 'believers', die zeggen gewoon doen. Je hebt de twijfelaars, van ja je moet me overtuigen dat het ook wat oplevert.

Sjors: En nu worden die commissies georganiseerd. Is 10 mei de eerste. Komt daarna nog een reeks?

K1: Voor resultaat zichtbaar maken? Ja daar ben ik benieuw naar haha. Wat mij betreft moeten we dat thema uitwerken. Dat we geholpen worden van wat bedoelen we daar precies mee? Wat is resultaten inzichtbaar maken? Hoe doe je dat dan precies? Dus dat is wat we beloofd hebben in het jaarplan. We gaan een manier ontwikkelen waarmee we beter resultaten inzichtbaar maken.

Sjors: Dus gaat in eerste instantie puur om de manier?

K1: Ja!

Sjors: Oké. Ik heb het er de vorige keer met K2 over gehad dat het interessant is om hier en daar al wat te meten.

K1: Dat is prima! K2, waar jij mee bent betrokken met VSM... dit is vb. om poging te doen om resultaten inzichtelijk te krijgen.

K2: Het verbeterbord is ook handig voor jou Sjors. Gewoon de resultaat van de verbeterborden bespreken → kijken wat daar de winst is geweest. Bijvoorbeeld, met de voorraadaanschaf. Of we gaan een proces vereenvoudigen. Kunnen vaak kleine dingen

zijn. En dan kun je zeggen van we gaan zorgen dat iets altijd klaar ligt. Zodat mensen minder gaan zoeken. Dan kun je gewoon zeggen wat levert dat klaarleggen op met betrekking tot minder zoeken. Zoeken is dan een schatting. Bijvoorbeeld ik ben 10 minuten hier per dag mee bezig per medewerker. Keer 6 medewerkers, vermenigvuldigen met 5 dagen is 5 uur in de week. Dat kun je omrekenen in een bedrag. Elke medewerker kost x euro per minuut. En dat kun je dan vermenigvuldigen. Ik heb dat is een keer eerder gedaan bij een andere instelling. Dat je de bespaarde tijd vertaald naar geld. Is geen winst dat je in zak steekt want die mensen werken nog steeds. Wij hadden uitgerekend meer dan 1 fte, zelfs 2, winst is. Dat was ongeveer 70/80000 euro minder tijd besteed wat ik net vertelde: minder zoeken en dat soort zaken.

Sjors: Dus eigenlijk return on investment.

K2: Ja inderdaad. Dat was onder andere de aanleiding van de manager van die andere organisatie. Je wilt toch wel weten.. consultancy organisatie kost zo veel geld en wat levert het op. Dat hebben we kunnen aantonen. Daarnaast leveren we veel winst voor patiënt. Minder wachten, minder naar ziekenhuis komen. Dat zouden we ook bij deze organisatie kunnen doen. Doorlooptijden is daar een voorbeeld van. Dat zouden we hier ook eigenlijk kunnen doen. 1 werknemer heeft dat nu gedaan voor de zorglijn waar we nu mee bezig zijn. En je ziet gewoon dan ook of die doorlooptijd gaat verminderen. Dat zichtbaar maken is niet alleen goed voor de managers. Is ook goed voor werknemers. Zien opbrengt van hun inspanning. Dat patiënt niet meet 6 weken wacht, maar 3 weken. Is ook prettig voor degene die de inspanning doet voor verbeteringen.

Sjors: Heb ik ook rekening mee gehouden met dat ik naar verschillende perspectieven kijk. Financieel perspectief, klantperspectief, werknemersperspectief, en continue verbeteren perspectief. Dat je vanuit verschillende invalshoeken kijkt.

K1: Heb je daar theorie bij?

Sjors: Ja heb heel systematisch de literatuur bekeken wat nu in de literatuur wordt weergegeven hoe lean management performance goed gemeten kan worden. Maak top 3 per perspectief en ga dan kijken hoe ze passen bij deze organisatie.

K1: Vind ik heel waardevol. Want voor je het weet heb je het over indicatoren. Maar dan weet je nog niet waar ze aan moet bijdragen. Door perspectieven te introduceren weet je dat over klant perspectief gaat. Dwingt je ook dat je naar verschillende kanten gaat kijken. Niet alleen maar efficiency. Maar dat je gewoon rijkheid krijgt. Heel goed!

K2: Heb je daar al wat dingen op papier staan?

Sjors: Ja heb ik naar jullie gestuurd. Afgelopen vrijdag heb ik mijn proposal ingeleverd. Is hoofdstuk 1, 2 en 3. Daarin heb ik voorgesteld om een focusgroep te organiseren. In eerste instantie met jullie, om te achterhalen of de indicatoren bij deze organisatie passen. Nog een focusgroep heb ik voorgesteld om gewoon met 4 mensen van deze organisatie te gaan zitten.. 5,6 kan ook. Om te kijken wat zij er van vinden. Want zij moeten er ook mee werken.

K1: Mooi! Als je daar naar kijkt, methodologisch. In literatuur heb je bepaald model, aanpak. Focusgroep is dan een expertgroep, van hé jullie hebben verstand van en kijk is mee of goed is. En dan ga je naar de toepassing. Kan het ook in de praktijk.

Sjors: Ja precies. In eerste instantie met jullie tot set van indicatoren komen. En daarna met mensen, wat vinden jullie hiervan? Kunnen jullie hier mee aan de slag?

K1: Expert is natuurlijk spreiding. Toepassing, moet je overwegen of je dan ook spreiding wilt, of ga je het koppelen aan bepaald project.

Sjors: Oké, dat we kunnen kijken of de indicatoren toepasbaar zijn in een bepaald project.

K1: Ja, want dan ga je meer de toepasbaarheid toetsing. Toepasbaarheid is lastig, als iedereen vanuit verschillende situaties bekijkt. Bij expert speelt dat niet. Bij toepasbaarheid wel. Geef ik je even mee.

Sjors: Dankjewel, sowieso fijn om te weten. In eerste instantie heb ik zo voorgesteld, met als gedachtegang dat ik op basis van die twee focusgroepen hier en daar al wat metingen kan gaan doen.

K1: Dat kun je sowieso kijken. Wat doen jullie nou? Het valt me bv op dat er alleen maar financiële of proces indicatoren zijn. Maar leuke aanpak! Toch K2?

K2: Ja zeker! Ik heb een goede indruk van Sjors.

Sjors: Dat is mooi te horen!

K1: Ik hoop dat dat wederzijds is haha

Sjors: Haha ja zeker.

K2: Je hebt een gedegen aanpak Sjors. Had ik bij het eerste gesprek ook al. Je zit er goed in en je bent eager als het gaat om dingen op te zoeken of om dingen aan te nemen van mensen waarmee je in gesprek bent.

Sjors: Mooi om te horen. Heb ik nog 1 algemene vraag, voor de commissiebijeenkomst. Wat wordt er precies van mij verwacht qua input?

K1: Goed dat je dat vraagt. Want ik denk al Sjors heeft 10 mei gepland. Maar wat gaat er eigenlijk gebeuren. Terechte vraag. Wat gaan we primair doen. Want dan is het aan iedereen die deelneemt wat gaat we doen?

Sjors: Wij drie zijn er sowieso bij, en dan nog 2 of 3 andere erbij.

K1: Ik pak even agenda erbij.

Gesprek over planning focusgroep/commissie bijeenkomst...

K1: ik ben ook bezig met mijn masterthesis. Bijna af. Ik heb ook expertgroep gedaan. Ik ben in praktijk actieonderzoek gaan doen. Voor de mensen uit de praktijk heb ik een focusgroep georganiseerd. Van help mij is bij het interpreteren.

Sjors: Ow zo dan heb je het als data analyse gebruikt.

K1: Ja precies. Wat jij al zegt, jij hebt al literatuuronderzoek gedaan. Ook dan kun je zeggen van hoe kijken jullie er na. Een manier om daar behulpzaam bij te zijn is dat we dat gaan waarderen. Jouw idee met die kaartjes lijkt me top. Want daarmee bevorder je die verschillende perspectieven. Door gesprek gaan we naar gemeenschappelijke opinie. Je gebruikt dit ook om inzichten te krijgen in visies. In focusgroep moet je dan ook spreiding van mensen hebben. Als je ook model hebt van verschillende indicatoren, zou je het ook handig zijn om iemand aan tafel te hebben die behandel vertegenwoordigt, iemand financiën, iemand processen.

K2:Wie zaten er nu aan tafel (aantal namen).

K1: 1 kan niet, die is afwezig. Die is een beleidsadviseur, ook een van die lean coaches, met een bedrijfseconomische achtergrond. Zij wordt vaak ingezet voor financiële of proces analyses. Dat is wel een mooie. Is een scherp iemand. Zou even navragen of ze echt niet kan. Want is wel balen als ze er niet is. Een ander is onze informatiemanager. Die heeft zicht of we aan de informatie voor de indicatoren kunnen komen. Dat is gewoon een heel hoog geschoold iemand. Ik kan ook de groep vertegenwoordigen, maar zit ook medewerkerkant aan. Een andere is zorglijnmanager bedrijfsvoering. Onlangs is die naar andere functie gegaan. Ik zit toch te kijken of ik nog wil uitbreiden. Ga ik met

Arjanne afstemmen. 10 mei is al snel. We moeten als de donder dit bij elkaar zetten. In onze agenda staat de datum. Het is prima om toch met 6,7, 8 mensen, te gaan.

Sjors: Ik had in eerste instantie met 5 man gepland. Kan nog wel iemand van deze organisatie bij. Maar is wel misschien zaak om duidelijk om te kijken of die commissie bijeenkomst nu los staat van de focusgroep. Misschien moeten jullie dat zelf overleggen. Dat jullie daarop terug komen bij mij.

Sjors: Doel is om te achterhalen of de indicatoren passen bij deze organisatie.

K1: Ja je gaat toetsen of jouw model toepasbaar is.

Sjors: Ja inderdaad. Misschien kan ik wel een indicator voorstellen, maar jullie kunnen dan bijvoorbeeld zeggen van Sjors 'bij deze organisatie past dat zo niet, en je kunt beter zo en zo doen'.

K1: Ja daar maken we bijvoorbeeld stappen. Kunnen wij zeggen, is prima model om mee te werken. Vervolgens heb je ook al indicatoren hierin gezet. Maar misschien vergeet je nog niets, zijn er nog andere indicatoren die in dit model passen. Dan noem ik het dus meer een expert meeting. Met die samenstelling kunnen we 10 mei gelijk de eerste slag te maken. Hoeft niet een groep bij te zijn. Daarna gaan we ermee aan de slag. De andere focusgroep is dan een later moment. Werkt het in de praktijk. Kunnen we er iets mee. Mee eens k2?

K2: Ja. Doorlooptijd is gewoon heel belangrijk. Hoef je niet lang over te praten.

Sjors: Ja die heb ik ook.

K1: Model dwingt ons ook van he.. hier hebben we nog niet zo veel van.

Sjors: Ik zou persoonlijk wel fijn vinden als half mei die focusgroep is.

K1: Wat is jouw deadline voor de thesis.

Sjors: De eerste kans is 17 juni.

K1: Ow ja dat is snel. Moeten we veel meer praktisch kijken volgens mij. Die expertmeeting, die kunnen we organiseren. Als je dan gaat kijken van wat kunnen we in praktijk mee, dan kun je koppelen aan bestaande projecten. Van is dit van toegevoegde waarde. Dan kun je aansluiten bij wat er al is. Of een focusgroep... die ga je houden, van mensen die met projecten bezig zijn.

Sjors: Ja dat is ook heel waardevol.

K1: Ja dan krijg je eerst dat experts iets van zeggen. En daarna mensen die echt mee bezig zijn. Kunnen ze er iets mee. Je kunt niet toetsen of ze in praktijk iets mee doen.

Sjors: Nee, eerste instantie is zaak om goede set van indicatoren op te stellen om de lean performance goed te meten.

K2: Zijn er dingen retrospectief te meten of toetsen? Ligt natuurlijk aan indicator.

K1: Daar is een collega belangrijk voor. Je hebt van die indicatoren waarvan je zegt die zijn beschikbaar in user. Of die zijn beschikbaar in ons personeelsysteem.

K2: Vorig jaar in Zwolle heb ik met 2 andere collega's en de bedrijfsleider gekeken naar een nieuwe vorm van kijken naar budget in poliklinieken. Volgens mij moet dat retrospectief zijn terug te halen.

K2: Ik was niet bij dat project. Dus dat is dan een vraag die je kunt stellen. Bijvoorbeeld bij bedbezetting en dat soort zaken. Dat kun je niet 1 op 1 vast stellen dat dat door

projectgroep... maar is altijd leuk om voor zowel organisatie als voor jou Sjors kijkt naar wat doet zo'n indicator nu?

Sjors: Ja precies, dan zou mooi zijn als ik hier en daar wat metingen ga doen, kan ik dat gelijk testen.

K1: Ja daar zijn verschillende criteria. Zijn ze beschikbaar, meetbaar, retrospectief. Kun je ze uit systemen halen. Of moet je ze steeds koppelen aan verbetering. Dus echt 10 mei moeten we zorgen dat expert groep wordt. Als we dat helder hebben, kunnen we kijken wat waardevolle projecten zijn waarmee we de focusgroep organiseren. Heb je vertegenwoordigers nodig. Als je 17 juni wil halen, moet je eind mei... Is een hell of een job om mensen bij elkaar te krijgen. Zeker in mei. Want is gigantisch druk. Ik moet nu iets plannen. Eigenlijk begint vanaf vandaag twee weken meivakantie. Voor die ene hebben we gelukkig al datum. En dan kun jij Sjors, voor die expertgroep, maak er een presentatie van.

Sjors: Ja wil ik ook doen. Want niet iedereen hoeft het hele stuk te lezen. Ik leg kort uit wat ik heb gedaan en wat ik wil gaan doen.

K1: Die techniek die je zei, met kaartjes, lijkt me perfect en leuk. En dan gaan we op einde ook zeggen wat waardevolle projecten zijn en wie voor focusgroep dan. Zal ik afspreken dat ik jullie maandag laat weten of Marije en Astrid dan ook kunnen. Dat ik dan een voorstel doe voor eind mei voor die tweede focusgroep.

K1: Ik zit even hard op te denken. We hebben in die leiderschapstraining veel mensen bij elkaar. Zit ik even hard op te denken. Als je combinatie maakt. Als mensen uur eerder komen. Maar dat kan straks dan ook. 16 juni is afsluiting, maar dat is al te laat. Dus dan zal het... uhm...

K2: He maar Sjors, ik zit ook te denken van.. dat mensen tijdens project dingen zichtbaar maken. Dat is ook een indicator. Uitkomsten zichtbaar maken. Misschien dat we ook...

nu zitten we bijvoorbeeld met 1 groep bij VSM met doorlooptijden. Maar voorbeeld 1 van de verbeteringen die zij hebben gedaan is dat ze bijvoorbeeld de wachtlijst hebben verkort. Maar die wachtlijst kan volgende week weer vervuld zijn. Zou mooi zijn als je een indicator hebt dat die wachtlijst wordt uitgewerkt. Dat is ook een indicator.

K2: Opschonen in de zin dat er alleen mensen op staan die er thuis horen. Dus met andere woorden, een indicator zoals deze kan mensen echt helpen in het proces. Dan wordt soort spelletje voor de medewerker dat er geen verkeerde namen op staan.

Sjors: Juist deze input is voor mij heel waardevol om te horen tijdens de focusgroep. Dit soort input kan heel fijn zijn voor mij.

K2: Ja. Wat erop gaat is dat je niet al die kleine dingetjes gaat maken, maar dat jij zorgt dat mensen beseffen dat visueel maken echt helpt in continue verbeteren. Ook al duurt dat project maar 3 weken.

K1: Ik zit even met de tijd.

K2: Dus een indicator van een indicator. Dus ook kleine verbeteringen.

K1: Ik moet stoppen.

K2: Oke. Prima. Ik vond fijn gesprek. Sjors kun je mij... zullen we die voorbereiding nog een keer samen doornemen. Half uurtje over praten. Of via mail of via deze manier. Ik vind dat ook wel fijn om dat met jou af te stemmen.

Sjors: Ja is goed!

K2: Prima!

K1: Dan ga ik nu de afspraak over de expertgroep ga ik uitbreiden. Maandag hebben wij ook nog overleg, over de voortgang. Heb ik overleg met collega's van jou. Jij zou eventueel aansluiten K2.

Privé gesprek...

Appendix 10: Informed consent

Titel onderzoek:

Verantwoordelijke onderzoeker:

In te vullen door de deelnemer

Ik verklaar op een voor mij duidelijke wijze te zijn ingelicht over de aard, methode, doel en [indien aanwezig] de risico's en belasting van het onderzoek. Ik weet dat de gegevens en resultaten van het onderzoek alleen anoniem en vertrouwelijk aan derden bekend gemaakt zullen worden. Mijn vragen zijn naar tevredenheid beantwoord.

[indien van toepassing] Ik begrijp dat film-, foto, en videomateriaal of bewerking daarvan uitsluitend voor analyse en/of wetenschappelijke presentaties zal worden gebruikt.

Ik stem geheel vrijwillig in met deelname aan dit onderzoek. Ik behoud me daarbij het recht voor om op elk moment zonder opgaaf van redenen mijn deelname aan dit onderzoek te beëindigen.

Naam deelnemer:

Datum: Handtekening deelnemer:

In te vullen door de uitvoerende onderzoeker

Ik heb een mondelinge en schriftelijke toelichting gegeven op het onderzoek. Ik zal resterende vragen over het onderzoek naar vermogen beantwoorden. De deelnemer zal van een eventuele voortijdige beëindiging van deelname aan dit onderzoek geen nadelige gevolgen ondervinden.

Naam onderzoeker:

.....

Datum: Handtekening onderzoeker:

Appendix 11: Employee commitment survey.

Revised Version (Meyer, Allen, & Smith, 1993)

Affective Commitment Scale

1. I would be very happy to spend the rest of my career with this organization.
2. I really feel as if this organization's problems are my own.
3. I do not feel a strong sense of "belonging" to my organization. (R)
4. I do not feel "emotionally attached" to this organization. (R)
5. I do not feel like "part of the family" at my organization. (R)
6. This organization has a great deal of personal meaning for me.

Continuance Commitment Scale

1. Right now, staying with my organization is a matter of necessity as much as desire.
2. It would be very hard for me to leave my organization right now, even if I wanted to.
3. Too much of my life would be disrupted if I decided I wanted to leave my organization now.
4. I feel that I have too few options to consider leaving this organization.
5. If I had not already put so much of myself into this organization, I might consider working elsewhere.
6. One of the few negative consequences of leaving this organization would be the scarcity of available alternatives.

Normative Commitment Scale

1. I do not feel any obligation to remain with my current employer. (R)
2. Even if it were to my advantage, I do not feel it would be right to leave my organization now.
3. I would feel guilty if I left my organization now.
4. This organization deserves my loyalty.
5. I would not leave my organization right now because I have a sense of obligation to the people in it.
6. I owe a great deal to my organization.

Note. (R) indicates a reverse-keyed item. Scores on these items should be reflected (i.e., 1 = 7, 2 = 6, 3 = 5, 4 = 4, 5 = 3, 6 = 2, 7 = 1) before computing scale scores.