

MASTER

Design & implementation of a performance management system

van Assema, I.M.

Award date:
2011

[Link to publication](#)

Disclaimer

This document contains a student thesis (bachelor's or master's), as authored by a student at Eindhoven University of Technology. Student theses are made available in the TU/e repository upon obtaining the required degree. The grade received is not published on the document as presented in the repository. The required complexity or quality of research of student theses may vary by program, and the required minimum study period may vary in duration.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain

Eindhoven, July 2011

Design & Implementation of a Performance Management System

by

Idsart van Assema

Student identity number 0600919

in partial fulfilment of the requirements for the degree of

**Master of Science
in Operations Management and Logistics**

Supervisors:
Dr. Tanja Bipp
Dr. ir. Ad Kleingeld

TUE. School of Industrial Engineering.
Series Master Theses Operations Management and Logistics

Subject headings: Human Performance, Productivity Measurement, Productivity Improvement.

Preface

Looking back at the period I spent at the University I can say that I have always enjoyed the time and the atmosphere. I feel that my study shaped my life in a positive way and gave me the mentality, knowledge and tools needed to succeed in both a research and business environment. There were times of stress and hard work, but also of inspiration and relaxation. Choosing for the TU/e, faculty Industrial Engineering & Innovation Sciences, and Master Operations Management & Logistics was right for me.

This master thesis report is one of the end products of the study, together with the prior conducted literature study and research proposal. After approval of my supervisors I will have the opportunity to defend my thesis during a presentation and a question and answer session. This point was not achieved with ease. Especially, since I conducted my master part-time and my thesis as entrepreneur. On top of that my wife and I were so fortunate to give birth to two healthy sons. I have no idea how I managed to combine it all, but I do remember the countless evenings and nights that I was working on my project. I feel a sense of pride and relief when I hand over this report and finish my studies.

Carrying out this project in the company was a great experience. This was mainly because it was nice to cooperate with the employees in the design team. Also, I strongly feel that the implementation of the performance management system helped the organization to improve on topics as goal clarity, performance feedback and goal rationale.

What is also important to me, is to take this opportunity to thank the people who played a role in my studies. First, I would like to thank my master thesis supervisor dr. Tanja Bipp for her patience, critical feedback and coaching. Second, I would like to thank my second supervisor dr. Ad Kleingeld for reading and commenting on my report three times during the project. Third, I would like to thank my wife Bregtje van Assema-Looijmans for her continuous support and patience with me during the six years I spent on the TU/e. Fourth, I would like to thank my father and mother for their believe in me which gave me the self-efficacy needed to go for my goals. Fifth, I would like to thank Franca van Ham and Fred Das for supporting me. Last, I need to apologize to my family and friends for being very egocentric during the last months of my master thesis. I will make it up to them!

Idsart van Assema
15th of July 2011, Dommelen

Management Summary

To improve the performance of organizations and its members, the design and use of performance management systems are of central interest to managers and researcher. Performance management systems are used in organizations to motivate employees and for strengthening organizational objectives. The word *system* is important because it implies that all performance management practices belong to a set of entities forming an integrated whole that links individual behaviour to the organizational objectives.

This master thesis project is initiated to solve a business problem which was indicated by the management of the company at which the project was carried out. Problems are experienced with working with objectives which hinders the organization from growing further. Tasks were delegated but because no clear objectives were given employees do not know what is expected from them. A performance management system (PMS) was suggested as direction of solution.

PMSs are defined as “the evolving formal and informal mechanisms, processes, systems, and networks used by organizations for conveying the key objectives and goals elicited by management, for assisting the strategic process and on-going management through analysis, planning, measurement, control, rewarding, and broadly managing performance, and for supporting and facilitating organizational learning and change”. (Ferreira & Otley, 2009, p264). For PMSs three essential characteristics are discussed which have positive and negative consequences which work out different depending on the characteristics of the organization. The characteristics of PMSs are that they can have a top-down or bottom-up approach, can be individual or group oriented, can have objective or subjective measures of performance. PMSs use a theoretical background in their design. Three of these theories are discussed: goal setting, feedback and pay for performance and key points are given which should be incorporated into the design. A comparison was made using a conceptual framework with 12 key aspects between three PMSs: the Balanced Score Card BSC, Productivity Measurement and Enhancement System (ProMES) and Tableau de Bord (TdB). The last mentioned scores weakest on all points, BSC scores high on higher level aspects like strategy, mission, vision, organization structure and key success factors, ProMES scores high on aspects as key performance measures, target setting and performance evaluation.

A problem definition was developed following the stream analysis from Porras. The stream analysis revealed two root cause statements. One was titled “Structure and Time Pressure” but was not chosen for this project because of the limited time involved. The second root cause was titled “Goal Setting & Objectives” which indicated problems with measuring performance, the lack of objectives, unclear and not measureable objectives, organizational objectives that are not communicated within the organization, strategy is not dispersed through the organization, difficulties with setting job priorities, double positions and unclear responsibilities. Looking at the problems and the root cause story a performance management system could provide a solution if the topics are included conform the framework of Ferreira & Otley (2009) that discusses essential elements of a performance management system. A final project description was given:

“Design and implement a performance management system for the organization to solve the business problems that were identified by the stream analysis. The characteristics of the system should match with the organization and the underlying theories have to be applied in the design phase for best results. A pilot project must be set up in order to evaluate the use of the system and to decide if a performance management system has to be implemented companywide”

From this description a central research question and sub questions were formulated that needed to be answered:

1. Could a performance management system solve the business problems as identified by the stream analysis?
 - a. *Could the problems that were indicated be validated using quantitative research?*
 - b. *Which unit of the organization could be selected for a pilot project?*
 - c. *Which characteristics should the system have to match the organization?*
 - d. *How can underlying theories be incorporated into a system?*
 - e. *How can be evaluated if the system is successful?*

With the problem description and the identified root causes a thorough analysis was made by using a questionnaire which includes questions from the Goal Setting Questionnaire, Job Ambiguity, Motivation Assessment Questionnaire, Organization Climate Measures, and Job Satisfaction Measure. This analysis revealed that relative low scores were found for goal rationale, performance feedback, clarity of organizational goals, job factors and goal clarity.

For sub-question **1a** can be answered that the problems were validated by using quantitative research. As the scales that scored low are included in the framework of Ferreira & Otley (2009) a performance management system is selected as solution for the identified problem areas.

Another result from the analysis is that relative weak scoring departments were identified. Although the differences between the departments were small, it was decided to group the production leaders, production manager and the production employees. Together they represent three production departments. By selecting this unit sub-question **1b** was answered.

Decided was to start a pilot project for which a PMS is designed for these three departments. The production leaders and manager formed the design team together with the researcher. The design of the PMS is based on ProMES because of its proven results for production departments. Besides this, the characteristics of this system as the bottom-up approach, group orientation and use of objective measures of performance fit the departments and the organization. This implicitly answers sub-question 1c. However, because of time constraints not a full ProMES as defined by Pritchard *et al* (1993) was designed. The development of the objectives and indicators was made similar to the original ProMES because participation of the employees is regarded as very important for this stage because of its positive influence on the acceptance of the objectives and indicators. In order to speed up the development process, the development of weights of the indicators and contingencies, and the feedback reports was done by the researcher. This was thoroughly discussed with the production leaders and manager. They were asked for their opinion, suggestions and approval of the system which resulted in minor adjustments.

The implementation went smooth which is due to the participative design process. Only minor problems were experienced such as different measurement methods for the indicators by the employees and Excel sheets that were needed for filling in the measurement results contained some difficulties in the formulas.

With regard to the underlying theories of performance management it can be concluded that goals are used as a motivational force. For the best performance specific, difficult goals were set for tolerances in the production. One of the ways of enhancing goal commitment is to have employees participate in setting them which was done in the design stage. Other ways for enhancing goal commitment were used as well like making public commitment and by leaders who behave supportively. In this way the importance of the goals is stipulated.

It is generally assumed that feedback on performance will improve the outcomes for future activities. DeNisi & Kluger (2000) discuss ways to design feedback systems which maximize their effectiveness. Their recommendations for feedback interventions were discussed with the production leaders before the feedback meetings.

Although pay-for-performance was also discussed as being an underlying theory for a performance management system, the subject was not included in this design. The reason for this is that the time available for the project did not allow for incorporating it into the design. So for sub-question **1d** can be answered that the goal setting practices and feedback theory were included in the design, but that pay-for-performance was not. It is recommended to assess this in a later stage.

After implementing the system an evaluation was made by using a structured interview which revealed that the designers / interviewees are positive about the system. However, critical remarks are made as well and will be used for improvement of the system. It was indicated that some working activities are not included in the system such as packing finished goods and time spent on handling trading products.

The interviewees also indicated that goals were specific and clear and that the feedback meetings are believed to provide employees with a better understanding of the job. The first feedback meeting for each department did not result in a lively discussion with the employees that worked on the project. However, during the second meeting, employees joined the discussion. It is concluded that employees need time to get used to the system and the feedback meetings. What is mentioned as well is that the production leaders are more conscious of the performance measures and discovered that employees use different ways of measuring the performance indicators. Also, it was discovered that tolerances for some indicators were not as strict as they should be, this was corrected immediately. For sub-question **1e** can be answered that the interviewees see the implemented system as successful albeit with some critical points for improvement.

After answering the sub-questions, an answer can be formulated for the central question as well. The business problems that were identified in the stream analysis are recalled: No measures of efficiency of decisions are available (related to performance feedback and job factors), caused by goals and objectives which are not SMART (related to goal clarity). Goals and objectives are not communicated through the organization or do not exist at all (related to goal rationale, job factors). From the evaluation is concluded that the intervention clearly improved on the topics that were identified as problems. However, the evaluation is qualitative and does not show to what extent improvements are made. For this reason it is recommend to conduct the developed questionnaire for a second time as quantitative research tool to assess to what extent improvements were made.

Table of Contents

1. Introduction	9
2. Performance Management Systems	11
2.1. Definitions Performance Management Systems.....	11
2.2. Characteristics of PMSs	11
2.2.1. Top Down versus Bottom Up Approach	12
2.2.2. Individual versus Group Orientation	12
2.2.3. Objective versus Subjective Measures of Performance.....	13
2.3. Theoretical Background of PMSs	13
2.3.1. Goal Setting.....	14
2.3.2. Feedback.....	15
2.3.3. Pay for Performance	15
2.4. Comparison Performance Management Systems	17
3. Description of Field Site.....	19
3.1. Organization	19
3.2. Activities	20
4. Problem Definition	21
4.1. Porras Steam Analysis.....	21
4.1.1. Collecting Problems for Analysis.....	21
4.1.2. Stream Analysis Chart.....	24
4.1.3. Root Cause Statements	24
4.2. Final Project Description.....	25
5. Research & Analysis of Work Conditions	27
5.1. Research Method.....	27
5.1.1. Descriptive Statistics	29
5.2. Comparison between Groups	35
5.3. Conclusions Data Analysis.....	38
6. ProMES as basis for PMS	39
6.1. ProMES Design Steps	39
6.2. Characteristics of ProMES	40
6.3. Theoretical Background of ProMES	41
6.4. Implementing ProMES.....	41
6.5. Empirical Evidence for ProMES	41
7. Design of a ProMES based PMS.....	42
7.1. A ProMES based PMS design.....	42
7.2. Process of Development of PMS.....	43
7.2.1. Development of Objectives	45
7.2.2. Development of Indicators	46
7.2.3. Development of Indicator Weights and Contingencies	48

7.2.4.	Development of Feedback Report and Sessions.....	50
7.3.	Implementation of PMS	52
7.4.	Evaluation of PMS Design	52
8.	Discussion	55
8.1.	Limitations.....	57
8.2.	Recommendations	58
	References	59

1. Introduction

To improve the performance of organizations and its members, the design and use of performance management systems are of central interest to managers and researchers (Stringer, 2007). Performance management systems are used in organizations to motivate employees and for strengthening organizational objectives. The word *system* is important because it implies that all performance management practices belong to a set of entities forming an integrated whole that links individual behavior to the organizational objectives.

This is a design oriented study which discusses the design and implementation of a performance management system in a company with just over thirty employees. The management of the company indicated that problems were experienced with working with objectives which was confirmed by an independent auditor. It is believed that this hinders the organization from growing further. Tasks have to be delegated to employees; this means that employees should be given objectives to focus on in order to know what is expected from them. A performance management system was suggested as a possible solution. At the start of the project Porras' stream analysis (Porras, 1987) was used for providing a quick overview of the problems that are experienced in the company. The analysis identified two root causes from which one concerns "goal setting and objectives" that largely matched the problem as described by the management. This root cause was selected to be addressed and led to the following central question with five sub questions:

1. Could a performance management system solve the problems as identified by the Porras stream analysis?
 - a. *Could the problems that were identified by the stream analysis be validated using quantitative research tools?*
 - b. *Which characteristics should the system have to match the organization?*
 - c. *How can underlying theories be incorporated into the system?*
 - d. *Which unit of the organization could be selected for a pilot project?*
 - e. *How can be evaluated if the system is successful?*

A regulative cycle based on van Aken *et al* (2007) was followed which consists out six of steps starting with the problem mess as can be seen in figure 1.

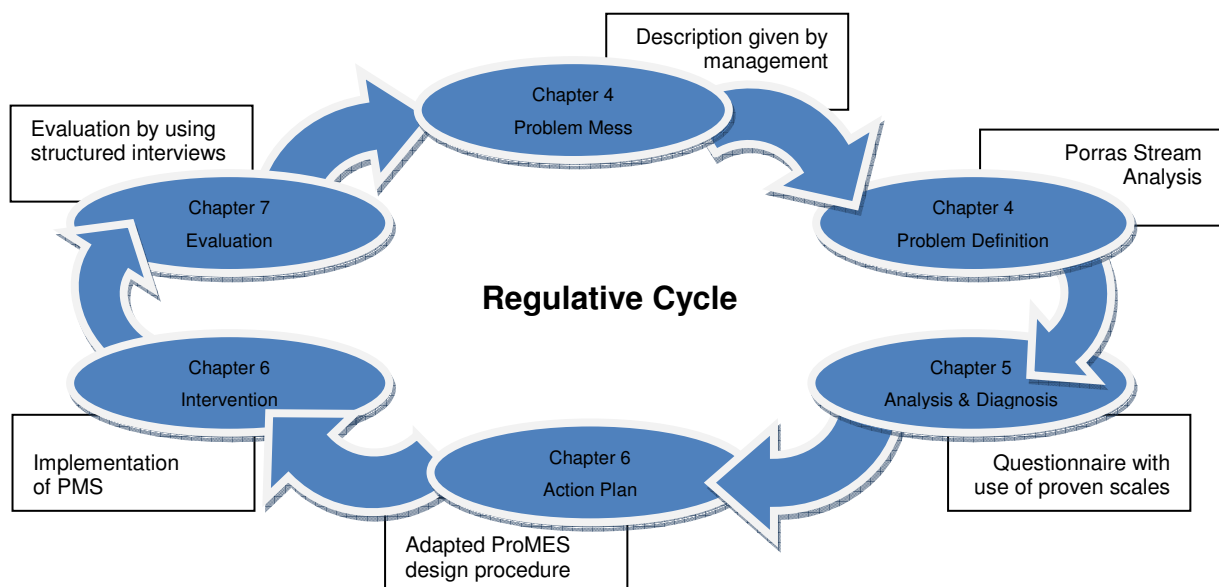


Figure 1: Regulative Cycle (based on van Aken *et al*, 2007) with chapter numbers and approach

This master thesis report starts in chapter 2 with an introduction into the subject of performance management systems. In chapter 3 a description is given of the field site; the organization and the activities of the company under consideration are discussed here. In chapter 4 the problem mess is described and a problem definition was developed using the qualitative stream analysis from Porras (1987). Chapter 5 continues with a quantitative analysis by using a questionnaire. Conclusions were drawn from this analysis indicating that a performance management system could be a solution for the relatively low performing areas. ProMES provided a foundation for designing a PMS in this study and is briefly discussed in chapter 6. Decided was to start a pilot project for which a performance management system is designed for three departments which is discussed in chapter 7. After the implementation an evaluation is made by using a structured interview which revealed that the interviewees are positive about the system in general, but points for improvement are given as well. In chapter 8 this master thesis finalized with the discussion which provides conclusions, limitations and recommendations.

2. Performance Management Systems

It is necessary to build a further understanding in performance management systems. To start with, this chapter provides a definition for a performance management system (PMS) as it will be used in this study. Hereafter, it continues by discussing essential characteristics and theories that form the foundation of PMSs. These characteristics and theories will be used for the design of a PMS which will be described in chapter 6. Three different PMSs are discussed briefly and a comparison is given in which the PMSs are scored on essential elements.

2.1. Definitions Performance Management Systems

In this paragraph, a definition will be given for 'performance', for 'performance management' and for 'performance management systems'. It is important that these definitions are given in order to build a common understanding throughout this report.

Performance

"Performance is defined as the actions or behaviours relevant to the organization's goals; measures in terms of each individual's proficiency. Performance is not the consequence or result of action; it is the action itself." (Campbell, 1993, p.40)

Performance Management

"Performance management is defined as a range of practices an organization engages in to enhance the performance of a target person or group with the ultimate purpose of improving organizational performance." (DeNisi, 2000, p.121)

Performance Management Systems

"Performance management systems are the evolving formal and informal mechanisms, processes, systems, and networks used by organizations for conveying the key objectives and goals elicited by management, for assisting the strategic process and on-going management through analysis, planning, measurement, control, rewarding, and broadly managing performance, and for supporting and facilitating organizational learning and change". (Ferreira & Otley, 2009, p264)

After reading these definitions a structure can be found: *performance* itself is defined as the action itself that is relevant to the organizational goals. It is not about the actual result, which could be positive or negative. *Performance management* in its turn are the activities the organization engages to enhance performance. It is about managing the actions that employees undertake relevant to the goals of the organization. The addition of the word system in *performance management systems* implies that all performance management practices in the organization belong to a set of interacting or interdependent entities forming an integrated whole. The system is created to link individual behaviour to the organizations strategy and goals. The definition of Ferreira & Otley (2009) is relatively long, but it incorporates the essentials and completeness of a performance management system as defined in their conceptual framework. This framework was also used for analysing and comparing three performance management systems. The results of this comparison will be presented at the end of this chapter.

2.2. Characteristics of PMSs

It was found that every PMS has its own characteristics (van Assema, 2011). These characteristics will be discussed with regard to the top-down / bottom-up approach, individual / group orientation, and objective / subjective measures which are believed to be the central aspects of any PMS. Since a PMS will be developed in this study, it needs to be investigated

which characteristics and thus which PMS would fit the organization. This evaluation is done by comparing different performance management systems on the central aspects and an assessment whether they would fit the organization. However, the time available for a master thesis project prevented to design a system as defined by their developers. An adapted performance management system was developed which will be described in chapter 6.

2.2.1. Top Down versus Bottom Up Approach

When designing a PMS, the following question arises: who will set the objectives? The objective setting process can follow the traditional top-down approach or the emergent bottom-up approach (Otley, 1999). Besides that, the participation of the employees in the process of setting the objectives is a key element that must be considered for both approaches.

In the top-down approach the top managers do the strategic thinking, decision making, planning and communication to the organization's members. Top down PMSs take the organizations strategy as a given and the PMS is used as a major instrument to make explicit the set of means-end relationships that was developed by the organization in order to implement the strategy (Otley, 1999). A critical remark is that research shows that it is difficult for top managers to control how middle managers understand and accept the (new) strategy (Balogun & Johnsons, 2004).

In the bottom-up approach the performance management system is designed by the lower levels of the organization which is more likely to result in greater understanding of the strategic intent, broader acceptance, and provide for a broader organizational alignment (Ferreira & Otley, 2009). A key element in the bottom up approach is the participation of employees in the decision making process. The acceptance of measurement and feedback system, which is part of the PMS, is influenced by the employee's perception of fairness of the system. This perceived fairness is in its turn heavily influenced by the degree of participation of those involved Pritchard *et al* (1988). Also, Kleingeld *et al* (2004) address the importance of participation of employees. They found that satisfaction with the program, and the perceived usefulness of the feedback, were significantly higher in the participation condition when compared to a tell-and-sell strategy. A critical remark is that in the bottom up approach it is important to keep an eye on the conformity with the organization's strategy. A risk is that the PMS proves to misfit with the organizational objectives when conformity of the organization's strategy is not addressed adequately during the design phase.

2.2.2. Individual versus Group Orientation

A PMS could be designed to have an individual or group orientation. From a motivational point of view there is a difference. Pritchard *et al* (2008) provide results in a meta-analysis where the focus on individual performance had bad consequences. Their point is that when employees are rewarded for their individual performance, teamwork is discouraged which has a negative effect on group performance. Individual based plans will not generate cooperation when the work is highly interdependent and might be seen as unfair when individual effort and ability do not determine overall performance.

Also a group orientation has its problems according to Rynes *et al* (2005). People are individuals; they tend to search for opportunities where individual results are rewarded more heavily. Group oriented incentives can be weakened by the social-loafing problem, which are more likely to occur with larger groups. Another weakened effect is found for aggregated incentives such as gain sharing, profit sharing and stock plans. On the contrary, aggregated plans may have a positive effect in situations where cooperation is promoted, people with cooperative values are attracted, and overly narrow individual goals are avoided.

2.2.3. Objective versus Subjective Measures of Performance

Performance could be measured objectively which is usually a number such as the number of products produced per hour. When performance is measured subjectively, the rater interprets performance and decides if it is good or bad. Gerhard (2000) addressed four advantages of subjective measures relative to objective measures. The first one is that subjective measures can be used for any kind of job. Second, variables can be taken into account that are not in the individual's control but influence performance. Third, a judgement can be made on whether results are achieved by acceptable means and behaviours. Fourth, the risk of lacking measured results and the over-focus of employees on measured results is lower. However, the subjectivity brings risks as well. The most obvious risk is the subjectivity itself. Meta-analytic evidence finds a mean inter-rater reliability of only 0.52 for performance ratings (Viswesvaran *et al*, 1996). An inter-rater reliability value of 1 means that two or more raters agree completely with each other's ratings. A value of 0 means that the raters completely disagree with each other's ratings. Besides differences in judgment by the raters themselves and ratee, it is difficult for organizations to make decisions regarding differentiating employees on the basis of their subjective performance measures.

Objective measures provide a higher acceptance by employees because of the objectivity itself. But, such objective measures are not available for most jobs (Rynes *et al*, 2005) and certainly do not cover all tasks and behaviours of employees. Besides that, results based plans increase risk bearing by employees (Gibbons, 1998). Risk bearing may go unnoticed as long as performance is positive and the plan is paying out for the employees. But when results decline and payments go down, major employee relation issues might be the result. Especially when the feeling arises that the results are being perceived as not in control of the employee. According to Gibbons, many results based plans are abandoned because of the pressure exerted by employees.

Conclusions can be drawn from the last three paragraphs which were taken into account when designing the PMS in chapter 6. The bullet points sum up the important aspects:

- Participation of employees in the design phase has a positive influence on the acceptance of the PMS.
- When using a top-down approach attention has to be devoted to the understanding and acceptance of the strategy and objectives by the middle managers.
- When using a bottom-up approach attention has to be devoted to ensure that the design does not misfit with the organization's strategy.
- If teamwork determines performance, the PMS should not focus on individual performance.
- When the PMS has a group orientation attention has to be paid to the fact that social loafing might occur during operation.
- Objective performance measures provide higher acceptance by employees.
- Subjective measures are more flexible in use, but research show low inter-rater reliability.

2.3. Theoretical Background of PMSs

In this paragraph essential theoretical background of PMSs will be discussed. The topics that are addressed are goal setting, feedback, and pay for performance. These topics are considered to be of most importance in every PMS. When designing a performance management system, the theories that form the foundation of the system need to be incorporated. This will be done during the design stage where goals are set; feedback loops are designed and pay for performance could be incorporated.

2.3.1. Goal Setting

Goals or objectives form the basis of performance management systems. They serve two purposes: control and motivation. It has been long established that a fundamental requirement for control is the existence of objectives; objectives are used to evaluate performance (Otley and Berry, 1980). Besides that, Locke & Latham (1990) established their well-known goal-setting theory and claim that a goal is a motivational force, and that specific, difficult goals lead to the best performance. Performance management systems make use of the controlling and motivational nature of goals by setting objectives that must be achieved by the individual or group. Implicitly can be said that objectives must be set with care. They determine what is considered to be important and must be controlled.

There are also moderators that are taken in consideration during the design phase. In the work of Locke & Latham (2002) a review is done of their 35 years of work on goal setting theory. Figure 1 shows the essential elements of the goal setting theory. Although not all elements as presented in the figure are included in this study, it is useful to place the subject into perspective. The figure starts with the goal core. For the best performance goals should be specific and difficult but attainable. Five moderators influence the relation: goal commitment (one's determination to reach a goal), goal importance, self-efficacy (believe in one's capability to complete a task successful or reach a certain goal, Bandura, 1997), feedback, and task complexity.

Goals affect performance through four mechanisms. Goals direct attention and effort to activities relevant to the goals. Goals also have an energizing function which means that high goals lead to greater effort as compared to low goals (Locke & Latham, 2002). Goals affect persistence as well. When hard goals are given, prolonged effort is put into attaining the goal. The last mechanism regarding strategies is more complex but less relevant to this study, the reader is referred to Locke & Latham (p707, 2002) for further reading.

With the outcomes of performance, one can be satisfied when goals are reached or exceeded but also dissatisfied when goals are not attained. The more success one has the higher one's satisfaction. This will positively influence the willingness to commit to new challenges which in its turn positively affects goal commitment. However, this could be different when one is not satisfied with performance or rewards, which lowers the willingness to commit to new challenges and results is lower goal commitment.

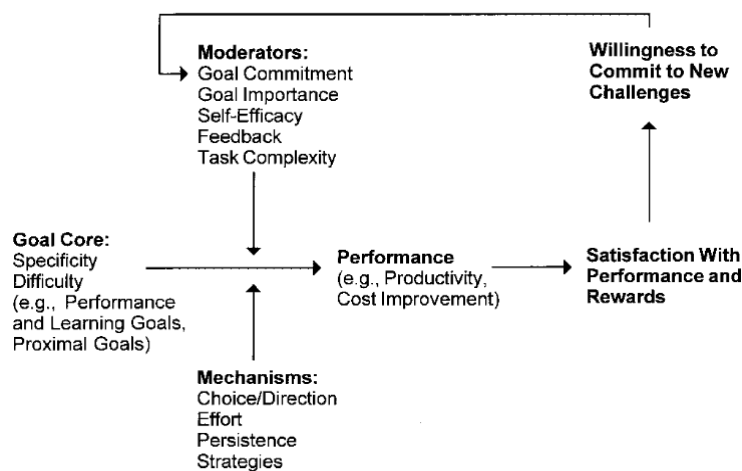


Figure 2: Essential Elements of the Goal-Setting Theory (Locke & Latham, 2002, pp714)

Individuals have to be committed to their goals to perform the best. Especially difficult goals require commitment in order for the best performance. For the design of a performance management system the question arises how to arrange for employees to be committed to their goals. There are multiple ways for enhancing goal commitment which are discussed by Locke & Latham (2002). One of the ways of enhancing goal commitment is to have employees participate in setting them. However, the authors show that literature does not provide an unambiguous view. This is an important finding that has to be kept in mind when designing a PMS. Other ways to enhance goal commitment that are discussed are making public commitment and communication of an inspiring vision by leaders who behave supportively. In this way the importance of the goals is stipulated which contributes to goal commitment.

The next paragraph will discuss feedback separately. Self-efficacy and task complexity will not be discussed in this report as it is not regarded as part of the design of the PMS.

2.3.2. Feedback

It is generally assumed that feedback on performance will improve the outcomes for future activities. But, poorly implemented feedback programs could worsen the situation, rather than improve performance (DeNisi & Kluger, 1996). It was found in their meta-analysis that 38 percent of the feedback effects were actually negative. DeNisi & Kluger (2000) discuss ways to design feedback systems which maximize their effectiveness. They have the following recommendations for all feedback interventions:

- Focus on the task and task performance only, not on the person or any part of the person's self-concept.
- Be presented in ways that do not threaten the ego of the recipient.
- Include information about how to improve performance.
- Include a formal goal-setting plan along with the feedback
- Maximize information relating to performance improvements and minimize information concerning the relative performance of others.

Although the focus of DeNisi & Kluger's paper is primarily on the 360-appraisal system, they point out that their recommendations can be used for any feedback system. Locke & Latham (2002) discuss the importance of feedback in the goal setting theory as well. With a practical example they show the importance of feedback: when a person is given a goal of cutting 30 trees in a day, they will only know if they are on target if feedback is given of how many trees they have cut. New strategies or increase of effort will be the result if people have not attained the goal. If the goal has been achieved, people generally set higher goals for themselves.

2.3.3. Pay for Performance

In a meta-analysis by Locke *et al* (1980) in search for alternative motivational interventions is concluded that money is the most crucial incentive and that no other incentive or motivational technique comes even close to that. Organizations use pay for performance to motivate their employees and to increase the probability that high performing employees stay with the organization. For these reasons it should be considered if pay for performance should be integrated in a PMS design. Because PMSs incorporate performance evaluation and pay for performance these have to be connected in a certain way, otherwise it is not part of the *system* as defined in the beginning of this chapter. However, due to time constraints, pay for performance will not be integrated in the PMS design for this study.

Conclusions can be drawn from the last three paragraphs which were taken into account when designing the PMS in chapter 6. The bullet points sum up the important aspects:

- Goals should be specific and difficult but attainable for best performance.
- Goal commitment, feedback and goal importance are moderators that affect the relation between goals and performance and should be considered during the design of the PMS.
- Participation of employees in setting goals results in higher goal commitment.
- Goal commitment is enhanced by public commitment and communication of an inspiring vision by leaders who behave supportively. In this way the importance of the goals is stipulated which contributes to goal commitment, thus performance.
- Feedback is an essential part of any PMS and moderates the relation between goals and performance. When feedback is given, consider the following points:
 - Focus on the task and task performance only, not on the person or any part of the person's self-concept.
 - Be presented in ways that do not threaten the ego of the recipient.
 - Include information about how to improve performance.
 - Include a formal goal-setting plan along with the feedback
 - Maximize information relating to performance improvements and minimize information concerning the relative performance of others.

2.4. Comparison Performance Management Systems

The conceptual framework of Ferreira & Otley (2009) was used to analyze and compare three of the most discussed performance management systems: Balanced Score Card, Productivity Measurement and Enhancement System, and Tableau de Bord. In table 1 the results of the comparison are displayed. For further reading the literature study that was carried out prior to this thesis could be consulted. Stars indicate the incorporation of the topic in the PMS. The system which incorporates the topic best receives three stars, and the worst incorporation of the topic receives one star. The analysis provides useful insights into the strong and weak aspects of the three performance management system.

Framework in the form of Questions	Balanced Scorecard	ProMES	Tableau de Bord
1. Vision and mission	***	*	**
2. Key success factors	***	**	**
3. Organization structure	***	*	**
4. Strategies and plans	***	*	**
5. Key performance measures	**	***	*
6. Target setting	**	***	*
7. Performance evaluation	**	***	*
8. Reward system	**	**	*
9. Information flows – Systems and networks	**	**	*
10. Use of information and control mechanisms	**	***	*
11. Changes in PMSs	**	***	*
12. Strong and coherent links	**	***	*(***) depends on approach (p26)
Total number of stars	28	27	16 (18) ^{depends on approach (p26)}
<i>Stars indicate the importance of the topic in the PMS relative to the others. A maximum of three stars can be obtained, a minimum of 1 star can be obtained.</i>			

Table 1: Comparison of three PMSs on 12 topics

As can be seen in the table, Balanced Score Card (BSC) and Productivity Measurement and Enhancement System (ProMES) include topics of performance management systems to the largest extend. However, they score on completely different topics. Tableau de Bord (TDB) includes the topics to the least extend. It should be noted that this comparison is not conducted to determine what the best system is, merely to show the strong and weak aspects relative to each other.

The BSC is the strongest in communicating the strategy and plans, vision and mission, and key success factors of the company. Because of its design, it could be used for all kinds of companies, 60 to 80 percent of the fortune 500 companies use the BSC (Newly, 2008). The BSC could be considered as the tool that has the best fit with top-management as it has a strong top-down approach, communicates the vision and strategy that are set by top management, and works these plans out to key success factors, key performance measures and targets for each department or even the individual employee. This might explain why the

BSC is the most popular PMS. Besides topic 1 to 4, the BSC does not pay much attention and the “how and why” for the topics from 5 – 12. These topics are included in the papers from Kaplan & Norton (1992, 1996), but not discussed extensively.

ProMES scores low on the communication of the vision and mission, strategies and plans, and organizational structure. ProMES as a PMS is developed for companies that are production oriented. That is where the focus of this system is on. This limits the applicability of the system; it does not suit every organization. A bottom-up approach is used with the assumption that the design team knows what is expected from their unit when developing objectives and performance indicators. In the comparison strong scores are achieved on key performance measures, target setting and performance evaluation. These topics are extensively discussed in the literature of Pritchard et al (2002). ProMES scores well on the use of information and control mechanisms, changes, and strong and coherent links.

TDB does communicate the vision and mission, key success factors, and strategy and plans, but not as strong as the BSC. There is no consistent view found in literature on the TDB as a PMS Bourguignon et al (2003). Topics 5 – 12 are merely addressed in the literature on TDB, for this reason it obtains the lowest score on these topics.

Similar to the BSC, TDB translates vision and strategies into objectives and measures. The approach is to link top management decisions to the actions of the employees, a so-called top-down approach, the opposite from the bottom-up approach that is used with ProMES. The BSC differs from TDB and ProMES in the sense it has four pre-categorized areas of measurement and it is built on Porters strategic model (Porter, 1980, 1985). Although Kaplan & Norton (1996) claim that this should not be perceived as a “straitjacket” and that other areas may be included. ProMES and TDB do not rely on a specific strategic model or pre-defined areas of measurement. ProMES does rely on the lower levels in the organization to decide which measures to adopt and which targets to set. Although the employees have to present their work to their management, a lot a work has be done already before management can intervene. TDB does rely on the conception of strategy of each manager. This means that the manager’s subjectivity plays a major role in the design of the area of measurement. The pre-determined categories of the balanced scorecard make it practical for application (Epstein & Mazoni, 1998). ProMES and TDB do not have predetermined categories and are therefore considered more complicated to develop and implement.

3. Description of Field Site

This design oriented project focuses on a business problem and has been conducted in a field site. The previous chapters gave the introduction into the subject and elaboration on characteristics and theories behind performance management systems. This paragraph will discuss the organization and its activities which is the context in which the project was carried out. The company is addressed under general designations such as “the company” or “the organization” for confidentiality reasons.

3.1. Organization

The organization in which the project is carried out is a privately held company which is based in the surroundings of Eindhoven. The company was established in 1992 and currently employs 33 employees. A yearly turnover of approximately 5 million Euros is realized of which 98% is earned internationally. The general manager and sales & development manager are the company’s only shareholders and form the board of directors. Together with the sales, marketing and quality employees, the board of directors form the management team of the organization that is responsible for the day-to-day operations and responsibilities. Further, three team leaders are responsible for production activities in three production departments. The organization is supported in its activities by the administration, a quality engineer and a health, safety and environment consultant. The organizational chart was obtained from the ISO9001:2010 documentation and is presented in Figure 3.

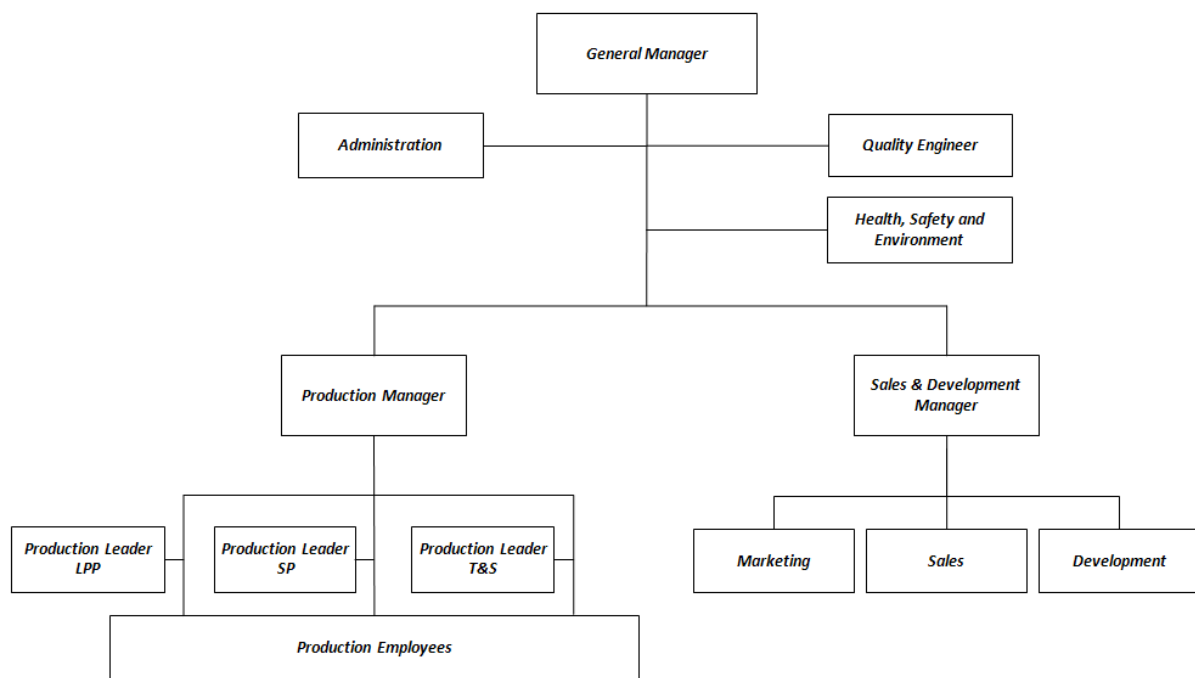


Figure 3: Organization chart of the organization in June 2011 (from ISO9001:2010 handbook)

The general manager is one of founders of the company. His role has changed from being a starting entrepreneur to being general manager of over thirty employees. In 2006 the author of this paper joined the company and combined a part-time job with his studies at the university. At the end of 2006 the author discovered that the company did not have an explicit corporate strategy, mission or vision. In 2007 a strategy was formulated during a 3 day session at a location outside of the company. The general manager, marketing & quality manager and author were at that time the management team at the company which had 15 employees at that time. The formulated strategy was implemented and guided marketing campaigns and product developments. After adopting the strategy the yearly turnover

doubled within two years. In 2009 the strategy was reassessed and adapted. During the rapid growth in recent years, the management team was strengthened with three new employees. In total, the employees more than doubled from 15 to 32 at the end of 2008. During the economic crises in 2009 and 2010 the number of employees decreased to 22. At that time the author operated as sales & development manager. In April 2010 the author joined the company as shareholder. As can be read, the organization has been exposed to many changes in the last three year. The organization can be described as young, flexible and growing.

3.2. Activities

The company is active in the pipeline industry. Pipelines are constructed for transport of water, oil or gas and are very capital intensive. An example is the recent 7 billion Euro Nord Stream pipeline that brings natural gas from Russia through the Baltic Sea to the EU. For these projects the company develops and manufactures products which protect pipes from damaging during the logistics in the supply chain. Figure 2 shows a simplified figure of the supply chain. Because projects are carried out globally, the supply chain and the logistics are complicated. The company supplies its products to companies that are active in the supply chain of line pipes. Examples are project management organizations, pipe manufactures, pipe coaters, pipe transport and handling companies, pipe storage facilitators, and the pipeline constructors. The goal of all these companies in the supply chain is to complete a pipeline project which supplies gas, oil or water to the desired destination. Typical pipelines have diameters that range from 24 inch (609,6 mm) to 56 inch (1.422,4 mm) and have lengths that range from hundreds to thousands of kilometres that often cross borders of several countries. Hence the international focus of the company.

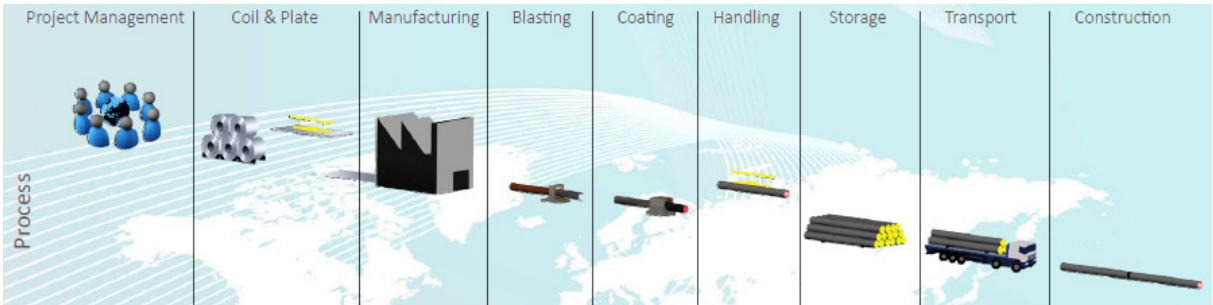


Figure 4: Supply chain of pipe lines

The products and services of the company are designed to enhance efficiency, quality and safety in the supply chain. Examples are consulting services to project management, equipment which enhances manufacturing processes, pipe transport equipment for truck and train, storage systems for line pipes, and equipment for pipeline constructors. New product developments are initiated by the company or the customers. Lead customers are approached for customer involvement during the early phases of the design stage. After approval of the product of the lead customer, the products usually find their application for other customers. Approximately 50% of the products are manufactured in the factory of the company. Further, 40% of the products are assembled in the factory and the remaining 10% are trading products.

4. Problem Definition

As described in the chapter 2 the company is expanding. In order to grow further, responsibilities have to be delegated in the organization. The board of directors expressed that the company is experiencing problems with delegating responsibilities, setting goals and dispersing the corporate strategy through the organization. Employees indicated that they often do not know what is expected from them. In this chapter a more concise problem definition will be developed by using Porras' stream analysis.

4.1. Porras Steam Analysis

When performing research it is important to start with a proper problem definition. For formulating the problem definition out of the problem mess, the stream analysis of Porras (1987) is used. This analysis is chosen because it identifies core problems in a systematic way and indicates causal relations between the core problems. The method also indicates at which area most core problems appear. Problems with regard to goal clarity, motivation and role clarity are found by use of interviews, observation and company documentation.

The method of Porras (1987) exists out of five steps: collecting problems, choice for root causes, relations between the problems, the stream analysis chart and root cause statements. Porras suggests ways to search for initial core problems such as interviewing employees, observing employees, use of questionnaires and searching corporate documentation. The researcher determines on his own criteria which core problems are subject for the study. Relations between the core problems are investigated with the use of a table which also visualizes the direction of the connections. The next step is to create the stream chart which makes it possible to diagnose problems. It is a schematically representation of the connections between the core problems. The core problems are divided into columns that represent a dimension which is considered to be of importance by the researcher. The core problems are displayed as squares and the connections between them as arrows. An arrow is drawn if one problem is causing another and points in that direction. With the help of these connections it is possible to indicate what the core problems, sub-problems, and symptoms are.

After constructing the stream chart root cause stories have to be distinguished. A root cause story is a collection of problems which are related to each other. Porras (1987) suggests reasoning from symptoms towards the core problems in order to create clear problem statements.

4.1.1. Collecting Problems for Analysis

In this section the process from problem mess to problem definition will be discussed by use of the stream analysis. The collection of core problems is done in three ways: by interviewing employees, observation of employees during their daily activities, and by searching the corporate documentation. In the next sections these three approaches are discussed and the core problems are identified. At the end of this paragraph the identified problems are listed.

Interviews

After implementing a new organization structure in January, four employees were interviewed. A selection of common job satisfaction questions was asked. Although it was not the primary goal of the interview, it revealed a lot of problems that were experienced by the employees. The problems were documented and used for the stream analysis. The questions that were asked in the interview were:

1. What do you think of the new organization structure?
2. How satisfied are you with your job?
3. What do you like about your job?
4. What do you dislike about your job?
5. What is your future vision on your activities and tasks?
6. Do you feel competent or do you need training?
7. Do you feel more committed to The Firm than you did one year ago?
8. Are you optimistic about the future of The Firm?
9. Are you optimistic about your future success within The Firm?
10. Do you feel that working for the company will lead to the kind of future you want?
11. Do you feel that your opinion is valued within The Firm?
12. Does your job provide you with personal satisfaction?

During the interview, the problems that were identified by the employees were written down. The problems that were identified by the questionnaire are listed on the next page.

Observation

Observing employees in their daily activities was done by the author. It seemed that employees experience difficulties by setting their own job priorities and experience difficulties with double positions within the company. This became obvious from discussions between employees and management about differences between priorities as expected by the management and the priorities set by the employee. Further, it was observed that employees struggle with double positions and have to choose which role to play. Also it was observed that corporate information is not stored consequently and discussions with the management revealed unclear allowances and hour declarations when travelling for work. What was observed as well is that projects are not approached in a structured way, it looks like projects are approached ad hoc without planning the activities that need to be carried out. This can be a result of the constant time pressure on the employees. Employees are working overtime almost every day.

Corporate Documentation

The ISO 9001:2008 management system is used in the organization. A recent audit conducted by Lloyds concluded that goals are not vertically aligned. The report of the auditor states that the corporate strategy is clear but that it is not dispersed through the organization by use of goals and objectives at each level of the organization. The goals and objective that are set were not considered to be SMART (Specific Measurable Achievable Relevant Time bound). Further, corporate documentation reveals the unstructured approach of projects and the inconsequent storage of corporate information.

A list of problems was made by writing down the problems that come from the interviews, observation and analysis. Additional core problems are added by drawing conclusions from the initial core problems. This results in the final problem list which will be used for the problem definition. The problems that became apparent from interviews are denoted with [i], observation [o] and corporate information [c]. In total, nineteen problems were identified. Four problems [d] were added by drawing conclusions from the initial problems.

List with problems:

1. Organization chart does not represent hierarchy [i]
2. Employees are not involved in decision making [i]
3. Double positions difficult to deal with [i] [o]
4. Inconsequent storage of corporate documentation [i] [o]
5. Unclear allowance when travelling for the job [i] [o]
6. Lack of structured approach in projects [i] [o] [c]
7. Not feeling competent for certain job aspects [i]
8. Working below competence level [i]
9. Tools to do the job not available [i] [o]
10. No time available for improvement [i]
11. No time available for new product development [i]
12. Difficult to set job priorities [i] [o]
13. Lack of highly experienced employees [i]
14. Time pressure [i] [o]
15. Ideas enthusiastically brought in by management but no support later [i]
16. High number of unfinished projects [i]
17. No measures of efficiency of decisions [c]
18. Goals and objectives are not SMART [c]
19. Strategy is not dispersed through the organization [c]
20. Responsibilities are unclear [d]
21. Goals and objectives are not communicated [d]

For making causal relations visible table 1 is constructed to determine if there are connections between the problems.

21						X													X	X		
20	X	X																	X	X		
19																						
18						X																
17																						
16						X		X			X		X	X								
15						X																
14									X													
13																						
12	X	X	X			X																
11			X																			
10																						
9																						
8																						
7																						
6																						
5																						
4																						
3																						
2	X																					
1																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	

Table 2: Cause and effect relations between identified problems

Root cause statement 1 “Structure & Time Pressure”

Employees complain about incomplete storage of corporate information in the interviews and also the corporate files show inconsequent storage of information (4). This directly relates with the lack of structure (6) and time pressure (14). There is little structure in the work of the employees which could make it difficult to be consequent. This, combined with time pressure may be the reason that employees are not consequent in storing corporate information.

There are a high number of unfinished projects as well (16). This is directly related to the lack of a structured approach in the projects and time pressure. For example, for new product development there is no project structure or schedule that is followed. But in the interviews employees claim that there is no time available that can be devoted to new product development because of time pressure. This is related with difficulties to set job priorities (12) which is, among other relations, related to the double positions (3) that employees have in the organization. The difficulties with the double positions come from unclear responsibilities (20) which are caused among other things by the not representative organization chart (1). Another issue that causes a lot of unfinished projects is that management brings in ideas very enthusiastic and ad hoc (15). Employees start a project but find out that there is no support from the management later. The management does not follow a structured approach creating confusion amongst the employees. From this story can be concluded that the lack of structure and time pressure are root causes.

Root cause statement 2 “Goal setting & objectives”

No measures of efficiency of decisions are available (17) caused by goals and objectives which are not SMART (Specific Measurable Achievable Relevant Time bound) (18). Goals and objectives are not communicated (21) through the organization or do not exist at all which was also confirmed by audit from Lloyds. The unclear communication of goals and objectives results from the strategy that is not dispersed through the organization (19). The corporate strategy is developed by the management team but is not split up in goals and objectives for each level in the organization. This is also indicated by the complaints of employees that there is no time available for new product development (11) or other improvements (10). This has to do with difficulties to set job priorities (12) and difficulties to deal with double positions (3). Employees have no goals and objectives which could be a reason for difficulties with setting priorities and double job positions. This is caused by unclear responsibilities (20) for which there are two main reasons which is the organization chart that does not represent hierarchy (1) and the strategy which is not dispersed through the organization (19). The root cause which becomes clear in this story is that the corporate strategy is not translated into goals and objectives for each level.

4.2. Final Project Description

In the previous paragraph two root cause stories were identified that need attention. “Structure and Time Pressure” is the first root cause story. A possible solution is restructuring the organization and hiring employees to reduce time pressure. This is considered not to be feasible for a master thesis. The second root cause story is “Goal setting and Objectives”. Most problems in the stream analysis are somehow related with goals and objectives. The stream analysis also revealed that the corporate strategy was not translated into goals and objectives and the strategy not dispersed through the organisation. The root cause story “goal setting and objectives” is selected for this research project because it was believed that a possible solution could be the design and implementation of a performance management system if it fulfills the framework of Ferreira & Otley (2009). The orange dashed line in figure 5 shows the problems that are included in this root cause statement. Within the time that is

available for the master thesis a pilot project was set up and an intervention and evaluation were made.

Performance Management Systems are designed to set goals and objectives in a structured way; the word 'system' in *performance management systems* implies that all performance management practices in the organization belong to a set of interacting or interdependent entities forming an integrated whole. This system is created to link individual behavior to the organizations strategy and goals. The objective for this graduation project can be described as follows:

“Design and implement a performance management system for the organization to solve the business problems that were indicated. The characteristics of the system should match with the organization and the underlying theories have to be applied in the design phase for best results. A pilot project must be set up in order to evaluate the use of the system and to decide if a performance management system has to be implemented companywide”

The project description was used to formulate research questions that need to be answered in order to carry out the project. To be able to answer the central question, five sub questions are developed. Sub question 1a is about validating the problems that were identified in the stream analysis. In Porras' qualitative stream analysis, the researcher's subjectivity could bias the conclusions. For this reason, it is important to use quantitative research for providing objective conclusions, this was done by using a questionnaire. As described in chapter 2 each PMS has its own characteristics. Sub question 1b assesses which PMS has the characteristics that match with the organization. In chapter 2 also the underlying theories of PMSs were discussed. Sub question 1c is about how these can be incorporated into the design of the PMS. Because a pilot project was one of the requirements, it needed to be assessed which unit should be selected. Once the pilot project is running, an evaluation has to be made in order to conclude if the project is successful or not, this is considered in sub question 1e. The sub questions are displayed in the regulative cycle in figure 1. Please find the main question and sub questions below.

1. Could a performance management system solve the business problems as identified by the stream analysis?
 - a. *Could the problems that were identified by the stream analysis be validated using quantitative research tools?*
 - b. *Which characteristics should the system have to match the organization?*
 - c. *How can underlying theories be incorporated into the system?*
 - d. *Which unit of the organization could be selected for a pilot project?*
 - e. *How can be evaluated if the system is successful?*

5. Research & Analysis of Work Conditions

The stream analysis provided an overview of the problems that are apparent at the company which are used to identify the root causes. This analysis does incorporate objective input but is subject to the interpretation of the researcher which might result into subjectivity. For this reason it is important to use objective research tools for a reliable analysis. This is done by constructing a questionnaire that exists out of questions relevant to the identified problems in the stream analysis. In this chapter the research method and the results will be discussed.

5.1. Research Method

A questionnaire named “werkbelevingsonderzoek” was developed for confirming the stream analysis, performing a t=0 measurement, and help to select a department for a pilot project. The problem analysis that is presented in chapter 4 was based on observations, company information and interviews with three employees. The questionnaire is constructed to make a more exhaustive analysis of the topics that were identified as problems in the stream analysis. A t=0 measurement is conducted to be able to compare results before and after an intervention. The employees were grouped into four different departments that could be selected for a pilot project. The questionnaire identified a department that scored low in comparison with the other departments which was the reason for selecting that department for a pilot project.

In the questionnaire all 23 questions were included from the Goal Setting Questionnaire which was developed by Locke & Latham (1984) in order to analyze current goal setting practices. The root cause story identified problem 17, 18 and 21 as goal setting related. All 9 Job Ambiguity Items were included from Breaugh & Colihan (1994) to see how employees experience job ambiguity. These questions assess whether employees know how and when work activities have to be carried out and what level of performance is considered to be acceptable. The related problems in the stream analysis are numbered 3, 12 and 20. From the Motivation Assessment Questionnaire of Pritchard *et al* (2006) questions were taken which regard the information and formal evaluation and job factors. The 24 questions assess how employees experience the informal (18) and formal (6) relation between evaluations to job outcomes related to problem 17 and 18. From the Organization Climate Measures of Patterson *et al* (2005) in total 10 questions were taken to assess the clarity of organizational goals (5) and performance feedback (5). These questions are related to problem 19 and 20. As ice breaker the first question of the questionnaire was a single item Job Satisfaction Measure from Kunin (1998). The construction of the questionnaire is more elaborately discussed in the Research Proposal (van Assema, 2011) that was carried out prior to this project. The next paragraphs discuss the outcomes of the questionnaire. Appendix I provides an overview of the questions that are included in the questionnaire, from which questionnaire they are taken, and the points on the Likert scale.

At the time of conducting the questionnaire there were 25 people employed. The two company shareholders were excluded from the questionnaire because of the nature of the questionnaire. The other 23 employees were asked to fill in the questionnaire. The response rate was 91,3% which is due to the fact that the questionnaire was conducted under working hours at the 18th of January 2011, 13:00. After a 5 minute introduction speech of the author the employees started. Two of the employees originate from Poland and indicated during the test that the Dutch language was too complicated. These two employees did not finish the test and their results were not used in the further analysis.

Table 3 shows details of the respondents such as the number of employees per department, average age, average years of employment, gender and level of education. For the latter, the education grades of older employees were transferred into levels that are used nowadays. It can be seen that the company’s workforce is young. This is due to the fact that the company has been steadily growing since 1992 and because the work is project related which means

that there can be large fluctuations in the amount of work that has to be done. Temporary employees are hired on a regular basis. The data as presented in Table 3 was found in the corporate files and is not gathered by the questionnaire because it would threaten the anonymous nature of the questionnaire. The two dropouts that were described earlier are excluded. The dropouts could be identified because they informed the researcher that they could not participate further.

The anonymous nature of the questionnaire was stressed in the introduction speech by the researcher and again in the introduction of the questionnaire. The questionnaires were handed out in a white envelope and all employees were provided with a black pen. After completing the questionnaire they were handed in into a box in the same white envelopes. The first employee finished after 12 minutes, approximately 20 employees finished between 15-20 minutes, and the last employee finished after 32 minutes. The author was present in the same room for answering questions, but no questions were asked. The author was at such a distance that the anonymous nature of the research was not violated. See Figure 6 for an impression of the setting in which the questionnaire was filled in.

Department	Number Employees	Average Age (SD)	Average Years of Employment(SD)	Gender Female	Level of Education
Production	10	29,6 (9,1)	3,2 (3,1)	25%	None / VMBO
Production Leader / Manager	4	37,5 (9,1)	6,0 (5,4)	0%	MBO / WO
Administration / Secretary	3	42,0 (7,2)	5,7 (5,7)	100%	MBO / HBO
Marketing / Sales / Engineering	4	28,8 (4,3)	5,5 (5,3)	50%	HBO / WO
Total (SD)	21 (-)	32,9 (9,1)	4,6 (4,2)	33%	

Table 3: Respondent Details (information from corporate files, dropouts excluded)



Figure 6: Conducting the “Werkbeleving” questionnaire

5.1.1. Descriptive Statistics

The descriptive statistics that will be discussed consist out of the mean, standard deviation, Cronbach's alpha, number of cases, Kolmogorov-Smirnov test and the correlations between the scales. Cronbach's alpha is a coefficient of reliability. It is used as a measure of the internal consistency of the scales. The measure can range from 0 to 1. A score of 0 indicates that there is no consistency between the items of the scale, a score of 1 indicates full consistency of the items for the scale. Values higher than 0,6 generally indicate a reasonable consistency (Hair *et al*, 2006). For 'job satisfaction' the Cronbach's alpha is not calculated because it is represented by a single item. Table 4 shows the results.

The K-S test is the principal goodness of fit test for normal and uniform data sets. Because the sample size is small (sample size <30), a conservative level of $p < 0,01$ was taken as being significant and the research examined graphical plots to assess the assumption of normality. If the score proves to be significant it indicates that a normal distribution could *not* be assumed. As can be seen in Table 4 none of the scales are significant for the K-S test. The graphical plots do not show reasons of non-normality. For these reasons a normal distribution will be assumed in the further analysis.

	Items ($\Sigma 67$)	Mean	Std. Deviation	Cronbachs Alpha	N	K-S Z	Sig. (2 tailed)
Job satisfaction measure	1	1,90	,62		21	1,48	0,03
Supervisor support/participation	3	3,77	,71	,79	21	0,91	0,38
Goal efficacy	4	3,94	,47	,52	21	0,85	0,47
Goal rationale	4	3,30	,64	,79	21	1,06	0,21
Goal conflict	8	2,18	,65	,73	21	0,67	0,76
Goal clarity	4	3,71	,59	,45	21	0,56	0,91
Work method ambiguity	3	5,75	,76	,83	21	0,80	0,55
Scheduling ambiguity	3	5,59	,67	,53	21	1,16	0,14
Performance criteria ambiguity	3	5,53	,88	,92	21	1,26	0,86
Informal evaluations	6	3,64	,44	,37	21	0,76	0,61
Job factors	12	3,58	,52	,88	21	0,35	1,00
Clarity of organizational goals	5	2,83	,62	,87	21	0,62	0,84
Performance feedback	5	2,74	,49	,74	21	0,76	0,61
Formal evaluations	6	3,87	,55	,67	19	0,53	0,94

Table 4: Descriptive Statistics 1st Analysis

As can be seen, four scales score below 0,6 for Cronbach's alpha. The procedure to follow is to see which items cause the inconsistency and remove these items. SPSS is used for analysis of the data. One of the options in SPSS is that it calculates the score for Cronbach's alpha if items are left out of the calculation. Three scales could score >0,6 if one item was left out. These items were removed from the data. For one scale the procedure had to be repeated three times until Cronbach's alpha scored above 0,6. Table 5 shows which items are removed.

Scale	Original # of items	# of items after removal of inconsistent items	Removed items
Goal efficacy	4	3	GSQ5
Goal clarity	4	3	GSQ20
Scheduling ambiguity	3	2	JAI6
Informal evaluations	6	3	MAQ1, MAQ2, MAQ6

Table 5: Removed Scales for Questionnaire

Table 6 shows the results of the mean, standard deviation and Cronbach's alpha after removing the above mentioned items. As can be seen, Cronbach's alpha now scores above 0,6 for all items. For further analyses, the items that we removed are not taken into further consideration.

Scale	Descriptive Statistics 2nd Analysis				
	# Point Likert Scale	Mean	Std. Deviation	Cronbachs Alpha	N
Job satisfaction measure	5	1,90	,62		21
supervisor support/participation	5	3,77	,71	,79	21
Goal efficacy	5	3,80	,55	,62	21
Goal rationale	5	3,30	,64	,79	21
Goal conflict	5	2,18	,65	,73	21
Goal clarity	5	3,59	,77	,62	21
Work method ambiguity	7	5,75	,76	,83	21
Scheduling ambiguity	7	5,67	,71	,70	21
Performance criteria ambiguity	7	5,53	,88	,92	21
Informal evaluations	5	3,70	,53	,64	20
Job factors	5	3,58	,52	,88	21
Clarity of organizational goals	4	2,83	,62	,87	21
Performance feedback	4	2,74	,49	,74	21
Formal evaluations	5	3,87	,55	,67	19

Table 6: Descriptive statistics after removal of inconsistent items

A further analysis is performed with the data from which the items were removed as described above. The scores for each scale are compared with each other. This will give an indication of which items score high or low compared to the other items. In Table 7 and Figure 7 the relative scores are visualized. Because the scales in the questionnaire varied from 4 to 7 point Likert scales, the scores are transferred into relative scores which range from 0 to 100%. The scales for job satisfaction and goal conflict are reversed for reasons of comparison.

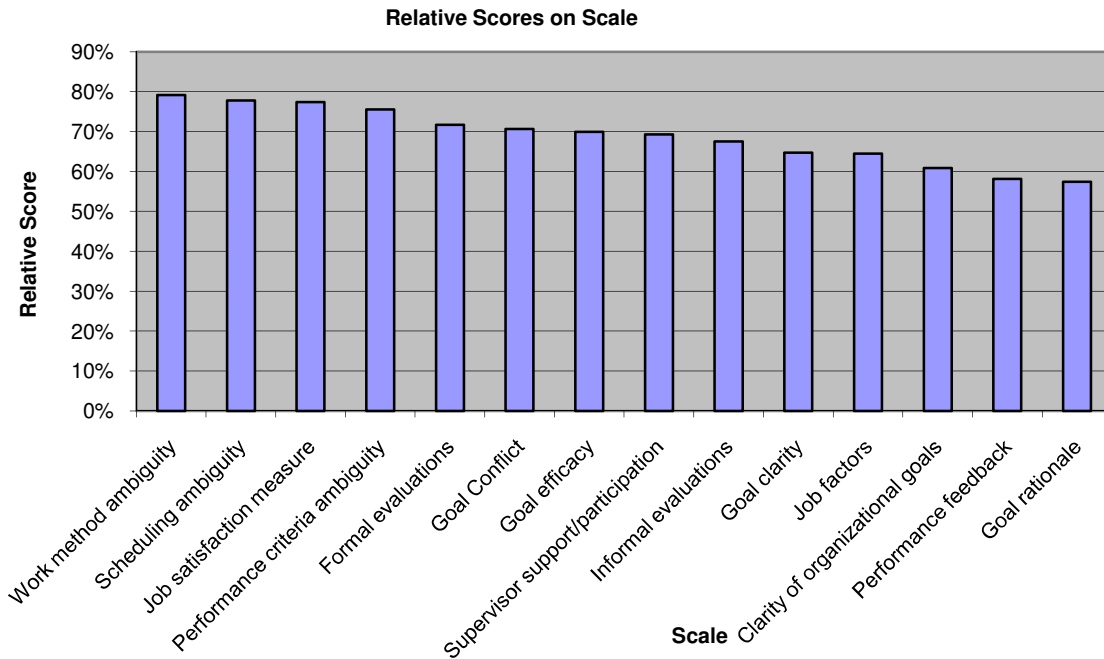


Figure 7: Relative scores on items ranked from high to low

The scores are ranked from high to low. What can be seen from table 6 and the graph is that the scores range from 57% to 79% which is on the positive side of the scale. This indicates that the *employees* have a positive opinion about the work conditions. The graph does give a good impression on the scores in comparison with each other. In Table 7 the scores are divided into three groups in order to distinguish between the bottom, middle and top scores. The scores are marked in respectively red, orange and green. The standard deviation is displayed to see to what degree the employees agree on the scales. The lower the standard deviation, the higher employees agree on the scale. However, the relative standard deviation scores from 10 to 15 percent of the 100 percent scale which indicates similar agreement among the various scales.

Scale	# Point Scale	Mean	Mean Corrected for reverse scores	Relative scores	% Std. Deviation
Work method ambiguity	7	5,75	5,75	79%	11%
Scheduling ambiguity	7	5,67	5,67	78%	10%
Job satisfaction measure	5	1,90	4,10	77%	12%
Performance criteria ambiguity	7	5,53	5,53	76%	13%
Formal evaluations	5	3,87	3,87	72%	11%
Goal Conflict	5	2,18	3,82	71%	13%
Goal efficacy	5	3,80	3,80	70%	11%
Supervisor support/participation	5	3,77	3,77	69%	14%
Informal evaluations	5	3,70	3,70	68%	11%
Goal clarity	5	3,59	3,59	65%	15%
Job factors	5	3,58	3,58	64%	10%
Clarity of organizational goals	4	2,83	2,83	61%	15%
Performance feedback	4	2,74	2,74	58%	12%
Goal rationale	5	3,30	3,30	57%	13%

Table 7: Mean, corrected mean, relative scores and SD for each item

During the problem analysis the root cause story for “goal setting and objectives” was selected as topic for investigation. Below the root cause story for “goal setting and objectives” is repeated and the problems are marked with green, orange and red which correspond with the colors in Table 7. Between brackets, the item which corresponds with the problem is noted. The result of the questionnaire confirms the problems as identified in the stream analysis therefore partly.

Root Cause Story “Goal Setting and Objectives”

No measures of efficiency of decisions are available (Performance feedback and job factors) caused by goals and objectives which are not SMART (Goal clarity). Goals and objectives are not communicated (Goal rationale, job factors) through the organization or do not exist at all. This is caused by the strategy that is not dispersed through the organization (Clarity of organizational goals). The corporate strategy is developed by the management team but is not split up in goals and objectives for each level in the organization. This is also indicated by the complaints of employees that there is no time available for new product development or other improvements. This has to do with difficulties to set job priorities and difficulties to deal with double positions (scheduling ambiguity). Employees have no goals and objectives which could be a reason for difficulties with setting priorities and double job positions. This is caused by unclear responsibilities for which there are two main reasons which is the organization chart that does not represent hierarchy and the strategy which is not dispersed through the organization. The root cause which becomes clear in this story is that the corporate strategy is not translated into goals and objectives for each level.

Scales with Top Scores

The top and bottom scores will be discussed first. The top four scales are grouped together in green and score from 76% to 79%. Table 8 displays these scales and one question from that scale as example.

Q#	Question	Scale	M	SD
26	I know what is the best way (approach) to go about getting my work done	Work Method Ambiguity	5,76	0,70
27	I know how to get my work done (what procedures to use)	Work Method Ambiguity	5,81	0,87
1	Which of the following faces resembles your job satisfaction best	Global job satisfaction single-item faces scale	1,90	0,62
29	I am certain about the sequencing of my work activities (when to do what)	Scheduling Ambiguity	5,50	1,00
33	I know what level of performance is considered acceptable by my supervisor	Performance Criteria Ambiguity	5,57	0,87

Table 8: Examples of questions for scales that score relatively high

The highest scores are found for work method ambiguity (79%), global job satisfaction (77%), scheduling ambiguity (78%) and performance criteria ambiguity (76%). Seen the nature of the questions the employees seem to know how and when to conduct their work activities and what degree of performance is expected from them. It can be seen that the employees are satisfied with their job, please note that this is a reversed scale.

When examining the items separately, the top two scores will be discussed. The top two scores both come from the goals setting questionnaire. The highest score of 88% (4,52 on a 5 point scale) was obtained for question 5 in the questionnaire: “I feel proud when I get feedback indicating that I have reached my goals”. Question 4 in the questionnaire scored 81% (4,24 on a 5 point scale) which is the following: “Trying for goals makes my job more fun than it would be without goals”. It is interesting to see that these questions are about the interviewee himself and not about the company. In the next paragraph the lowest scoring items will be discussed as well which show an interesting contrast.

Scales with Bottom Scores

The bottom five scales are grouped together in red and score from 57% to 65% which is relatively low. Table 9 displays the scales that received the bottom scores and includes two questions from that scale as example.

Q#	Question	Scale	M	SD
22	I have specific, clear goals to aim for on my job	Goal clarity	3,62	1,07
23	If I have more than one goal to accomplish, I know which ones are most important and which are least important	Goal clarity	3,71	0,90
40	All the important parts of my work are measured	Job factors	3,38	1,12
45	I am evaluated on all the important parts of my job	Job factors	3,62	0,80
53	The future direction of the company is clearly communicated to everyone	Clarity of organizational goals	2,95	0,92
55	Everyone who works here is well aware of the long-term plans and direction of this company	Clarity of organizational goals	2,38	0,86
58	People don't have any idea how well they are doing their job	Performance Feedback	2,67	0,80
61	The way people do their jobs is rarely assessed	Performance Feedback	2,90	0,79
9	I understand how my performance is measured on this job	Goal rationale	3,57	0,87
11	My boss tells me the reasons for giving me the goals I have	Goal rationale	3,62	0,92

Table 9: Examples of questions for scales that score relatively low

The lowest score is found for goal rationale (57%) which assesses what and why goals are given, and how the performance is measured and feedback is given. Related to the previous scale, performance feedback was measured on a separate scale and scores low with 58%. Also related are the questions for the job factor scale (61%) which includes various questions about how performance is measured and what employees think of the measured items, questions about work priorities, if they know how performance is valued, about how feedback is given and how often feedback is given. The score on goal clarity (64%) assesses the clarity and priority of goals and scores the same as job factors. The organizational goals do not seem to be clear to the employees with a score of 65%. For the latter, it needs to be noted that the company's strategy is reevaluated by the management team in May 2011. After reestablishing the strategy it will be presented to all The Firm employees. This will most likely influence the score on this scale. The management does not expect mayor changes in the corporate strategy which could endanger this project.

The two lowest scoring items will be discussed here. The lowest scoring item comes from the organizational climate measures which scores 52% (2,55 on a 4 point scale) which asked the following: "In general, it is hard for someone to measure the quality of their performance". The second lowest scoring item concerns a question from the motivational assessment questionnaire which scored 56% (3,25 on a 5 point scale) and questioned the following: "I do not get information about by job performance often enough". It is interesting to see that the employees indicated in the top scores that they find their job more fun when having goals to achieve and feel proud when receiving feedback indicating that goals have been achieved. At the same time, the employees indicate that it is hard to measure the quality of their performance and not get information about their job performance often enough. Thus, employees like to have goals and receive feedback, but goals and feedback are rarely given.

Correlations

Table 10 shows the correlations between the scales. The correlations can be of importance when an intervention is planned to take place. Focusing on changing one scale may affect other scales as well. It is interesting to note that the four of the five scales with the bottom scores correlate (>0,5) with supervision support / participation, goal efficacy and goal rationale (except for clarity of organizational goals). Further, the years of employment correlates (0,500) with job satisfaction in a negative sense. The other correlations that are shown in the table originate because the questions that belong to certain scales show strong similarities. For example: this question for the scale performance feedback: *People's performance is measured on a regular basis* shows similarities with the question for the scale job factors (reversed item): *I do not get information about my job performance often enough*.

Mean, Std. Deviation, Cronbach Alpha, and Correlations

		Mean	Std. Deviation	Years of employment	Job_Satisfaction	Supervisor_Support_Participation	Goal_Efficacy	Goal_Rationale	Goal_Conflict	Goal_Clarity	Work_Method_Ambiguity	Scheduling_Ambiguity	Performance_Criteria_Ambiguity	Informal_Evaluations	Job_Factors	Clarity_Organizational_Goals	Performance_Feedback	Formal_Evaluations
Years of employment	Spearman Correlation	4,6 [years]	4,24	No Alpha														
Job_Satisfaction	Pearson Correlation	1,90	,62	,500*	No Alpha													
Supervisor_Support_Participation	Pearson Correlation	3,77	,71	-,003	-,077	,79												
Goal_Efficacy	Pearson Correlation	3,80	,55	-,060	,301	,344	,62											
Goal_Rationale	Pearson Correlation	3,30	,64	-,122	,043	,771**	,624**	,79										
Goal_Conflict	Pearson Correlation	2,18	,65	-,402	-,011	-,018	,210	,245	,73									
Goal_Clarity	Pearson Correlation	3,59	,77	-,142	,092	,548**	,610**	,729**	,132	,62								
Work_Method_Ambiguity	Pearson Correlation	5,75	,76	-,015	,156	,076	,100	,058	-,123	-,083	,83							
Scheduling_Ambiguity	Pearson Correlation	5,67	,71	-,032	,042	-,161	,090	-,168	-,085	-,065	,591**	,70						
Performance_Criteria_Ambiguity	Pearson Correlation	5,53	,88	-,057	-,152	,132	,524**	,348	,086	,296	,342	,588**	,92					
Informal_Evaluations	Pearson Correlation	3,70	,53	,101	,213	,336	,303	,094	-,223	,259	-,067	-,242	-,144	,64				
Job_Factors	Pearson Correlation	3,58	,52	,313	,144	,512*	,523*	,457*	-,134	,412	,342	,077	,283	,549*	,88			
Clarity_Organizational_Goals	Pearson Correlation	2,83	,62	,089	,259	,090	,141	,244	,004	,258	,211	,065	,188	-,065	,229	,87		
Performance_Feedback	Pearson Correlation	2,74	,49	,112	,114	,675**	,602**	,642**	-,065	,519*	-,158	-,129	,278	,523*	,609**	,214	,74	
Formal_Evaluations	Pearson Correlation	3,87	,55	,091	-,017	,435	,168	,185	-,292	,149	-,214	-,139	-,331	,426	,348	-,335	,443	,67

* Correlation is significant at the 0,05 level (2-tailed).

** Correlation is significant at the 0,01 level (2-tailed).

Table 10: Mean, std. deviation, Cronbach's alpha and correlations

5.2. Comparison between Groups

One of the goals of the questionnaire was to identify a department for a pilot project. Because the questionnaire is anonymous and is carried out under a small sample, not too many background variables could be obtained in order not to reveal the identity of the respondents. In this chapter the differences between groups will be investigated. The respondents are divided into groups per department: production, production leader / manager, secretary / administration and sales / marketing / engineering. And, respondents were also divided into groups by the number of years they are working in the organization. The variable number of years working at the company is divided into the following three groups: shorter than 2 years (5 employees), between 2 and 5 years (7 employees), more than 5 years (8 employees).

For both variables ANOVA was performed in order to establish if significant differences between the departments and the years of employment could be found. Typically, alpha has to be $<0,05$ as significance level to avoid making a type I error. However, for this analysis with a small sample size a significance level of $<0,1$ will be assumed to indicate a trend. A non-parametric Kruskal-Wallis test has been performed as well for assessing the scores if a non-normal distribution was assumed but this did not lead to further insights. Significant differences between groups were found for the years of employment and job satisfaction, and between years of employment and formal evaluations (marked in green). The relations between the variable and the groups are displayed in Table 10. One significant relation was found for job satisfaction and the years of employment. It shows that job satisfaction decreases over the years. People who work less than 2 years at the company seem to be the most satisfied and people who work longer than 5 years at the company are the least satisfied about their job.

	ANOVA YEARS OF EMPLOYMENT			ANOVA DEPARTMENTS		
	df	F	P	df	F	p
Job satisfaction measure	F(2,18)	3,000	0,075*	F(3,17)	1,395	0,278
supervisor support/participation	F(2,18)	1,350	0,284	F(3,17)	0,219	0,882
Goal efficacy	F(2,18)	0,256	0,777	F(3,17)	0,284	0,836
Goal rationale	F(2,18)	0,766	0,479	F(3,17)	0,574	0,640
Goal Conflict	F(2,18)	1,493	0,251	F(3,17)	0,199	0,895
Goal clarity	F(2,18)	0,692	0,513	F(3,17)	0,207	0,890
Work method ambiguity	F(2,18)	0,960	0,402	F(3,17)	0,425	0,737
Scheduling ambiguity	F(2,18)	1,633	0,233	F(3,17)	0,427	0,736
Performance criteria ambiguity	F(2,18)	1,073	0,363	F(3,17)	2,123	0,135
Informal evaluations	F(2,17)	0,379	0,690	F(3,16)	0,379	0,769
Job factors	F(2,18)	1,742	0,203	F(3,17)	0,350	0,790
Clarity of organizational goals	F(2,18)	2,066	0,156	F(3,17)	0,737	0,544
Performance feedback	F(2,18)	0,531	0,597	F(3,17)	0,416	0,744
Formal evaluations	F(2,16)	7,600	0,005**	F(3,15)	1,990	0,159
Trend concluded if $p < 0,10^*$ Significant if $p < 0,05^{**}$						

Table 11: Results of ANOVA with groups 'years of employment' and 'departments'

Another significant relation is found between the years of employment and formal evaluations. The group that is working at the company between 2 and 5 years are most confident about the relation between performance and formal evaluations. The group that is working at the company for less than 2 years has the least confidence in the relation between their performance and formal evaluations.

One of the goals of dividing the employees in groups was to see if differences existed between the groups and if this could be a criterion to select one of the departments for the pilot project. However, no significant differences were found between the departments so that means the decision cannot be based on the ANOVA. Also, a t-test was performed that groups the departments into two groups: 1. production and production leaders/manager, and 2. Administration / secretary and sales / marketing / engineering (blue collar compared to white collar workers). No significant differences were found for the t-test as well.

To be able to make a decision which department to select for an intervention table 10 was constructed which displays the means of all the scales per department. The colors of the scales correspond with the colors in table 7. Red scales indicate the bottom 5 scores, orange the mid 5 scores and green the top four score. Looking at the five scales that scored the lowest in the questionnaire, the production employees (1) and the sales/marketing/engineering department (4) score lowest on two of these scales. It was difficult to separate production employees (1) from production leaders/managers (2) during the intervention. This is because the production leaders are actually doing the same work as the production employees but have a senior position because of their experience and perform scheduling and leading tasks as well. The decision was made to look at this department as being one (1+2). Looking at the scores for department 1+2 they have the weakest scores on the bottom scales as presented in table 7. For this reason department 1+2 were selected for a pilot project for which a PMS will be designed and implemented.

Department	Mean / SD	Job Satisfaction	Supervisor support/participation	Goal efficacy	Goal rationale	Goal Conflict	Goal clarity	Work method ambiguity	Scheduling ambiguity	Performance criteria ambiguity	Informal evaluations	Job factors	Clarity of organizational goals	Performance feedback	Formal evaluations	
1 Production Employees	Mean	1,70	3,65	3,80	3,16	2,10	3,47	5,90	5,80	5,82	3,70	3,59	2,85	2,68	3,67	
	SD	0,67	0,87	0,62	0,71	0,84	0,97	0,83	0,59	0,65	0,54	0,47	0,71	0,52	0,50	
2 Production Leaders / Manager	Mean	2,25	4,00	4,00	3,65	2,38	3,83	5,83	5,50	5,25	3,92	3,79	2,45	2,90	4,21	
	SD	0,50	0,27	0,35	0,34	0,51	0,64	0,64	1,08	1,50	0,69	0,42	0,55	0,12	0,25	
3 Administration / Secretariat	Mean	2,33	3,78	3,75	3,40	2,05	3,56	5,56	5,83	6,00	3,67	3,44	3,13	2,93	3,61	
	SD	0,58	0,39	0,66	0,53	0,52	0,51	0,51	0,29	0,00	0,58	0,17	0,50	0,81	0,84	
4 Sales, Marketing, Engineering	Mean	1,75	3,84	3,63	3,20	2,25	3,67	5,42	5,38	4,75	3,50	3,44	2,90	2,60	4,28	
	SD	0,50	0,88	0,60	0,82	0,45	0,61	0,96	0,95	0,50	0,43	0,92	0,53	0,49	0,35	
Blue marked is lowest score		Green marked is highest score														

Table 12: Comparison of means and sd's per department for all scales (colors correspond with table 5)

5.3. Conclusions Data Analysis

During the stream analysis the root cause story for “goal setting and objectives” was selected as topic for investigation. The questionnaire confirmed the problems that were related to goal rationale, performance feedback, clarity of organizational goals, job factors and goal clarity by scoring relatively low on these items. Below the major findings are summarized.

1. The scores for each scale all are on the positive side: 56% to 79%
2. The relative highest scores are found for the ambiguity scales and job satisfaction scale.
3. The relative lowest scores are found for goal rationale, performance feedback, clarity of organization goals, job factors and goal clarity.
4. The employees indicated in the top scores that they find their job more fun when having goals to achieve and feel proud when receiving feedback indicating that goals have been achieved, contrasting with the lowest scoring items in which the employees indicate that it is hard to measure the quality of their performance and not get information about their job performance often enough.
5. No significant differences between departments could be found
6. The root cause story from the problem analysis was confirmed by the data analysis except for setting job priorities.
7. The lowest scores are found for scales that could most likely be influenced by performance management systems because these systems include goal setting practices and performance feedback.
8. For the intervention the departments “production employees” and “production leaders/managers” could not be separated. Together, they show the lowest scores on the bottom items and would therefore be selected for a pilot project with performance management systems.
9. ProMES is selected for forming the basis of a PMS that will be designed for the corporation.

The results of the questionnaire showed relatively low results for the scales mentioned under point three. Performance management systems as defined in chapter two include these aspects in the design. For this reason it is believed that a performance management system could improve on the identified problems.

According to the comparison between PMSs in table 2 in chapter 2, ProMES scores relatively strong on the topics as “target setting”, “performance evaluation” that corresponds with the identified problems goal clarity, job factors, and performance feedback. For these reasons ProMES was chosen as basis for the design of the PMS for the organization. Other reasons for selecting ProMES is because it has proven results for production environments (Pritchard *et al*, 2008) and because of its participative design which shows significant correlations with goal rationale, goal clarity, job factors and performance feedback (see Table 10). The next chapter discusses ProMES and its characteristics more elaborately.

6. ProMES as basis for PMS

ProMES was selected as a basis for the design of a PMS for the company. This chapter discusses ProMES as PMS. The Productivity Measurement and Enhancement System (ProMES) is designed to measure and improve productivity, effectiveness and overall performance of people in the organization. ProMES found its origin during the work of Naylor, Pritchard and Ilgen (1980) that became known as the NPI theory. NPI incorporates individual differences, perception, motivation, roles, leadership, judgement, climate, etc. into one integrated conceptualization. This theory became the foundation of ProMES.

6.1. ProMES Design Steps

Pritchard *et al* (2002) discuss how a ProMES should be developed for an organization. They discuss seven design steps in detail. An overview of the design steps that have been taken are displayed below after which the steps will be explained briefly.

1. Forming the Design Team
2. Identifying Objectives
3. Identifying Indicators
Review and Management Approval
4. Defining Contingencies
Review and Management Approval
5. Designing the Feedback System
6. Giving and Responding to Feedback
7. Monitoring the Project Over Time

Forming the Design Team

The design team is the group of people who are responsible for developing the ProMES. The team has to be composed out of people who do the work, one or two supervisors, and one or two facilitators. The facilitators have to be familiar with ProMES in order to facilitate the design process. It is stressed out that involving the people who do the work is very important.

Identifying Objectives

The design team has to come to an agreement of what the overall objectives of the unit are. The group has to reach consensus by discussion about what the organizational unit is trying to accomplish. The role of the facilitator is to guide the discussion and make it as constructive as possible.

Identifying Indicators

After the identification of the objectives, indicators have to be identified. The indicators are meant to measure how well the objectives are being met. This could result in one or more indicators per objective. Important is that the indicators are under the control of the employees themselves. Again, the team has to reach consensus about the indicators by discussion.

Defining Contingencies

For understanding the definition of a contingency in ProMES it is necessary to explain the following. Indicators are important and a target value may be set, but the relation between the indicator value and the effectiveness may not be linear. It could, for example, not be more effective for the organization to over-perform on a certain indicator. This could be solved by having a relation with a maximum instead of a

positive linear relation. The same could be done for negative performance. It could be the case that performing 20% under target does a lot of damage to the organization. In this case the relation between effectiveness and negative performance can be changed in such a way that becomes visible in the system. That is why a contingency is defined. In fact it is a relation between the indicator value and the effectiveness for the organization of how it is seen by the development team. The effectiveness can be scored between 100 and -100. In case there are more indicators they have to be hierarchically classified. Only the first indicator can score minimum -100 and maximum 100. The second indicator has to stay within these values, the third indicator has to stay within the values of the second, and so on.

Designing the Feedback System

Feedback is given in the form of a written report with the data collected for the work period. The effectiveness score for the indicator value is calculated from the contingency and is displayed in a table. In addition the overall effectiveness score is calculated which is the sum of the effectiveness scores across all indicators. Historical data is also included to show the change for each indicator since the last period. This shows where things are improving or declining. Perhaps the most important feature of the report are the priorities for improvement. According to Pritchard *et al* (2002) it is difficult for a work unit to focus their effort for improvement. It is made clear by showing the gain in effectiveness if an indicator is improved by one step. This is different for each indicator because of the developed contingencies. One step improvement for one indicator may make a huge difference in the effectiveness score while one step improvement for another indicator will only make a small difference in the effectiveness score.

Giving and Responding to Feedback

Pritchard *et al* (2002) claim that the feedback should be given ideally within a few days after the reporting period. A discussion should follow about the overall performance and how improvements can be made or sustained. For indicators that decreased it should be discussed what caused this decrease and how things could be changed to improve things. The feedback phase is seen as a mechanism for continuous improvement.

Monitoring the Project over Time

It is suggested that after a few feedback sessions there can be aspects of the measurement system that need to be adjusted. According to Pritchard *et al* (2002) this is especially true when the measures are new to the unit personnel. The facilitator should ideally determine from time to time whether changes in the work or changes in policy make a review of the measurement system necessary.

6.2. Characteristics of ProMES

In chapter 2 three characteristics of PMSs were discussed. ProMES uses a bottom-up approach. The PMS starts at the lower levels in the organization and assumes that the employees know what to do and set appropriate targets for themselves. The facilitator and direct supervisor are assumed to guide the process so that organizational targets will be met. After developing certain parts of the system a management approval must be obtained before continuing. Although ProMES can be used on an individual level as well, the design is made for a group orientation. The examples that are given in Pritchard *et al* (2002) all show a group orientation. The authors clearly prefer objective measures because the acceptance of objective measures is assumed to be higher in comparison with subjective measures.

6.3. Theoretical Background of ProMES

With regard to goal setting it can be said that target setting is a crucial feature of ProMES. However, the goals are set by the employees themselves. Locke & Latham (1990) argue that specific and difficult goals lead to the best performance. The question remains if the employees set specific and difficult goals for themselves. After setting the goals they will be presented and assessed by the management as well. This provides the opportunity for the management to intervene and make targets more specific and difficult. A strong point is that the contingencies, if made correctly, will devote attention to the targets that improve performance the most. In the literature provided by Pritchard attention is given to the goal setting theory as well. One who studies ProMES will therefore be aware of the target setting theory as well. The same holds for feedback theory which is also discussed by Pritchard. Feedback is well incorporated in ProMES. Pritchard also provides guidelines on how to give feedback in order to improve performance. Reward structures are little mentioned, although they have the potential to destroy the impact of an otherwise well-designed PMS. Pritchard *et al* (2002) explain little about linking rewards to performance.

6.4. Implementing ProMES

For each of the steps in the design of the ProMES one or more meetings must be arranged. It is suggested to have a time period of at least two weeks between the meetings to give employees the opportunity to think and discuss the subjects with their colleagues. It will take at least 14 weeks to have the ProMES operational. With a group size of approximately eight employees there is a considerable amount of time invested in developing the system.

6.5. Empirical Evidence for ProMES

In a meta-analysis carried out by Pritchard *et al* (2008) in which data from 83 field studies was examined evidence is found for the effectiveness of ProMES. Evidence was found that ProMES improved productivity which last over time. The overall average effect size of all studies was 1.16 which indicates that productivity under ProMES is 1.16 SD higher than productivity during baseline measurements. The analysis provides insights into different settings which all seem to benefit from ProMES. However, no comparison was made between a division of a company that implemented ProMES and a non-ProMES division or company. David (2003) researched 74 ProMES interventions from the database that is created by Pritchard *et al* (2002). It should be noted that most interventions are done in a production setting. The database shows that productivity gains are realized faster with ProMES but their sustainability is questioned. He did find a strong positive association between the feedback quality and productivity improvements. This indicates the importance of feedback in ProMES. Surprisingly, unlike what was described about employee participation earlier in this report, no significant relationship was found between employee participation and productivity improvement.

7. Design of a ProMES based PMS

In the previous chapters it was discussed how, where and who filled in the questionnaire which provided background information about the respondents. Further, the descriptive statistics were given and the scores are compared with each other. The root cause story that resulted from Porras' stream analysis was reassessed and the results of the questionnaire confirmed four of the five problems that were identified. ProMES was selected as basis for the PMS design and ProMES as PMS was discussed. This chapter will discuss the design of a ProMES based PMS that is intended to influence the identified problems in a positive way.

The scales with the lowest score are goal rationale, performance feedback, clarity of organizational goals, job factors and goal clarity. The management plans to re-evaluate the corporate strategy and present the outcomes to the employees in May 2011. Due to this, the scale for clarity of organizational goals is expected to be influenced in a positive way during the project. The other four scales are expected to be influenced in a positive way by implementing a performance management system because ProMES scores relatively strong on the topics as "target setting", "performance evaluation" that corresponds with the identified problems goal clarity, job factors, and performance feedback. The items that measure goal rationale have to do with how performance is measured, why certain goals are given and if regular feedback is given. These scales are covered by performance management systems if they fulfil the framework of Ferreira & Otley (2009). The same holds for the scales performance feedback and goal clarity. The scale for job factors concerns different items that have to do with feedback, goal clarity, and goal rationale. A performance management system is expected to be a valuable tool in order to improve on these scales and will therefore be used for a pilot project. When developing a PMS for the pilot project, special care will be devoted to the above mentioned scales. Later in this chapter a structured interview will be used to evaluate the PMS.

In paragraph 5.2.3 differential research was conducted in order to find a department which scores relatively weak which could be selected for the pilot project. However, both the ANOVA and t-tests did not provide significant differences between the departments. For the pilot project, one department was selected in order to be able to make a comparison before and after the intervention. The departments "production employees" and "production leaders/managers" could not be separated for an intervention because the production leaders perform the same work activities as production employees but additionally have scheduling and administrative tasks. Taken together, these two departments show the lowest scores on the bottom items that were presented in Table 7 and are therefore selected for the pilot project.

The next paragraphs discuss the design process, development of objectives, indicators, contingencies and feedback reports. It will be discussed as well on what parts the design is different from the original ProMES. The implementation and evaluation of the PMS are discussed as last part in this chapter.

7.1. A ProMES based PMS design

With regard to timing, the design and implementation of a ProMES system as suggested by Pritchard *et al* (1990) takes at least 14 meetings according to the developers as discussed in chapter 6. Between the meetings it is advised to have two weeks in order for the employees to process and discuss the outcomes with each other. This would be too much time consuming for the intervention in this graduation project. For this reason, an alternative approach will be discussed in

which a pilot PMS for three departments was developed. During the development three main steps will be distinguished which will be discussed in the next paragraphs:

Step 1: Development of objectives and indicators

Step 2: Development of the weight of the indicators and contingencies

Step 3: Development of feedback report and sessions

The next paragraphs discuss the design of the ProMES based PMS extensively. Please be aware that the PMS was developed for three departments, but that only the design process will be discussed for the LPP department.

7.2. Process of Development of PMS

Department 1 and 2 together are the units that have been selected for the intervention. These departments consist out of the production employees and production leaders/manager. A design team was formed with the production leaders and manager that had to develop the PMS during meetings. Participation in identifying the objectives and indicators is important because employees' acceptance of measurement and feedback systems is influenced by their perceptions of the fairness of the evaluation system. This fairness is heavily influenced by the degree of participation of those being measured according to Bobko & Colella (1994). During the interviews the researcher proposed a set of objectives and indicators and discussed these with the employees until consensus was reached in which the author had a consultative role. Before discussing objectives and indicators the corporate strategy was presented in order to have the organizational goals clear. The employees who were selected for these interviews are the production manager, and the three production leaders. Production employees are not selected for the interviews because they rotate frequently between the three departments and 60% of these employees are hired from a job agency for relatively short periods of time.

In this paragraph the design phase is discussed only, the outcomes will be presented later. Figure 8 gives a visual presentation of the process. As discussed in paragraph 5.3 ProMES was selected as foundation for the PMS. One of ProMES' main characteristics is the bottom-up approach it uses and the participative design method which is considered to influence the conception of fairness of the system (Bobko & Colella, 1994). These characteristics are respected during the design phase. Before starting to work bottom-up, it is important to obtain management approval which is the starting point of the flow diagram as displayed in figure 8.

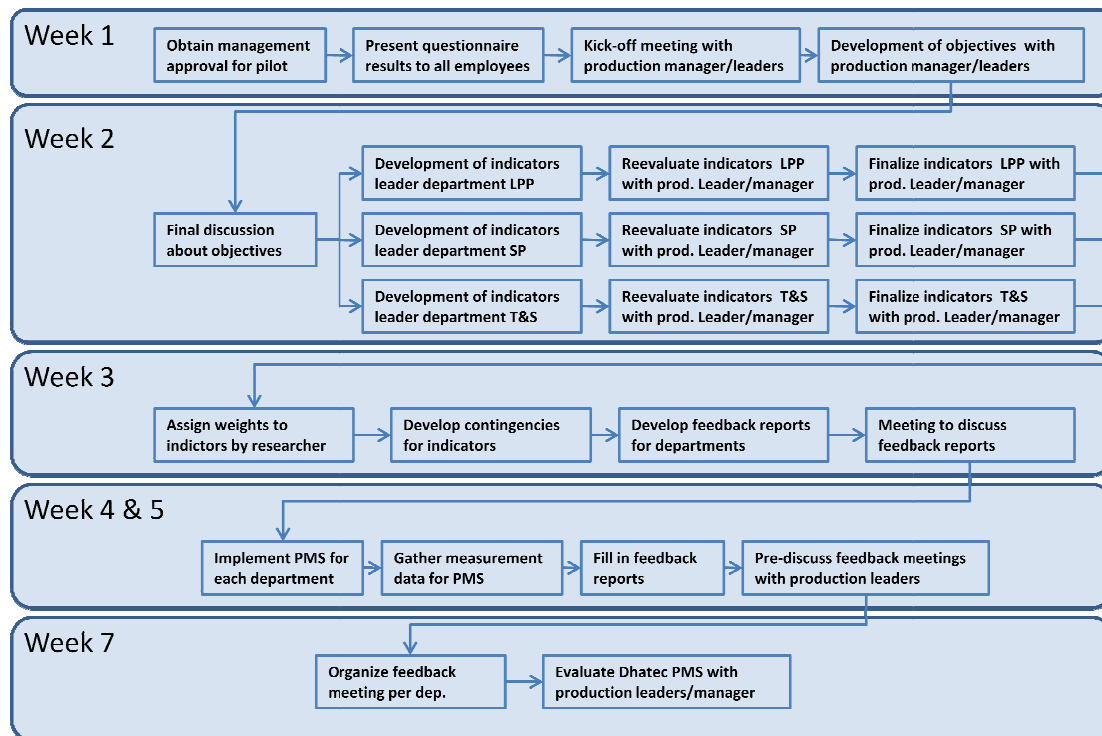


Figure 8: Visual presentation of design steps of PMS

The general manager was presented with the results from the questionnaire and the plan to develop a PMS as a pilot project for the production leaders and manager. Approval was obtained and feedback on the questionnaire was given to all employees during a lunch break in week 1. The feedback consisted of mentioning and discussing the scales that scored relatively high and the scales that scored low as presented in table 7. In order to improve on the lower scoring scales, the plan to develop a PMS was briefly discussed. Hereafter, a kick-off meeting was organized with the production leaders and manager in which the process of development of the PMS was presented. The researcher asked the production leaders and manager to think of objectives for their departments prior to the next meeting in which the objectives would be developed. The question was asked to define exactly what the department is trying to accomplish (Pritchard *et al*, 2002). Also, according to Pritchard *et al* (2002) differences in opinion could be expected, for this reason the next meeting was planned with the production leaders and manager together and the researcher as facilitator to guide the process. However, during the first meeting for developing the objectives, time was needed to get all participants on the same page about what an objective for a department is intended to be. A second meeting was planned to finalize the discussion about the objectives for the departments. During this meeting, consensus was achieved and it was agreed upon that all departments have the same principal contribution to the organisation, and share the same objectives.

After consensus was reached about the objectives, the indicators were developed starting with individual meetings with the production leaders. During the first meeting it was explained that indicators should be developed in order to measure to what degree the department is obtaining the objectives. Also it was emphasized that measures should be controllable and understandable by the people who are working with the PMS. Besides the production leaders, the production manager was also invited for the second and third meeting. The production manager proved to be very helpful for providing suggestions for the indicators. After the final meeting the

researcher summarized the outcomes in an email which was sent to the production leaders individually. In this email the indicators are mentioned together with how they are measured. The email was written in such a way that the researcher was still open for suggestions and improvements. This was also explicitly stated in the email in order to emphasize the participative design methodology.

Controversially, in order to speed up the design phase, assigning weights and developing contingencies and feedback reports was done by the researcher without the participation of the production leader or manager. The outcome was discussed with the production leaders and manager in a meeting in which they were asked to share their opinion about the design. This time, consensus was reached in a single meeting and the participants agreed that the next step was to implement the PMS. The implementation and further steps will be addressed in the next paragraphs.

In only seven weeks a ProMES like PMS was developed, implemented and evaluated. This could not be done by following the steps as suggested by Pritchard *et al.* (2002). Summarizing the points that were addressed differently results in the following: 1. the time in between the meeting was not two weeks as suggested but 1 or 2 days, 2. weights were assigned to the objectives by the researcher, 3. contingencies were developed by the researcher, 4. feedback reports were developed by the researcher, 5. a meeting was organized to discuss and approve the elements that were designed by the researcher, 6. management approval was only needed before the start of the pilot project.

7.2.1. Development of Objectives

To the production leaders, the question was asked to define exactly what the department is trying to accomplish (Pritchard *et al.*, 2002). As described in paragraph 7.2, objectives were developed that suit all three departments. Objectives must be clearly stated, complete and beneficial to the organization. In this paragraph will be discussed which objectives have been developed and why these are considered to be of great importance.

The first objective is that products must be fit for purpose. More than for other organizations, the Firm has to deliver the products exactly according to customers' specifications. The products that are fabricated for the customers are made exactly for the pipeline diameter and wall thickness. This means that the make-to-order products are project specific and have no further commercial use. If products are not fit for purpose when they arrive on the customer's job site, they are worthless to the customer. Besides risking to losing the good reputation of the company, new products have to be manufactured and send to the customer. This is a costly procedure considering that projects are carried out worldwide. For the reasons above, the production leaders and manager agreed to define the first objective as follows:

Objective 1: Products must be fit for purpose

The second objective is that products need to be delivered before the agreed deadline. Pipeline projects consist out of a complex worldwide supply chain in which on-time delivery is the industry's standard. This also holds for the Firm's product deliveries; when the delivery takes place after the agreed deadline they could be worthless to the customer and payments will not be made. Alternatively, some purchase orders include contracts that include fines that have to be paid for each

time unit late. The height of the fine and the time unit are negotiated before the purchase order is signed. For the reasons above, the production leaders and manager agreed to define the second objective as follows:

Objective 2: Deliver on time

The third and last objective is to produce efficiently. Because the products are made or assembled in the Netherlands and the Firm operates internationally, special care should be devoted to produce as efficient as possible. If products are made inefficiently, there will be room for competition to arise and gain market share. For the reason above, the production leaders and manager agreed to define to third objective as follows:

Objective 3: Produce efficiently

After establishing the objectives, indicators were developed. These are discussed in the next paragraph.

7.2.2. Development of Indicators

Indicators are the measures that show how well the unit is performing on the objectives. As described in paragraph 6.2 discussions were held with the production leaders and production manager. Indicators must be complete, valid, controllable, cost-effective to collect and understandable & meaningful. This paragraph will discuss the development of the indicators for the LPP department only. The indicators for the other departments were developed in a similar way but will not be discussed in this report.

The objectives that were defined earlier were taken as a starting point to develop the indicators. This resulted into a total of six indicators; three for objective 1, one for objective 2 and two for objective 3. After the last meeting the researcher concluded the meeting in an email which was sent to the production leaders and manager in order to provide a last opportunity for feedback. None of the production leaders indicated that there was a need for change. The Special Products (SP) department has five indicators in total and the Transport & Storage (T&S) department has six indicators.

A brief description of the activities in the department is necessary for understanding the development of the indicators. The LPP department produces metal rings in a diameter range from 219,1 to 3.048,0 mm. These rings are formed out of slit coils into a specific shape and include a clip which is used to secure the ring into both ends of a pipe. The pipe ends are prepared for welding and have a specific shape which is covered by the metal ring. The ring protects the pipe-ends from damaging during logistic operations. Because pipes are made project specific, the rings are manufactured specifically for the pipes of this very project. That means that the production has to take place within strict tolerances.

For the first objective titled “products must be fit for purpose” three indicators were developed. Three product specifications are considered to be critical in order to have the rings fit for purpose. These specifications are: a. the outside diameter of the ring, b. the insert tolerance of the ring in the pipe-end, and c. the measure of rectangular shape of the ring. For ‘a’ and ‘b’ the indicator value is the diameter of the ring at two different positions and for ‘c’ the indicator value is measured with a special device. For these three indicators, three criteria are set up under which the indicator

performs best, acceptable or unacceptable. Later on, these criteria will be used to establish the contingencies. An overview of the indicators for objective 1 can be found in table 13.

Department	Line pipe Protection		Performance		
Objective	Indicator	Measurement Unit	Best	Acceptable	Unacceptable (Correction necessary)
1 "products should be fit for purpose"	1	Diameter of ring in 'mm' measured with 32 mm overlap compared with internal diameter of customer's pipe as specified on PO	Diameter tolerance below 0,5 mm	Diameter tolerance below 1,0 mm	Diameter tolerance above 1 mm
	2	Diameter of ring measured in 'mm' with clip should be 1,5 mm smaller than internal diameter of customer's pipe as specified on PO	Diameter tolerance below 0,5 mm	Diameter tolerance below 1,0 mm	Diameter tolerance above 1 mm
	3	Conicalness of ring in 'mm' is measured with measurement device	Diameter tolerance below 0,5 mm	Diameter tolerance between -2 and + 1 mm	Diameter tolerance below -2 or above +1 mm

Table 13: Overview of indicators, measurement unit and performance for objective 2

The second objective is titled "delivery before deadline". A deadline can have different meanings, depending on what has been agreed by the contract. Deliveries are made conform the internationally known Incoterms (2010) and can range from EXW (pickup at manufacturers factory) to DDP (delivery on the doorstep of the client including payment of duties). An internal deadline will be created for deliveries that will be made by external transport agencies, that is when the order should be ready for pickup at the factory. Within the company, it has been agreed that optimally, the production should be planned so that products are ready before the deadline but not earlier than one week before the deadline. Deliveries after the deadline cannot be accepted. When the order is ready more than one week before the deadline, it is acceptable, but not optimally considering the storage space that is needed. Table 14 provides an overview of the indicators for objective 2.

Department	Line pipe Protection		Performance		
Objective	Indicator	Measurement Unit	Best	Acceptable	Unacceptable (Correction necessary)
2 "delivery before deadline"	4	Date of readiness of order is measured in days before or after the date as specified on the PO (deadline is "0", before deadline scores minus and after deadline scores plus, e.g. -7 when an order is ready 1 week in advance)	Between -7 and 0 days	Between -21 and -7 days	Below -21 days before or more than 0 days after agreed date

Table 14: Overview of indicators, measurement unit and performance for objective 2

The third objective is titled "production needs to be efficient". Together with the production leader and manager it has been agreed that efficient has two meanings in the department. First, labor should be as efficient as possible. Before a project starts an estimation of the hours that are needed to make the products is made. This estimation is made by using a complex formula that takes into account various product specifications such as the diameter of the ring, the specific rolling shape, the use of different steel grades, the combination with pipe closure products, etc. Based on historical data variable and fixed time units are used in the formula in order to make an accurate estimation of the hours that have to be used. Because averages are used in the formula, the outcome will be an average number of hours that are needed to complete production. The actual hours that are used for the project will be

compared with the estimated hours. It is considered to be best when the project is carried out with less hours than estimated, average performance when a maximum of 10% additional hours are needed and unacceptable when more than 10% additional hours are needed.

Second, the usage of raw materials needs to be as efficient as possible. Slit coils are used as raw material. By measuring the inner and outer diameter of the coils before and after production of the project, the used meters of steel band are known exactly. This can be compared with the meters that were needed in theory. There is always a small percentage of steel band that cannot be used and has to be treated as waste. This percentage should, in theory, not be higher than 2%. For this reason, best performance is a raw material usage of maximum 102% of the theoretical usage, acceptable is between 102% and 106% and unacceptable is more that 106% of the theoretical usage. Table 15 provides an overview of the indicators for objective 3.

Department	Line pipe Protection		Performance		
Objective	Indicator	Measurement Unit	Best	Acceptable	Unacceptable (Correction necessary)
3 "production needs to be efficient"	5	The number of man hours for each order will be measured and compared with an expectation that was made with a formula based on measurements on beforehand	Between 80 to 100% of average	Between 100 to 110% of average	More than 110% of average
	6	The diameter of the slit coil is measured before and after finishing the order and compared with the theoretics amount of raw material that should have been used	Between 100 to 102% material compared with theoretical amount (100%)	Between 102 to 106% material compared with theoretical amount (100%)	More than 106% material compared with theoretical amount (100%)

Table 15: Overview of indicators, measurement unit and performance for objective 2

These objectives and indicators are included in the feedback report that is displayed in table 17.

7.2.3. Development of Indicator Weights and Contingencies

After developing the indicators together with the production leaders and manager the author will devote weights to the indicators in the measurement system and also construct the contingencies. Before implementation, the production leaders and manager had the opportunity to review the system and suggest improvements.

Looking at the three objectives, a distinction can be made. The most relevant objective is that the products are fit for purpose which was confirmed by asking the production manager and general manager. For this reason, 50% of the weight of the objectives will be devoted to the first. Objective 2 and 3 are considered to be of equal weight and therefore both account for 25% of the total weight. Between the indicators for the objectives themselves, no distinction is made. The indicators are of equal importance; if one of the indicators completely fails, the objective cannot be achieved.

The contingencies are kept simple for the pilot project. For each indicator three levels are distinguished: "best", "acceptable" and "unacceptable". For each of these levels an indicator value range was established. Table 17 shows a feedback report in which the indicator value ranges are displayed. For example, the outside diameter of the

ring in 'mm' measured with an overlap of 32 mm should have a tolerance to the specified diameter of plus or minus 0,5 mm in order to perform best. If the tolerance is between plus or minus 1,0 mm an acceptable level is achieved but if the tolerance lies outside this specification, it is unacceptable and the product needs to be discarded and made over. These measurements take place every hour with a random ring selected from the production line and after changing the slit coil. The indicator values are written down on a measurement list. The production leader of the department takes this list and counts the number of best, acceptable and unacceptable values. After that he fills in the number on the feedback card.

Number of Best scores "B"	Number of Acceptable scores "A"	Number of Unacceptable Scores "U"	Effectiveness Score "Score _{EFF} "
90	10	0	90,00
50	40	2	-55,56
0	100	0	0

Table 16: Calculation of effectiveness score (maximum score is 100)

On the feedback card, the number will be translated to an effectiveness score by use of the contingencies. For the indicators for objective 1 it is difficult to design a contingency as described by Pritchard *et al* (2002) because the distinctions between the levels are not subject to partial scores. It is more like a switch that has three positions: best, acceptable, and unacceptable. The number of scores on one of the three positions for a project determines the effectiveness. To overcome this issue a formula was designed to calculate the effectiveness scores for objective 1. As an example the formula for indicator 1 is displayed below.

$$Score_{EFF} = 100 \cdot \frac{B}{B + A} - \frac{U}{B + A} \cdot 5000$$

Formula 1

From the formula can be seen that the positive side of the equation is determined by the fraction of Best scores (B) in relation to Acceptable scores (B). The full effectiveness score can only be obtained if all tolerance measurements are in the B category. As can be concluded from the formula, unacceptable scores have a large influence. It has to be noted that unacceptable scores are not expected to be recorded frequently. If an unacceptable score is found, the production needs to be stopped and it has to be checked which products of the series have to be discarded. These products have to be made over.

For each of the indicators of objective 1 similar formula are created in order to translate the scores into an effectiveness score. For the indicators for objective 2 and 3 contingencies are developed as suggested by Pritchard *et al* (2002). A distinction into three levels is considered to be sufficient for this pilot project. Moreover, it keeps the system understandable for all employees which is considered to be of importance according to Pritchard *et al* (2002). In between these three levels linear functions are assumed. The contingencies for these indicators can be found in graphs in the feedback report in table 13.

7.2.4. Development of Feedback Report and Sessions

The final step in the development of the system for the pilot project is the development of the feedback reports and the feedback meetings. An Excel sheet is made in which all the scores are filled in by the production leader. Table 17 shows an example of a feedback report. These scores are translated into effectiveness scores. Next to the effectiveness score the maximum score and last month's score is displayed. This gives the employees the possibility to compare the results of the current project to previous projects and to the maximum attainable scores. In the last column, the improvement possibilities are displayed per indicator which should focus the employees on the largest opportunities for improvement.

The feedback reports are constructed by the production leaders and send by email to the production manager and general management of the company. After finishing a project, which can have durations between a few days and a few weeks, the production leader invites the employees who have been working on the project for a group meeting. The production leader will supervise the meeting which will take approximately 15 to 20 minutes. The feedback report forms the starting point of a discussion for evaluating and improving the unit's productivity.

Before the first feedback meetings the researcher discussed with the production leaders how one should give and respond to feedback. It was discussed that, in order to maximize the results of the feedback meetings, the feedback should be provided within a few days after the reporting period. Further, the production leaders were provided with the following guidelines from DeNisi & Kluger (2000).

- Focus on the task and task performance only, not on the person or any part of the person's self-concept
- Be presented in ways that do not threaten the ego of the recipient.
- Include information about how to improve performance
- Include a formal goal-setting plan along with the feedback
- Maximize information relating to performance improvements and minimize information concerning the relative performance of others

The production leader and employees should discuss the general performance, and find an explanation for the reason why indicators improved or got worse. As last point they should focus on discussing how they could improve for the indicator that shows the most improvement opportunities.

Corporate Performance Management - Project Effectiveness Scores

Department	Line pipe Protection		15-7-2011 9:13	Performance									
Objective	Indicator	Weight	Measurement Unit	Best	Acceptable	Unacceptable (Correction necessary)	Number of Best scores	Number of Acceptable scores	Number of Unacceptable Scores	Effectiveness Score	Max Score	Last Months Score	Improvement Possibilities
1 "products should be fit for purpose"	1	16,7%	Diameter of ring in 'mm' measured with 32 mm overlap compared with internal diameter of customer's pipe as specified on PO	Diameter tolerance below 0,5 mm	Diameter tolerance below 1,0 mm	Diameter tolerance above 1 mm	25	5	1	-83,33	100,00	100,00	183,33
	2	16,7%	Diameter of ring measured in 'mm' with clip should be 1,5 mm smaller than internal diameter of customer's pipe as specified on PO	Diameter tolerance below 0,5 mm	Diameter tolerance below 1,0 mm	Diameter tolerance above 1 mm	23	4	0	85,19	100,00	100,00	14,81
	3	16,7%	Conicalness of ring in 'mm' is measured with measurement device	Diameter tolerance below 0,5 mm	Diameter tolerance between -2 and +1 mm	Diameter tolerance below -2 or above +1 mm	26	1	0	96,30	100,00	100,00	3,70
Total weight of objective 1		50,0%		Best	Average	Worst	Days Score			98	300	300	201,85
2 "delivery before deadline"	4	25,0%	Date of readiness of order is measured in days before or after the date as specified on the PO (deadline is "0", before deadline scores minus and after deadline scores plus, e.g. -7 when an order is ready 1 week in advance)	Between -7 and 0 days	Between -21 and -7 days	Below -21 days before or more than 0 days after agreed date	0			150,00	150,00	50	0,00
								Percentage score					
3 "production needs to be efficient"	5	12,5%	The number of man hours for each order will be measured and compared with an expectation that was made with a formula based on measurements on beforehand	Between 80 to 100% of average	Between 100 to 110% of average	More than 110% of average	104			36	75,00	50	39,00
								Percentage score					
	6	12,5%	The diameter of the slit coil is measured before and after finishing the order and compared with the theoretics amount of raw material that should have been used	Between 100 to 102% material compared with theoretical amount (100%)	Between 102 to 106% material compared with theoretical amount (100%)	More than 106% material compared with theoretical amount (100%)	103			15	75,00	50	60,00
								Percentage score					
Total weight of objective 3		25,0%								51	150,00	100	99,00
Overall Effectiveness										299	600	450	301

Table 17: Layout of feedback report

7.3. Implementation of PMS

The commitment of the senior management for the PMS before implementation was important. For this reason the outcomes of the performance indicators were discussed with the general manager. The general manager agreed to start the pilot project with the design that was developed as described in the earlier paragraphs. A short presentation was also given to all employees in order to inform them about the intervention.

During and after the implementation the author assisted the production leaders and manager. However, not much assistance was needed, most likely because of the participation of the production leaders during the design stage. Assistance was needed for the Excel file which contained minor problems with formulas for the contingencies. Also measurement lists were developed for the LPP department, and order readiness checklists were made for the SP and T&S department which included what is considered as minor or major nonconformity.

After the implementation, every department has had at least one feedback meeting. The LPP department has had two feedback meetings. The first meeting was for the LPP department where five employees attended which worked on the project. During this first meeting the employees that attended did not provide much input. This was contrary to the expectation because questions were anticipated. The same was true for the other two departments. However, during the second feedback meeting for the LPP department, questions were asked and the employees participated in the discussion about how to improve on the indicator that showed the most improvement possibilities. It is assumed that the employees are somewhat reserved during the first meetings and that effect of the feedback meetings will improve over time.

7.4. Evaluation of PMS Design

After implementing the PMS, the system ran for two weeks. For each department, the PMS has been used for at least one project and at least one feedback meeting was held. Although the timeframe that the PMS has been in use is short, the production leaders and manager were asked to evaluate the PMS. This provided a qualitative evaluation by asking opinions from four employees. With this early evaluation a first impression of the PMS in practice will be gathered and possible improvements can be identified quickly.

The method for evaluating the PMS has been done by using a structured interview. Questions were taken from Jones *et al* (1993) who designed an interview to detect problems with specific components of the measurement system such as adequacy of the individual measures, understanding of the contingencies, and so on. The production leaders and manager were selected to evaluate the PMS. Because they have been involved while designing the PMS they are considered to be able to give a decent evaluation of the PMS after a short time. In a later stage, after using the PMS for a longer period, it would be advisable to select employees to evaluate the PMS as well. Like Jones *et al* (1993), an introduction to the interview included a request that the interviewee would give their honest opinion and not respond with answers they thought the researcher would like to hear.

Besides the questions from Jones *et al* (1993), questions were asked about the subjects that achieved the bottom scores in the analysis phase. Because some questions were already covered by the questionnaire from Jones *et al* and questions were covered twice by the scales, a selection was made out of the questions which

were discussed with the interviewee. Out of the bottom scoring scales, the scale “clarity of organization goals” was not included in the structured interview because this scale was expected to be heavily influenced by a presentation that was held by the management to all employees about organizational goals and strategy.

Although the PMS has been developed together with the production leaders and manager, concerns are expected to arise once the system is implemented. The concerns expressed by the interviewees will be addressed after this project and most likely result in a revised system.

The structured interview revealed that the interviewees are positive about the system in general but at the same time have critical remarks about specific topics. Conclusions were drawn from the interviews and are displayed below. The critical remarks are considered to be points for future improvements. The numbers correspond with the numbers of the questions in the interview:

1. *How well do the dimensions cover the responsibilities of your department?*
The objectives cover the responsibilities of the LPP department best. The SP and T&O department indicated that 70% to 80% of the working activities are covered, but that more working activities e.g. products that are made less frequent have to be incorporated in the system somehow.
2. *What areas are not adequately represented?*
All interviewees indicated that there is one area that is not adequately represented in the system which is the packing of the finished goods. The production leader for T&S explained that the trading products are not represented in the system.
3. *How accurate is each of the measures?*
If indicators are measured, they are measured accurately.
4. *Which areas are not adequately measured?*
The LPP department mentioned that one indicator was not measured adequately because the tolerances were stricter than originally assumed which was corrected immediately. Further, two production leaders discovered that employees have different ways of measuring the same indicators.
5. *What did you get out of the contingencies?*
From the question about the contingencies there was not so much response. After asking if the contingencies were understood the answer was positive but it seems like they are not apparent in the system because they are ‘hidden’ in the formulas.
6. *What did you get out of the overall effectiveness graph?*
Effectiveness scores help the production leaders to compare actual results with recent history as they explained. Further, the production leader for SP indicated that he expects to see lower scores when new employees are learning on the job and see the improvement later.
7. *Does the PMS give you clear specific goals to aim for?*
All interviewees indicated that the system gives clear, specific goals to achieve.
8. *Do you expect that employees will have a better idea about how well they are doing their job though providing feedback?*
The production manager and production leader for LPP expect that feedback meetings give the employees a better understanding of the job but it takes certain number of feedback meetings before the understanding at a desired level. The production leaders from the SP and T&S department indicate that there is a lack of interest from the employees. (for SP and T&S only one feedback meeting was conducted, during the second meeting for LPP employees showed more interest and asked questions).

9. *Do you think that the PMS makes clear why the objectives and indicators are important?*

The production leader from the LPP department explained that the system provides an overall picture. The production manager indicated that the system itself does not stress the importance of the objectives and indicators; this should be done during feedback meetings.

10. *What does the PMS tell you that you did not already know?*

All except the production leader T&S explained that they realize now that employees have different ways of measuring the results. Further, the production leader LPP noticed that one of the product tolerances was stricter than he knew.

11. *What improvements would you make on the system?*

The production manager would like to improve the forms that are used to fill in the measurement results and the Excel forms.

12. *What, if anything, are you doing differently as a result of the measurement system?*

The production leaders indicated that they are more conscious of the performance measures for their department.

13. *In what ways has it gotten you to think differently about your department?*

None of the interviewees think differently of their department.

14. *Was what you got out of the measurement system worth the time you put into it?*

All interviewees indicate that the time devoted to develop the system was more than worthwhile.

15. *What did you not like about the PMS?*

The LPP production leader indicated that measuring and writing down the results is time consuming. Further, he indicated that the implementation is still ongoing because not all employees are used to work with the system and measure the indicators. The production manager explained that he is content with the system. It does not need to cover all aspects of the work. The production leader of the SP department explained that writing down the number of hours that employees are working in his department is time consuming and not always transparent. The production leader for T&S explained that his department has a lot of trading products. There is no actual production for these products, but moving around the trading products is more time consuming as expected.

With the outcomes of the evaluations a top three of improvements that could be made for the PMS was constructed:

1. Include packing of products that are ready for shipment in the PMS.
2. Provide instructions for employees how to measure indicators.
3. Include trading products for the T&S department.

8. Discussion

This design oriented case study has shown that implementing a performance management system improved the employee's perception of goal rationale, performance feedback, job factors and goal clarity. This could be concluded from a qualitative evaluation by means of a structured interview based on Jones *et al* (1993). The above mentioned scales were identified as scoring relatively weak in comparison with other scales as job ambiguity and goal conflict after analysis by the use of a questionnaire (see table 7). This questionnaire was constructed out of well-established scales to quantitatively verify the problem areas that were identified by the qualitative stream analysis of Porras (1987). The stream analysis was used to construct a problem definition out of the project description that was given by the management of the company.

Interviews, observations and corporate information were used as input for the stream analysis. The analysis revealed two root cause statements. One was titled "Structure and Time Pressure" which was not chosen for this study because it is not under control of the researcher. The second root cause was titled "Goal Setting & Objectives" which indicated problems with measuring performance, lack of objectives, unclear and not measurable objectives, organizational objectives that are not communicated within the organization, strategy is not dispersed through the organization, difficulties with setting job priorities, double positions and unclear responsibilities. Looking at these problems a performance management system (PMS) could provide a solution if essential aspects as shown in table 1 are included in the design (e.g. key performance measures, target setting and performance evaluation). This resulted in the following project description:

"Design and implement a performance management system for the organization to solve the business problems that were identified by the stream analysis. The characteristics of the system should match with the organization and the underlying theories have to be applied in the design phase for best results. A pilot project must be set up in order to evaluate the use of the system and to decide if a performance management system has to be implemented companywide"

From this description a central research question and sub questions were formulated that needed to be answered:

1. Could a performance management system solve the business problems as identified by the stream analysis?
 - a. *Could the problems that were indicated be validated using quantitative research?*
 - b. *Which unit of the organization could be selected for a pilot project?*
 - c. *Which characteristics should the system have to match the organization?*
 - d. *How can underlying theories be incorporated into a system?*
 - e. *How can be evaluated if the system is successful?*

With the problem description and the identified root causes a thorough analysis was made by using a 67 item questionnaire that assessed 14 scales. This analysis revealed that relative low scores were found for goal rationale, performance feedback, clarity of organizational goals, job factors and goal clarity. This confirmed sub-question **1a** by largely validating the results from the stream analysis. One problem from the stream analysis was not validated which had to do with setting job priorities and dealing with double positions. This problem was assessed by the scheduling ambiguity scale that scores relatively high in the analysis. An explanation

for this can be found in the interviews that were done for the stream analysis. The four interviewees all had double positions in the company. Employees working in the production to not have double positions

ANOVA was used for researching differences between the four departments but did not provide significant results. It was decided to group the production leaders, production manager and the production employees. Together they represent three production departments and show the highest number of weak scores on the problematic scales. This unit is selected for the pilot project which answers sub-question **1b**.

A PMS was designed for three departments. The design of the PMS is based on ProMES because it has the strongest incorporation of the aspects that were identified as being weak and ProMES shows proven results for production departments (Pritchard *et al*, 2008). Besides this the characteristics of this system as the bottom-up approach, group orientation and use of objective measures of performance fit the departments and the organization. This implicitly answers sub-question **1c**. However, because of time constraints not a full ProMES as defined by Pritchard *et al* (1993) was designed. The development of the objectives and indicators was made conform ProMES because participation of the employees is regarded as very important for this stage for positive influence on the acceptance of the objectives and indicators (Bobko & Colella, 1994). In order to speed up the development process, the development of weights of the indicators and contingencies, and the feedback reports was done by the researcher and presented as proposal. This proposal was thoroughly discussed with the production leaders and manager. They were asked for their opinion, suggestions and approval of the system which resulted in minor adjustments.

With regard to the underlying theories of performance management it can be concluded that goals are used as a motivational force. For the best performance specific, difficult goals were set for tolerances in the production. One of the ways of enhancing goal commitment is to have employees participate in setting them which was done in the design stage. Other ways for enhancing goal commitment were used as well like making public commitment and by leaders who behave supportively. In this way the importance of the goals is stipulated. In the definition of a performance management system "feedback" is included. It is generally assumed that feedback on performance will improve the outcomes for future activities. DeNisi & Kluger (2000) discuss ways to design feedback systems which maximize their effectiveness. They have recommendations for all feedback interventions which were discussed with the production leaders before the feedback meetings. Although pay-for-performance was also discussed as being an underlying theory for a performance management system, the subject was not included in this design. The reason for this is that the time available for the project did not allow for incorporating it into the design. So for sub-question **1d** can be answered that the goal setting practices and feedback theory were included in the design, but that pay-for-performance was not.

During the implementation only minor problems were experienced such as different measurement methods for the indicators by the employees and Excel sheets that were needed for filling in the measurement results contained some difficulties in the formulas. Two weeks after the implementation an evaluation was made by using a structured interview based on Jones *et al* (1993) which revealed that the designers/interviewees are positive about the system. However, critical remarks are made as well and will be used for improvement of the system. It was indicated that some working activities are not included in the system such as packing finished goods and time spent on handling trading products. The interviewees also indicated

that goals were specific and clear and that the feedback meetings are believed to provide employees with a better understanding of the job. Interesting to note is that the interviewees indicated that the first feedback meeting for each department did not result in a lively discussion with the employees that worked on the project. However, during the second meeting in the LPP department, employees joined the discussion. It is concluded that employees need time to get used to the system and the feedback meetings. What is mentioned as well is that the production leaders are more conscious of the performance measures and discovered that employees use different ways of measuring the performance indicators. Also, it was discovered that tolerances for some indicators were not as strict as they should be, this was corrected immediately. For sub-question 1e can be answered that the interviewees see the implemented system as successful albeit with some critical points for improvement.

After answering the sub-questions, an answer can be formulated for the central question as well. The business problems that were identified in the stream analysis are recalled: “*No measures of efficiency of decisions are available* (related to performance feedback and job factors), *caused by goals and objectives which are not SMART* (related to goal clarity). *Goals and objectives are not communicated through the organization or do not exist at all* (related to goal rationale, job factors)”. From the evaluation is concluded that the intervention clearly improved on the topics that were identified as problems. However, the evaluation is qualitative and does not show to what extent improvements are made.

Theoretical implications are made as well; for indicators that score on distinct levels such as between defined tolerances and could be corrected when the tolerance is not met, Pritchard *et al* (2002) do not provide a method for defining a contingency. In this study a formula was designed that provides a solution for defining the contingency. This method is generalizable and could be used for similar problems encountered by other designers of ProMES.

8.1. Limitations

PMS are normally used for measuring and improving performance. In this study it was used to improve goal clarity, performance feedback, and goal rationale. It is not known if the PMS will improve performance. The timeframe on which performance was measured is too short to draw conclusions on, especially since performance tends to decrease just after implementation Pritchard *et al* (2008).

What is not assessed is the impact of the intervention on scales that scored high in the analysis. For example, the scale performance criteria ambiguity scores high and assesses whether employees know what level of performance is expected from them. It could be that after implementation of the PMS with indicators and objectives, employees discover that a higher level of performance was expected from them. This could influence their perception resulting in lower scores on the scale.

The research method that was used to validate the problems that came out of the stream analysis has limitations. The limited sample size of 21 is relatively small and did not generate adequate significant levels in the statistical analyses, especially when analysing differences between groups.

Designing the performance management system together with the production leaders and manager involved more time than expected. The initial idea was to conduct the research questionnaire a second time after which the scores on the scales could be compared to the earlier scores. However, after implementing the systems it should

have been used for a couple of projects before employees could be asked to fill in the questionnaire for a second time. As alternative a structured interview was used to evaluate the system in a qualitative way.

The researcher is also owner of the company under consideration. Although much effort is devoted to objectivity, it is mentioned as a limitation because it could have affected the objectivity of the researcher and the behaviour of the interviewees could have been influenced resulting in filling in higher scores in the questionnaire or more positive answers during interviews which could bias the objectivity.

The performance management system was designed on the basis of ProMES, but did not follow the full development cycle as defined by Pritchard *et al* (2002). Although the objectives and indicators had been developed in high cooperation with the design team, the indicator weights and contingencies are primarily developed by the researcher and discussed by the design team hereafter. The participative design process of the original process is a strong aspect that leads to a higher acceptance of the PMS by employees (Pritchard *et al*, 1988). Because the participation of employees was less in the design process that was used in this study, acceptance of the PMS might be lower. It has to be noted, that the evaluation did not provide evidence for low acceptance of the system.

8.2. Recommendations

After completing this master thesis, the project continues within the company. The evaluation by use of the structured interview identified a top three of improvements that could be made for the PMS that are recommend to be done on short term:

1. Include packing of products that are ready for shipment in the PMS.
2. Provide instructions for employees how to measure indicators.
3. Include trading products for the T&S department.

Further, the critical points that were indicated by the production leader and manager in the structured interview have to be assessed again by the design team in order to decide which points need actual improvement.

In a meta-analysis by Locke *et al* (1980) is concluded that money is the most crucial incentive and that no other incentive or motivational technique comes even close to that. Pay-for-performance could have been included into the PMS as well but was not done with regard to time constraints. It is recommended to evaluate if pay-for-performance should be included in the PMS in the future.

In the first feedback meetings, there was not much discussion about the effectiveness scores. It is recommended to stimulated discussion in future meetings. The upcoming feedback meetings could be attended by a facilitator in order to assess whether the right atmosphere is maintained for having an open discussion about the feedback report and improvement possibilities and to make the production leader aware of the points in mind for giving successful feedback as stated by DeNisi & Kluger (2000).

What is recommended to be done to assess the impact on the scales that were influenced after implementing the performance management system is to conduct the “werkbeleving” questionnaire for a second time. It is expected that the scales that scored relatively weak in this study will not be in the bottom scores in the second analysis.

References

- Abernethy MA, Cua WF. "A field study of control system 'redesign': the impact of institutional process on strategic choice". *Contemporary accounting research* 1996; 13; p.569-606.
- Aken, J.E., Berends, H., & Van der Bij, H. *Problem-solving in organizations*. New York: Cambridge University Press; 2007
- Balogun J, Johnsons G. "Organizational restructuring and middle manager sensemaking", *Academo of Management Journal*, 2004, Vol. 47, No. 4, pp523-549.
- Bandura A. *Self-efficacy: The exercise of control*, New York: Freeman 1997
- Bobco, P., Colella, A. "Employee reactions to performance standards: a review and research propositions", *Personnel Psychology*, 1994, Vol. 47 pp.1-29
- Bourguignon A, Malleret V, Nørreklit H. "The American balanced scorecard versus the French tableau de bord: the ideological dimension", *Management Accounting Research* 2004, Vol. 15, pp107-134.
- Broadbent J, Laughlin R. "Performance management systems: A conceptual model", *Management Accounting Research*, 2009, vol. 20, p283-295.
- Chow CW. "The importance of national culture in the design of and preference for management controls for multi-national operations", *Accounting, Organizations and Society* 1999 Vol. 24, p441-461.
- David JH. *Identifying the factors that contribute to the effectiveness of the productivity measurement and enhancement system (ProMES)*, Texas A&M University, 2003 August.
- Davis S, Albright T. "An investigation of the effect of Balanced Scorecard implementation on financial performance", *Management Accounting Research* 2003, Vol. 15, pp135-153.
- Denisi AS. "Performance appraisal and performance management: A multi-level analysis" . In KJ Klein & S Kozlowski (Eds.), *Multilevel theory, research and methods in organizations* 2000, p121-156.
- DeNisi AS, Kluger AN. "The effects of feedback intervention on performance: a historical review, a meta-analysis and a preliminary feedback invention theory", *Psychological Bulletin* 1996, Vol. 119, Iss. 2, pp254-257.
- DeNisi AS, Kluger AN. "Feedback effectiveness: Can 360-degree appraisals be improved", *The Academy of Management Executive* 2000, Vol. 14, No. 1, pp129-139.
- Epstein M, Mazoni JF. "Implementing corporate strategy: from tableau de bord to balanced scorecards", *European Management Journal*, 1998, Vol. 16, No. 2, pp. 190-203.
- Ferreira A, Otley D. The design and use of management control systems: An extended framework for analysis, 2005 Lancaster University Discussion Paper.
- Ferreira A, Otley D. "The design and use of performance management systems: An extended framework for analysis", *Management Accounting Research* 2009, Vol. 20, pp263-282.
- Ferreira A, Otley D. The design and use of performance management systems: An extended framework for analysis. *Management accounting research* 2009, Vol 20, p263-282.
- Gerhard B. "Compensation strategy and organization performance". In *Rynes & Gerhart* 2000, pp. 191-194.
- Gibbons R. "Incentives in organizations", *Journal of economic perspectives* 1998, Vol 12, Q4, p115-132.
- Hair, J.F. *Multivariate data analysis* (3rd ed.). 1992 New York: Macmillan.
- Kaplan RS, Norton DP. "The balanced scorecard – Measures that drive performance", *Harvard Business Review*, 1992, January-February, pp123-145.
- Kaplan RS, Norton DP. Using the balanced scorecard as a strategic management system, *Harvard Business Review* 1996, January-February, pp183-211.
- Kerr S. "On the folly of rewarding A, while hoping for B", *The Academy of*

- Management Executive*, 1995, Vol. 9, Iss. 1, p7-15.
- Kleingeld A, Tuijl, van H, Algera JA,. "Participation in the design of performance management systems: a quasi-experimental field study", *Journal of Organizational Behavior*, 2004, Vol25, pp831-851.
- Landsberger H, *Hawthorne revisited*. New York: NY: Cornell University Press, 1958.
- Landy FJ, Conte JM. *Work in the 21st century: an introduction to industrial and organizational psychology*. New York: NY: McGraw-Hill; 2004. p165.
- Locke EA. "The ideas of Frederick W. Taylor: An evaluation", *Academy of Management Review* 1982, Vol. 7, No. 1, pp14-24.
- Locke EA, Latham GP. "*A theory of goal setting & task performance*", Englewood Cliffs, NJ, US: 1990 Prentice-Hall, Inc.
- Locke EA, Latham GP. "Building a practically useful theory of goal setting and task motivation", *American Psychologist*, 2002, Vol.57, No.9, pp705-717.
- Malo JL. "Les tableaux de bord comme signe d'une gestion et d'une comptabilité à la française". *Mélanges en l'honneur du professeur Claude Pérochon*. Paris, Foucher, 1995, pp357-376
- Milgrom P, Roberts J. *Economics, Organization and Management*, Englewood Cliffs: Prentice Hall, 1992
- Murphy KR, Cleveland JN. *Understanding performance appraisal: Social, organizational, and goal-based perspectives*, Thousand Oaks, CA: Sage 1995
- Naylor JC, Pritchard RD, Ilgen DR. *A theory of behaviour in organizations*, New York: Academic Press 1980
- Neely A. "Does the balanced scorecard work: An empirical investigation", *The Cranfield School of Management Research Paper Series*, 2008, No 1/08, ISBN 1859051928.
- Nørreklit H. "The balance on the balanced scorecard – a critical analysis of some of its assumptions", *Management Accounting Research*, 2000, Vol. 11, Iss. 1, p65-88.
- Otley D. "Performance management: a framework for management control systems research", *Management Accounting Research*, 1999, Vol. 10, pp363-382.
- Otley DT, Berry AJ. "Control, organization and accounting", *Accounting, Organizations and Society*, 1980, Vol. 5, Iss. 2, p231-244.
- Porras, J.I. *Stream Analysis: A Powerful Way to Diagnose and Manage Organizational Change*. Reading, MA: Addison-Wesley, 1987.
- Porter M.E. *Competitive Strategy*, Free Press New York, 1980.
- Porter M.E. *Competitive Advantage*, Free Press New York, 1985
- Pritchard R.D. "Designing a goal-setting system to enhance performance: a practical guide", *Organizational Dynamics*, 1988, Vol. 17, Iss. 1, p69-79.
- Pritchard RD, Harrel MM, DiazGranados D, Guzman MJ. "The productivity measurement and enhancement system: A meta-analysis", *Journal of Applied Psychology*, 2008, Vol. 93, No. 3, pp540-567.
- Pritchard RD, Holling H, Lammers F, Clark BD. *The measurement and improvement of organization productivity: An overview of ProMES, the productivity measurement and enhancement system*, Improving organizational performance with the productivity measurement and enhancement system: An international collaboration, Nova Science Publishers, Inc, New York, Excerpt 2002, pp3-27.
- Pritchard, R.D. Development of the Motivation Assessment Questionnaire April 24, 2006. University of Central Florida
- Pritchard, R.D., Jones, S. D., Roth, P. L., Stuebing, K. K., Ekeberg, S. E. *The effects of feedback, goal setting, and incentives on organizational productivity*. Journal of Applied Psychology Monograph Series, 1988, Vol 73(2), 337-358.
- Pritchard, R. D., Jones, S. D., Roth, P. L., Stuebing, K. K., Ekeberg, S. E. "The evaluation of an integrated approach to measuring organizational productivity", *Personnel Psychology* 1989, Vol 42(1), 69-115.
- Radnor ZJ, Barnes D. "Historical analysis of performance measurement and

management in operations management", *International Journal of Productivity and Performance Management* 2007, Vol. 56, No. 5/6, pp384-396.

Rynes SL, Gerhart B, Parks L. "Performance evaluation and pay for performance", *Annual Review Psychology*, 2005, Vol. 56, pp571-600.

Simme Douwe P. Flapper, Leonard Fortuin, Paul P.M. Stoop. "Towards consistent performance management systems", *International Journal of Operations & Production Management*, 1996, Vol. 16 Iss: 7, pp.27 – 37

Simons R. *Levers of control: How managers use innovative control systems to drive strategic renewal*, Boston – Massachusetts, Harvard Business School Press, 1995.

Stringer C. "Empirical performance management research: observations from AOS and MAR", *Qualitative Research in Accounting & Management*, 2007, Vol. 4, No. 2, pp92-114.

Varma A, Budhwar PS, DeNesi A. *Performance Management Systems: A global perspective*, New York: NY: Routledge 2008, Vol.1.

Viswesvaran C, Ones DS, Schmidt FL. "Comparative analysis of the reliability of job performance rating", *Journal of applied psychology*. 1996, Vol 81. pp 557-574.

White E. "Employers increasingly favor bonuses to raises", *Wall Street Journal*, B3, 2006, August 28.