How increase of job autonomy influences the tightness of coupling of a management control system within a high-reliability environment

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# Content

## Preface

## Abstract

1. **Introduction**

2. **Literature review**
   - 2.1 Job autonomy
   - 2.2 High-reliability environment
   - 2.3 Management control systems
   - 2.4 Loose coupling
   - 2.5 Research structure

3. **Methodology**
   - 3.1 Research method
   - 3.2 Data collection
   - 3.3 Data analysis
   - 3.4 Methodological issues

4. **Results**
   - 4.1 Case organization
   - 4.2 Qualification as high-reliability organization
   - 4.3 The former functional organization
   - 4.4 Introduction of self-organizing project teams
   - 4.5 Effects and risks of increased job autonomy
   - 4.6 Case studies project teams
     - 4.6.1 Case study PT1: Project team Heat Exchangers
     - 4.6.2 Case study PT2: Project team Air cooled Heat Exchangers
     - 4.6.3 Case study PT3: Project team Systems
     - 4.6.4 Case study PT4: Project team Complex Heat Exchangers
   - 4.7 Theoretical implications

5. **Conclusion, limitations and recommendations**
   - 5.1 Conclusion
   - 5.2 Potential limitations results
   - 5.3 Recommendations for further research
   - 5.4 Recommendations for practice

## Literature

## Attachments
Preface

My thesis is about the influence of more autonomy on management control systems. The study was carried out in the practice of Bronswerk Heat Transfer in Nijkerk, the Netherlands. This thesis is written for accomplishing the Master Management Sciences program of the Open Universiteit in Utrecht.

For me it means the realization of an intrinsic cherished desire. In combination with long working days, intensive marathon trainings and attention for my daughter, the past two and a half years have been a very intensive period. Still, the program gave me a lot of energy and some valuable new friendships.

I would like to thank Bronswerk Heat Transfer for facilitating the study, the managers for their enthusiastic contribution to the data and my mentor Pieter Kamminga for the intermediate feedback, which was very stimulating.

Ronnie Ligtenbarg
Abstract

Autonomy has become popular in knowledge work and organizations feel pressure to grant autonomy to employees. High-reliability organizations also must cope with environmental, safety and legal regulations. Duality between the principle of autonomy and the regulation demands leads to a dilemma of concurrent necessity for both flexibility and standardization. Following theories arguing that so called ‘coupling processes’ are key mechanisms, in this study it is argued that the use of loose coupling is the way in finding balance between flexibility and standardization.

Original theories state that elements of management control systems can be tied together tightly or loosely. In this study the theory of van Hengel et al. (2014) is followed, who distinguish two dimensions: vertical loose coupling, between hierarchical levels; and horizontal loose coupling, between intentions and actions. Previous studies show a very successful appliance of loose coupling, but it turns out to be not always the case in high-reliability situations. Therefore, more research seems to be necessary to understand first, how increase of job autonomy leads to a change of a management control system; and second, how change of job autonomy leads to a change in the tightness of coupling with the elements of a management control system. Following Malmi and Brown (2008) in this study a management control system is considered as a package of administrative controls, planning controls, cybernetic controls, reward and compensation and cultural controls. Most literature about job autonomy is focused on individual level effects. This study is distinguishing by focussing on organization level effects and taking into account the tension organizational leaders may feel. The main research question is:

How does increase of job autonomy influence the tightness of coupling of a management control system within a high-reliability environment?

For answering the question two relevant propositions have been formulated and tested in the practice of Bronswerk Heat Transfer, mainly active in the oil and gas industries. In the year 2013 the organizational structure was changed from functional departments to four multidisciplinary project teams, making it a representative context. Relevant insights were gained by interviewing seven managers. It seems that the change was motivated by internal pressure of employees. The idea was adopted from a health care company and introduced in a very short time period. On company level there were communication and efficiency advantages and personnel was satisfied, but also some side effects could be observed resulting in practical issues and liability risks.
For all cases both propositions are confirmed. Increase of job autonomy has resulted in a change of the package of management control systems, with reduced importance of administrative controls, planning controls and cybernetic controls and more attention for rewarding and cultural controls. Vertical coupling has become looser and horizontal coupling tighter. It could be observed that change of management control is a path-depending process with some examples of symbolic displaying in the first years, such as showing good results for legitimizing the new approach. It is stated that rules related to risks are followed tightly. The study results in some refinements: it takes a long time for embedding the change, cybernetic controls are used in a changed way, and there is a significant influence of personal characters of individuals on the arrangement of management controls.

Recommendations for further research are given by extending the study to other organizations and studying the refinements further on base of the old institutional economic approach (OIE) and the new institutional social approach (NIS). Recommendations for practise are given for optimizing the balance between a high level of job autonomy and stay compliant with external requirements by managing the principle of loose coupling.
1 Introduction

Autonomy has become much more prevalent and popular in knowledge work. Organizations feel considerable pressure from multiple sources to grant autonomy to employees, such as global shift from manufacturing economies to knowledge and services economies and change in attitudes and expectations of knowledge workers (Langfred and Rockmann, 2016). Besides firms that are operating in high-reliability organizations, such as in nuclear, aviation and oil and gas industries, also must cope with environmental and safety regulations (Chassin, 2013). Heads of such organizations are continuously concerned about finding the right balance between providing sufficient space for autonomy and complying with regulations (Langfred and Rockmann). Duality between the principle of autonomy and the regulation demands leads to a dilemma which in particular high-reliability organizations face: concurrent necessity for both flexibility and standardization (Grote et al., 2009).

Based on detailed observations in a gypsum mine Hallett and Ventresca (2006) argue that coupling processes are key mechanisms in finding balance between standardization and flexibility. In existing literature the term ‘loose coupling’ is frequently used. The concept of loose coupling is introduced by Weick (1976). In contrast to the prevailing image that elements in organizations are coupled through dense and tight linkages, Weick proposes that elements can be tied together tightly and loosely. In his study on the dual system in Dutch municipalities van Hengel et al. (2014) distinguish two dimensions: vertical and horizontal loose coupling. Vertical loose coupling is related to the influence of control orientation on a specific hierarchical level to other levels. Horizontal loose coupling is related to formally intended actions and how actions actually are carried out by organizational members. Weick states that one of the potential functions of loose coupling is ensuring more room availability for self-determination by organizational actors. With these insights I argue that managing loose coupling will be the way for handling the duality between granting autonomy and complying with regulations.

Successful use of loose coupling is described in the article of Hallett and Ventresca (2006), where a formal authority structure is imposed to workers within a gypsum mine. As an instance of loose coupling a mock bureaucracy at the mine involves an implicit agreement, where the workers let the management save face and have their rules as long as they look the other way as the workers continue with their daily practices. Another example of successful use of loose coupling is demonstrated in a case study of Lukka (2007) at Southlake, a fairly profitable firm in the heavy processing equipment business. The company has grown rapidly and has spread its operations all over the world. Pressure for major change is reduced by well-developed and flexible routines and knowledgeable actions by organizational members who are given autonomy and having capacity to smooth frictions of the formal rule systems in a moderate regulated environment. It appears that appliance of loose coupling
can be very successful in finding balance in situations with and without a high level of autonomy. The examples mentioned are from an environment in which the issue of reliability does not play an explicit role and one can question how this will be in case of high-reliability organizations.

Safety-critical projects and organizations do face particular challenges. Management systems in this area appear to be tightly coupled, but project teams need some degree of flexibility in establishing project processes and having the authorization to go off script when necessary (Saunders, 2015). A case study at a South Asian oil company shows an effective functioning of loose coupling in a high-reliability environment (Scapens, 2006). A division responsible for the production and transmission of natural gas is very profitable in an expanding market by holding a monopoly position. Their main focus is on safety and reliability, with efficiency as a distant third. By pressure of the parent company the division introduced value-based management which was implemented successfully, but only ceremonially. The new system did not have impact on ways of thinking within the division and the needs of the parent company could be met.

A qualitative analysis of Marriot at al. (2011) in the high-reliability environment of the National Health Service in Wales however shows features of unsuccessful use of loose coupling with detrimental consequences. The health service is underperforming as result of a loose coupling. Lower management relies on local systems, while the top-level managers rely on information from the formal management accounting systems and ad hoc enquiries. Two elements of loose coupling could have played their part here. First, there was no spread of change by single areas in case of changes made, resulting in no desired change. Departments did not integrate their information with that available elsewhere. While the figures for the annual accounts were specified centrally, ad hoc enquiries were used for determining the condition of the assets throughout the country. Both maintenance and new assets no longer met central identified requirements. Second, rigidity of the accounting systems which impeded response to external changes. The different departments were operating efficiently, but independently and reacted only on accounting changes imposed by the government on a responsive manner by identifying and correcting out of date information.

The case studies of Hallett and Ventresca (2006) and Lukka (2007) prove that loose coupling can be successful in finding balance between flexibility and standardization, but it turns out to be not always the case in high-reliability situations. In case of the South Asian oil company loose coupling was used successfully by ceremonial introduction of value-based management (Saunders, 2015), but at the Nation Health Service in combination with loose coupling major problems arose causing a poor state of assets (Marriot at al., 2011). Therefore it is interesting to investigate the subject further and more in
detail by examining the influence of increased job autonomy for employees. In a high-reliability organization a high degree of standardization always will be necessary, but with better understanding of the functioning of the coupling process more effective management control can be achieved. More research seems to be necessary to understand first, how increase of job autonomy leads to a change of a management control system; and second, how change of job autonomy leads to a change of coupling with the elements of a management control system. By looking very closely to the interaction between rules and other coordination mechanisms a step can be taken towards resolving the dilemma of concurrent standardization and flexibility in high-reliability organizations (Grote et al., 2009).

Purpose of this study is determining how loose coupling can be effective in the practice of a highly regulated environment combined with an increase of job autonomy. In particular the role of rules and organizational routines and the interrelation between different hierarchical levels will be considered. By far, most literature about job autonomy is focused on individual level effects. This study is distinguishing by focussing on organization level effects and taking into account the tension organizational leaders may feel (Langfred and Rockmann, 2016). Management accounting change has to be seen as a complex ongoing evolutionary process. The study contributes to the theoretical need for more detailed micro-level analysis for gaining more insights into such a process (Scapens, 2006; Modell, 2014). The results will be useful in practice for aligning rules and routines in high-reliability organizations. Insights from an industrial environment and culture can also be useful for other disciplines, such as health care.

The main research question is:

**How does increase of job autonomy influence the tightness of coupling of a management control system within a high-reliability environment?**

The underlying research questions are:

**RQ1** Which forms of job autonomy can be differentiated and what is their influence on dealing with rules?

**RQ2** What effects and risks can be distinguished as a result of increased job autonomy?

**RQ3** How does increase of job autonomy affect a management control system and more specifically loose coupling of a management control system?

**RQ3a** Which characteristics of a management control system are affected in combination with increased job autonomy?

**RQ3b** Which aspects influence the tightness of coupling of a management control system?
In order to find substantiated answers, four case studies are conducted in the practise of Bronswerk Heat Transfer in Nijkerk, the Netherlands. In the year 2013 Bronswerk, mainly acting in the oil and gas industries, changed its organizational structure from functional departments to four multidisciplinary project teams, which were given a pioneering role. Focus of this study is investigating how management control has developed during four years as result of increased autonomy in combination with the changed approach.

The results of the case studies will be described in chapter 4, followed by a conclusion and recommendations for practice and future research in chapter 5. The case studies were carried out on the basis of the methodology that will be explained in chapter 3. In the next chapter first the results of the literature review leading to the research structure will be explicated.

2 Literature review

Focus of the study is explaining how a management control system changes, and more specifically the tightness of coupling, in combination with increase of job autonomy. In this chapter the research structure is shaped, based on literature review of the four key concepts of the main research question. It will be substantiated with literature about characteristics of management control systems and about the specific aspects of loose coupling. Further, the characteristic aspects of the specific high-reliability context will be investigated. First will be figured out which forms of job autonomy can be distinguished in order to be able to answer the question what their influence will be on dealing with rules and what effects and risks can be distinguished in combination with an increased level of job autonomy.

2.1 Job autonomy

Providing some kind of job autonomy is essential to any individual employee. More autonomy has a positive influence on personnel motivation, satisfaction, performance and creativity. As result employees will feel more freedom for releasing rigid rules and giving novel thoughts a chance (Sripirabaa and Maheswari, 2015). Especially in knowledge work autonomy has become popular. By granting more autonomy to employees organizations have changed their control (Langfred and Rockmann, 2016).

Sripirabaa and Maheswari (2015) define job autonomy as “the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out” (Sripirabaa and Maheswari, 2015, p.112). Autonomy has been linked to positive individual outcomes. As response to the new conditions identified by Child (2015), such as new technologies and the knowledge-based society, organizations
realize that they have to give their workers more autonomy. It helps organizations remaining competitive. Most existing literature about job autonomy focuses on personnel level effects only, but compared to decades ago autonomy has become a much more complex issue. Due to increased complexity and unpredictability it is more difficult for organizational leaders to keep control on company level (Langfred and Rockmann, 2016).

Langfred and Rockmann (2016) argue that autonomy can be implemented in various ways. First, by implementing task-based autonomy, which means that methods, scheduling, and decision making are involved in the task itself. Outcomes and processes will be less predictable and due to multiple tasks the level of task uncertainty will be increased. Through the emergence of team-oriented work task-based autonomy is increasingly being applied. Individual workers assigned to such teams often have to manage complex work arrangements, as they have a variety of roles in such teams. Second form is implementation by job crafting, which means that employees are given freedom to redesign their jobs for creating a better fit between themselves and their jobs. Employees have freedom to make changes bottom-up in the tasks itself, but also in relationships and perceptions of the task. Finally, autonomy can be implemented by alternative work arrangements, which involve giving freedom to employees to decide where they work and when they work. This can go beyond self-organizing teams and can also be geographically spread or virtual teams.

By giving novel thoughts a chance results will be uncertain and risk taking is an important and unavoidable issue. New ideas represent a disturbance in routines, relationships and power balances. In order to prevent undesired outcomes it is important that people feel responsible to their work (Sripirabaa and Maheswari, 2015).

2.2 High-reliability environment

High-reliability organizations all operate in environments where mistakes have serious consequences, which is an obstacle for learning by experimenting. Often complex technologies have to be managed for which complex processes are required (Saunders, 2015). Saunders has explored the nature of safety-critical projects by examining day-to-day operations and has characterised an ideal type high-reliability organisation. Features are the high priority afforded to safety, hierarchical decision-making processes, evidence of redundancy in equipment design and operating procedures; and strong organizational cultures that fosters openness, individual accountability, and constant vigilance in anticipating and responding to potential safety threats. Saunders summarizes the high-reliability organization literature and synthesizes it into five core characteristics, which underpin an ideal-type of high-reliability organization. These are a strong organizational culture, clarity of organizational
objectives, the presence of redundancy and slack, mindful behaviour and the ability to prosper in the paradoxes (Saunders, 2015, Table 1, p.28).

Dilemma which high-reliability organizations face is necessity for both standardization and flexibility to ensure system safety. Important factors are amount and nature of uncertainties from internal transformation processes and from the external environment. Grote et al. (2009) experience a widespread belief that flexibility and change carry risks for failures and high-reliability organizations tend to tight coupling with central control systems. For dealing with uncertainty and complex situations however rules and flexible routines are needed. Grote et al. believe that flexible routines are helpful with strategic design of high-reliability systems as well as operational decision making, but there are difficulties in aligning rules with given uncertainties which have to be addressed. First, uncertainties in specific activities need to be reduced through more detailed and prescriptive rules and individual competencies need to be increased for using the provided decision latitude adequately. Second, employees need to be supported more in coping with uncertainties, for example by switching from coordinated action based on procedures to explicit coordination through direct communication (Grote et al., 2009).

Potential dangers of flexible routines and lack of regulation are the development of routines which are disintegrated from other parts of the organization and not in line with organizational standards. Therefore especially in high-reliability organizations other forms of coordination, such as cultural norms and frequent communication with other parts in the organization are notably important (Grote et al., 2009).

2.3 Management control systems

From an old cybernetic perspective a management control system (MCS) was a prescribed and usually repetitious way of carrying out activities for achieving the desired management goals. Within this rigid and mechanical approach learning from mistakes in a structured manner was a central focus (Anthony and Govindarajan, 2007). Later approaches put more emphasis on performance management with planning and control tightly linked. Performance management systems focus on defining, controlling and managing both achievement of results and the means used to achieve these results (Burns et al, 2013). According to a new and broader view focus is not only on measuring performance anymore, but on encouraging and enabling employees to act in the best interest of the organization to prevent problems proactively instead of just solving them reactively (Merchant and Van der Stede, 2012).
Management control systems have a critical function when it comes to implementation of strategy and therefore it is crucial to organizational success. As Adrian Grace, managing director of Bank of Scotland proffers: “success in business is 25% strategy, but 75% execution” (Merchant and Van der Stede, 2012, p.9). Reasons why MCSs are implemented are lack of direction, motivational problems and personnel limitations. Merchant and Van der Stede differentiate four kinds of control. First, result controls as indirect control that directs behaviour in the desired direction by linking rewards to results; second, action controls, which ensure that employees perform actions that are known to be beneficial to the organization; third, personnel controls, based on the natural tendency of staff to control and motivate themselves; and finally cultural controls, which focus on mutual supervision, resulting in pressure from a group in case of norm deviant behaviour. There is no universal best MCS and perfect and fool proof control does not exist. Therefore organizations have to seek to optimal control (Merchant and Van der Stede, 2012).

![Figure 1 – Management control systems package. Reprinted from “Management control systems as a package – Opportunities, challenges and research directions,” by T. Malmi and D.A. Brown, 2008, Management accounting research, 19(4), p.291.](image_url)

A number of definitions and descriptions of management control systems exist (Malmi and Brown, 2008). Some authors have outlined very broad conceptions of what could be considered as MCS, with factors such as personnel and clan controls, strategic development, strategic control and learning processes. All factors are typically beyond the scope of management accounting, which is a collection of practices related to costing. Almost everything in an organization can be part of the overall control system. Narrower views of what constitutes MCSs define management control as dealing with behaviour of internal actors. Other authors move beyond behavioural control and see control as a means of goal congruence. Malmi and Brown (2008) explicitly emphasize guidance of subordinates and
define management control systems as “complete systems of systems, rules, practices, values, and other activities management put in place in order to direct employee behaviour” (Malmi and Brown, 2008, p.290). There is a lack of clarity and wide variation and inconsistencies exist in how MCSs have been conceptualized. In most contemporary organizations there are a number of MCSs and control should be seen as a package of systems with five types of control: planning, cybernetic, reward and compensation, administrative and cultural controls (Malmi and Brown, 2008, Figure 1, p.291).

2.4 Loose coupling

Weick (1976) has developed the concepts tight and loose coupling for describing organizational structures of different organizations within educational institutions. According to Weick a tightly coupled organization has a set of mutually understood rules enforced by an inspection and feedback system. For example, a sandwich shop with a set of specific guidelines for how each sandwich should be made with employees who are trained in the guidelines and supervised by managers who correct errors. If a local sandwich shop opens a new location, but doesn’t apply the rules for how to make each sandwich, the organization becomes loosely coupled. The organization can also become loosely coupled if the rules exist at both locations but managers only inspect to ensure compliance at one of them, or if managers inspect for compliance but don’t retrain employees to improve performance. An organization can be tightly coupled in some respects and loosely coupled in others. Initially, loosely coupled organizations were seen as organizations with limited coordination, regulation, and standardization of activities within networks (Weick, 1976). More recent institutional research shows a tendency of focusing on processes within organizations (Scapens, 2006).

Following Weick (1976) Hallett and Ventresca (2006) state that the coupling process is a central theme in the emergence of new institutional forms. It helps understanding why many organizations continue to operate by familiar routines and practices despite environmental pressures to change. Another important function of loose coupling is creating the necessary room for facilitating self-determination by organizational actors. Secondary advantages are the capacity for retaining a larger number of mutations and novel solutions and reducing the costs of time and money investments for coordinating people.

In the previous chapter three examples of successful use of loose coupling were given. In the article of Hallett and Ventresca (2006) by loose coupling a mock bureaucracy involved after introducing a formal authority structure representing the mutual interests of the workers and the management. A new manager did not have to lose face to the regional office and the workers could maintain the existing working culture. In the case study of Lukka (2007) by loose coupling pressure for major change was
reduced by well-developed and flexible routines, where the formal rule system remained unchanged. In the case study at the South Asian oil company (Scapens, 2006) loose coupling was successfully used for ceremonial implementation of a value-based management system. In the qualitative analysis of Meriott et al. (2011) however use of loose coupling was not successful. Using different information systems at different hierarchical levels lead to a poor response to environmental developments.

Van Hengel et al. (2014) indicate that loose coupling may take place in various forms, for example by symbolic displaying of internal practices and actions in organizations for external legitimacy-seeking purposes, separation of specific performance indicators or measurement practices from organizational goals or meeting conflicting demands from multiple constituencies. They analysed two dimensions of loose coupling during the process of providing autonomy to entities within a governmental organization as result of New Public Management. First, vertical coupling, which means “tight or loose coupling between hierarchical levels” (van Hengel et al., 2014, p.51). Different levels of an organization (top, middle or bottom) contain interdependent elements with other hierarchical levels that vary in number and strength of their interdependencies, with a decreasing vertical coupling as result of increasing autonomy. Second, horizontal coupling, which is “loose coupling between intentions and actions” (van Hengel et al., 2014, p.51). More specifically, it relates to the difference between formally intended actions and how actions actually are carried out by organizational members. Van Hengel et al. (2014) argue that the implementation of mandated organizational changes is often symbolic, without many instrumental changes in the internal processes and refer to results of studies in several governmental organizations. By incentivizing local authorities to use more elaborated output measurement systems and to focus on controlling results horizontal coupling has been tightened.

Management control changes are not a matter of changing rules, but also of changing processes and institutions which are path-dependent (Burns and Scapens, 2000; Lukka, 2007). Related to this subject often a paradox irises: rational actors make their organizations increasingly similar as they try to change them (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). Isomorphism is a restrictive process that forces a unit to resemble other entities that have the same kind of environmental conditions, which leads to homogenization. There are three types of isomorphism. First, coercive isomorphism when organizations in a given area become increasingly homogenous and increasingly organized to conform to wider institutions. Second, mimetic isomorphism when techniques are copied to show in a ritual way that work processes are improved; and, finally, normative pressure, when a professional group defines conditions and methods that form a cognitive basis and legitimacy for their professional autonomy (DiMaggio and Powell, 1983).
2.5 Research structure

On base of the literature review the research structure can be drawn up with help of the research questions of chapter 1. With the emerging insights relevant propositions will be formulated, followed by a theoretical framework underlying the case studies.

RQ1: Which forms of job autonomy can be differentiated and what is their influence on dealing with rules? Langfred and Rockmann (2016) distinguish three forms of job autonomy: task-based autonomy, job crafting and alternative work arrangements. Effects of task-based autonomy are irreducible task uncertainty, different paths to the ultimate outcome and individual workers within teams who have to manage and juggle complex work arrangements. In case of job crafting people can redesign their jobs for creating a better fit between themselves and their jobs. Employees will use their creativity and feel freedom to release rigid work rules (Sripirabaa and Maheswari, 2015). Alternative work arrangements ensure employees control over where they work and when they work. This form solely relates to a physical environment and will have no relevant influence on dealing with rules. The high degree of task uncertainty within task-based autonomy can lead employees tending to mimetic isomorphism by copying techniques and showing improvement of working processes in a ritual way (DiMaggio & Powell, 1983). People may have a tendency to continue the old way of working by sticking to existing routines. As a result, changes will be path-dependent, with existing routines and institutions shaping the implementation process. Only after institutionalization of new routines a new rule will become an inherent feature of the management control process (Burns and Scapens, 2000).

RQ2: What effects and risks can be distinguished as a result of increased job autonomy? Desired effects of increasing autonomy on personnel level are encouraging higher motivation, satisfaction and performance such as a boost of employee creativity and capacity to follow novel thoughts (Sripirabaa and Maheswari, 2015). Organizations want to be able to give autonomy to their workers and having a workforce that helps them remaining competitive (Langfred and Rockmann, 2016). However company level effect will be a thorough change of the management control system, which is a crucial factor to the success of an organization (Merchant and Van der Stede, 2012). As high-reliability organizations operate in an unforgiving social and political environment (Saunders, 2015), this change requires special attention. Autonomy may have the risk to stimulate development of routines disintegrated from other parts of the organization and not in line with organizational standards. Therefore communication with other parts of the organization is crucial (Grote et al., 2009), but single areas, such as project teams, will rely on their local systems with no or bad spread of changes made, while top-level managers rely on information from the management account system and ad hoc enquiries. This can lead to an underperforming organization and bad response to external changes (Marriott et
al., 2011). By forces that implement new rules, such as the rule of increase of job autonomy, single areas will seem to have a tendency to get quick gains in showing good efforts, which not results in ‘real’ changes looking at the bigger picture (van Hengel et al., 2014).

RQ3: How does increase of job autonomy affect a management control system and more specifically loose coupling of a management control system?

RQ3a: Which characteristics of a management control system are affected in combination with increased job autonomy? By granting job autonomy methods, scheduling and decision making will be involved in the task itself and there will be a change in management control compared to a functional approach (Langfred and Rockmann, 2016). By natural tendency of staff to control and motivate themselves mainly personnel controls will be encouraged (Merchant and Van der Stede, 2012). By considering a management control system as a package, systems can be affected in five areas (Malmi and Brown, 2008, Table 1, p.292): planning controls, cybernetic controls, reward and compensation, administrative controls and cultural controls.

By including scheduling in the task and a more day-to-day approach of project teams, focus of planning controls will be shifted from a long-range planning to more action planning. Performance standards, feedback systems and improvements will be carried out more on personnel or team level with the aim of making work easier (Langfred and Rockmann, 2016), what causes a loss of importance of cybernetic controls as long-term company level instrument. Because methods and decisions are included in the task and communication lines are shortened by a team-based approach intra-departmental procedures will lose importance. Characteristic for a high-reliability environment are redundant elements, such as many comprehensive procedures and other rules (Saunders, 2015). In combination with more job autonomy employees will feel more freedom to release these procedures and rules (Sripirabaa and Maheswari, 2015), which results in reduced importance of administrative controls on company level. The way of rewarding will be aligned with the changed planning focus. More impulses will be given for achieving immediate efficiency results. Finally, in addition to the organizational culture team cultures will emerge with own beliefs, values and social norms in which emphasis will be placed on a sense of responsibility in addressing increased freedom (Grote et al., 2009).

Proposition 1: Increase of job autonomy leads to a change in the package of a management control system; with a decreasing importance of planning, cybernetic and administrative controls and an increase of reward and compensation and cultural controls.
RQ3b: Which aspects influence the tightness of coupling of a management control system? A high degree of loose coupling can be achieved through well-developed and flexible routines and well-informed employees with the ability to smooth frictions with formal systems. In such a case there will be no need to change formal rules (Lukka, 2007). Not entire organizations are loosely coupled, but rather some aspects are tightly coupled, where the relationship between others is loose (Weick, 1976). The tightness of the coupling with management control systems can be viewed vertically, between hierarchical levels, and horizontally, between intentions and actions (van Hengel et al., 2014). Looking at the vertical dimension, by a feeling of more freedom to release organizational rules (Sripirabaa and Maheswari, 2015) and the willingness to set up rules for addressing uncertainty (Grote et al., 2009) rules will be adjusted or interpreted in favour of employees. This probably will lead to an increasing gap between autonomous entities and the functional organization. Together with a shift of planning controls to more action planning the gap with the functional organization will grow and vertical coupling will become looser. Looking at the horizontal dimension, loose coupling can also be seen as the outcome of conflicting institutional pressures and how they come to accommodate within the organization. A more operational and professional focus may cause conflicting institutional pressures and lead to a tighter horizontal coupling (van Hengel et al., 2014).

Proposition 2: Increase of job autonomy leads to a change in tightness of coupling of a management control system; with a looser vertical coupling and a tighter horizontal coupling.

Change of management control is a path-depending process that actually will be shaped only after institutionalization of job autonomy (Burns and Scapens, 2000). In case of safety issues, which are characteristic for high-reliability environments, people will be inclined to follow rules strictly as result of representative bureaucracy and an existing tight coupling will be remained (Hallett and Ventresca, 2006). Van Hengel et al. (2014) state that loose coupling may take place in various forms, for example by symbolic displaying of internal practices and actions for external legitimacy-seeking. In doing so rational actors may make their organization increasingly similar in trying to change them (Meyer and Rowan, 1977; DiMaggio and Powell, 1983).

In summary, by increase of job autonomy personnel controls are encouraged, what will influence the full package of management control systems. Flexibility of routines, information level of employees and related safety issues influence the strength of the tightness of coupling of the management control system (MCS). By a growing gap between hierarchical levels the tightness of the vertical coupling with the MCS will decrease. Influenced by an operational focus the gap between intentions and actions will shrink and the tightness of the horizontal coupling with the MCS will increase. This is a
A path-dependent process with symbolic displaying of internal practices and actions for external legitimacy-seeking. In case of safety issues a tight coupling will be remained.

In figure 2 the theoretical framework is displayed, as result of the literature review. Aim of the study is gaining insight in how job autonomy impacts the tightness of coupling with the management control system. Similar to the two-way approach of Van Hengel (2014) the tightness of vertical coupling will be investigated related to the hierarchical effects and the tightness of horizontal coupling related to the intentions and actions. Besides the risks and effects of the specific high reliability context will be considered. Influence on characteristics of the management control system will be investigated by considering the elements of the system package (Malmi and Brown, 2008). The research methodology will be based on the two formulated propositions.

3 Methodology

3.1 Research method
In general three different methods can be used for carrying out the research: a survey, an experiment or a case study. Aim of this study is to explain how the influence of job autonomy has been. Therefore best suitable method for this study is an explanatory multiple case study in a real-life context. Introduction of self-organizing teams some years ago makes Bronswerk Heat Transfer, mainly acting in the oil and gas industries, a representative and unique context for investigation of the effects of a change by an increase of job autonomy. As units of analysis four project teams will be selected: PT1:
Project team Heat Exchangers, PT2: Project team Air cooled Heat Exchangers, PT3: Project team Systems; and PT4: Project team Complex Heat Exchangers.

3.2 Data collection
For collecting relevant data multiple sources will be used. The four selected cases will be viewed from project team insights by interviewing the four senior project managers (SPM 1 to 4). Additional insights from a functional business context will be generated by interviewing the general manager (GM) and two functional managers in the area of engineering (FL1) and quality control (FL2). Criteria for selection is primarily their position as manager, so they can provide relevant insights. Secondly, it is desirable that they have worked in the functional organization as it was before the change to the team-based approach. Prior to the interviews background information and purpose of the study will be discussed with the managers, so the intention of the interviews will be clear to them.

The interviews will be conducted in a semi-structured manner within an atmosphere of openness and confidentiality. A questionnaire will be prepared in advance on base of the theoretical framework in figure 2. By using mainly open questions differences in views can be captured. During the semi-structured interviews more detailed questions will be asked where necessary. Duration of the interviews is approximately one hour each. Other sources of information is documentation, such as progress reports, management reports, audit reports and data on the intranet. Finally, observations will be made by simply joining the teams during the investigation.

3.3 Data analysis
The general strategy of data analysis will be based on the theoretical propositions. By continuously looking for evidence (or no evidence) it can be determined to what extend the data match the propositions and opportunities can be charted for refinement. A deductive approach (Yin, 2014) will be used for operationalization of the results and comparing the empirical observations with the theoretical expectations. The interviews will be recorded and spelled out word by word in transcripts. Characteristic differences of analysing qualitative data relative to quantitative data are that they are based on meanings expressed through words, the requirement of result collection of non-standardised data into categories and conduction of analysis through the use of conceptualization (Saunders et al., 2012). With help of the literature review, concept-driven key will be placed next to the text and relevant sentences will be underlined, supplemented with data-driven words that emerged during the analysis. Characteristic and quote-worthy sentences will be highlighted in yellow. As Miles and Huberman (1994) advice, data will be reduced by summarizing and simplifying. In the description of the results illustrative quotes will be widely used.
3.4 Methodological issues

Much importance will be attached to the validity of the study. By using exclusively academic relevant peer-reviewed theories external validation will be ensured. Comparing results of the different project teams and use of different data sources helps with triangulation. Attention will be paid to issues which may reduce the validity of the study. First, there is a risk of non-response if managers are not willing to participate. By explaining the case study protocol this risk will be reduced. Second, by giving social desirable answers. This will be avoided by asking open questions and by asking for specific examples. Third, influence from own involvement in the issue. By a more or less independent position in the organization influence by own opinions will be limited. Finally, interpretation issues will be reduced by asking for conformation in case of lack of clarity for preventing misunderstandings.

4 Results

The study is based on the theoretical framework that was developed in chapter 2. Two propositions were devised for assessing the expected relationships. With assessing these propositions by a multiple case study this inductive study aims to generalize the findings based on four unique cases to a larger setting and provide refinements to the theory, suitable for further research. Although the study was conducted in a relative unique context, it is expected to be suitable for use in a broader context. Prior to the results of the case studies the case organization, qualification as high-reliability organization, the former functional organization, the introduction of self-organizing project teams; and effects and risks of increased job autonomy, will be explained.

4.1 Case organization

Bronswerk Heat Transfer from Nijkerk in the Netherlands acts in oil, gas and process industries for many years. The company is specialized in design and manufacturing of industrial systems and products in the field of heat exchange. This involves work in which knowledge plays a crucial role in order for achieving unique solutions in a project-oriented way. In the period from 2013 to 2016 the annual sales amount varied from 40 to 50 million euros. The staff comprises about 150 employees, of whom 80 people in the office and 70 workers at the factory. The vast majority of employees is educated on higher professional level, mainly in the technical fields of mechanical engineering, thermodynamics and industrial engineering. The company is fully owned by the Schaëfer family. Mr. Schaëfer determines the direction of the organization. The company is run by a two-board general management. Middle management is formed by manager sales, leading the sales department, four senior project managers, managing the multidisciplinary project teams and three functional managers supporting the project teams from their own disciplines. The company has its own manufacturing unit,
its own R&D department and three staff departments. In order to assess the suitability for the study, first will be determined if the case organization can be qualified as high-reliability organization.

4.2 Qualification as high-reliability organization

“We are in a world where, if an accident occurs, in most cases it is immediately deadly or oil flows into the sea” (SPM4). Safety is the overarching priority in high-reliability environments and hazards that must be controlled can harm either environment, personnel or public (Saunders, 2015). By comparing the case organization with the characteristics of a high-reliability organization (Saunders, 2015, Table 1, p.28), it can be determined to what extent the case organisation can be qualified as ideal-type of such organization.

Bronswerk Heat Transfer has to meet a high level of market requirements, the organization must maintain a broad package of certifications and employees must be qualified periodically in the areas of welding, inspection and safety. At product level detailed specifications and codes must be met and a strict inspection regime is applied in which independent inspection parties are involved. Therefore the basic organizational objectives in fact are very clear. There is a culture of learning and a continuous search for opportunities for improvement. Within a technological and professional culture employees have a strong sense of quality and feel responsibility for meeting procedures within the scope of projects. There is a high degree of openness and willingness to report and discuss errors.

Another characteristic is the low pronouncement of the presence of redundancy and slack. In the design of devices and in measurement methods large safety margins are used. At organizational level redundancy has been reduced over the years. Within an informal atmosphere, the importance of cognitive and organizational processes and structures is noticed. At product-level perfection is the standard, but general personal mistakes are handled very generously. There are systems for collecting non conformities, but analysis is done on the basis of rough interpretations and not by searching for deeper causes. The organization is able reacting flexibly to the multitude of conflicting requirements, surprises and moments of crisis. The mindfulness of a high-reliability organisation is clear manifested within the scope of project execution, but is significantly less prevalent in other activities. In general, the organization deals the characteristic paradoxes adequately. There are continuous questions about centralization or decentralization of decision making, about which processes do and do not have to be documented and how to interpret operational events from different points of view. Although the characteristics redundancy, slack and mindfulness are less noticeable, by clear basic objectives, a strong organizational culture and the characteristic paradoxes the case organization can be qualified as high-reliability organization.
4.3 The former functional organization

How management control was in the former functional organization will be explained by considering management control systems as a package (Malmi and Brown, 2008), as was illustrated in figure 1. Malmi and Brown distinguish five types of management control systems. Looking at the administration controls, to the year 2013 there were five executive functional departments: project management, engineering, purchasing, production operations and quality control. The specialized employees within these departments were seated physically together and managed by departmental managers. The managers were accountable to general management, who in turn was accountable to the shareholders. By means of a certified QSHE management system responsibilities and working methods were laid down in detailed procedures. FL1 expresses the importance of these procedures: “Procedures translate standards to be met, testing with legislation and regulations.” Companywide methods were established and followed up by the functional managers. By reason of conflicting interest between departments, changes in working methods had to be approved officially and communicated internally for informing all employees about the organizational standards that had to be used.

Looking at the cultural controls, characteristic for the organizational culture was the personal way of communicating within an open atmosphere. In spite of some freedom that was given, there sufficient discipline for following up procedures. Focus of the employees was mainly on good performing of their own work and only little attention was given to organizational mission and vision. For most employees this was a given thing that not had to be discussed. Compensations were based on the hours worked. After annual assessment interviews salaries were adjusted. Departmental managers had no influence on the level of salaries, which was established by general management. With respect to planning controls, objectives were drawn up by the departmental managers and were derived from the triennial policy statement. In addition, requirements from legislation and certifying bodies were included. Cybernetic controls were uses as a powerful instrument for improvement. For each department clear targets were quantified with specific indicators. It was a hybrid design, with both financial and non-financial indicators. Each quarter a management review meeting (MRM) was organized in which results and actions were presented by the functional managers. Although the MRM had a certain amount of window dressing in order to meet requirements of third parties, by doing that in the same way for many years long-term tendencies could be visualized. Where needed business improvement areas were established. In a very structured way companywide improvement plans were made by management. Every year management assessed whether goals had to be adjusted.
The existing way of organizing ensured an adequate relationship of management with subcontractors, working methods were clear and transparent to everyone and the organizational disciplines could adapt to external developments through a high level of knowledge on departmental level and by daily interaction between specialists within these departments. At company level disadvantages were poor communication between the various disciplines, slow progress in the early stage of projects, difficulties in making decisions a poor reliability of deliveries. At personnel level employees were not involved in improvements and their image was that no real changes were being made. Engineers felt pressure from many internal parties, which gave them a confusing feeling that was expressed by a defensive attitude. Project buyers experienced continuous time pressure and project managers felt inhibited by other departments. The existing way of working had a number of control benefits at company level, but disadvantages in terms of delivery performance. At personnel level working methods were experienced as inefficient, conservative and not very stimulating.

4.4 Introduction of self-organizing project teams

In the spring of the year 2013 the executive organization has been changed from functional departments to multidisciplinary project teams, as shown in figure 3 on the next page. In doing so, the organization has responded well to the new conditions identified by Child (2015), which was motivated by internal pressure of employees. The idea of switching to project teams was adopted from a health care company and by surprise of mainly the functional managers introduced in a very short time period: “The idea of self-organization first came there; we actually took notice of it and projected it here” (SPM4). Under the guise of lean management four fixed teams were formed with the aim of organizing, managing and simplifying project execution. Classification was based on product groups and the teams were acting physically together in one room (Reoss, 2013). For each of the teams a senior project manager (SPM) was appointed. At the final stage of the transformation the new responsibilities were clarified. The SPMs were given responsibility for assessment, training plans and setting official goals. In addition they were expected to make a mark in the new way of working (Memo, 2013). Early 2016 a new mission and vision were presented with an overview of the management roles and responsibilities related to goal setting and result evaluation. Relations between planning, KPI-setting and evaluation in management review meetings were established. Responsibility for formulating the strategy for implementation of the vision was assigned to the newly formed teams (MV-document, 2016).
**Functional department structure; until the year 2013**

**Project team structure; Since the year 2013**

*Figure 3 – Change of the organizational structure in the year 2013.*

Furthermore, emphasis was placed on self-organizing under guidance of an external coach. Need for this arose when real changes did not seem to come true. Coaching was mainly aimed to realize behavioural changes and was in particular focused on realizing an attitude of self-organizing by the teams, exploring expectations between functional managers and the teams and bringing into surface and trying to change old behavioural patterns (Memo, 2016).

### 4.5 Effects and risks of increased job autonomy

As result of the new approach, there were a number of beneficial effects on personnel and company level. On personnel level the initial idea for working in teams was broadly supported. Motivating employees has always been the main intention for the changed approach, which has resulted in a better use of employee capacities: “*What is created, is that people become more creative, more sensible, can grow in their work, their job*” (SPM3). Working in project teams has significant benefits in terms of communication and efficiency and by a joint team interest there are fewer conflicts causing clashes between departmental interests. With the increase of job autonomy also some side effects can be observed, possibly leading to new risks. First, distinctive working methods have been emerged, which is recognized and confirmed by the functional leads: “*Each team has its own method*” (FL2) and “*From people who are no team members you hear that they indeed should adapt to four teams*” (FL1). This makes it more difficult for the various disciplines taking over specialized activities. Second,
communication between disciplinary colleagues has been reduced and the mutual learning effect has been decreased making of maintaining professional knowledge more difficult. Third, deviating from supplier selection procedures and releasing general purchasing objectives, such as ensuring better agreements and relationships with less suppliers, affects strategic purchasing activities. Finally, appointments are confirmed by mail or group apps without consistently adjusting organizational procedures, which remain unchanged: “In the past five years I have not noticed that procedures have been changed” (FL1). There is some risk that not everyone is fully aware of current organizational standards and agreements anymore. Some crucial documents are adapted into team versions, such as the risk analysis concerning the European Pressure Equipment Directive (PED). After change of the PED this document was not updated, resulting in liability risks. Under influence of increased job autonomy some side effects can be observed, possibly leading to risks. The case studies may provide insights in how these effects have arisen.

4.6 Case studies project teams

In order to determine whether and how tightness of coupling of the management control system has changed in combination with increased job autonomy four case studies have been carried out in the practice of the Bronswerk organization. As units of analysis the four project teams have been examined: PT1: Project team Heat Exchangers, PT2: Project team Air cooled Heat Exchangers, PT3: Project team Systems; and PT4: Project team Complex Heat Exchangers. From the starting point of the functional organization first, for each case will be determined in which way autonomy has been implemented using the theory of Langfred and Rockmann (2016). Second, change of the management control system will be described by considering them as a package (Malmi and Brown, 2008) and it will be determined to what extent proposition 1 is applicable. Finally, change of tightness of loose coupling will be described by considering vertical and horizontal loose coupling (van Hengel et al., 2014), with a determination to what extent proposition 2 is applicable.

4.6.1 Case study PT1: Project team Heat Exchangers

Change of job autonomy: The change to job autonomy has resulted in a new project team. Project team Heat Exchangers consists of a senior project manager (SPM1), a project manager, four mechanical engineers, a project buyer, a production operations engineer and two quality control engineers and was formed after introducing the team based approach in 2013. Personnel controls were encouraged by giving the senior project manager a managerial role that he could use for redesigning team processes with increased job crafting. Project managers could make autonomous choices and set priorities with increased task-based autonomy, making them able to plan easier.
the other employees the level of autonomy barely was not changed. Alternative work arrangements were not changed.

**Change of the package of management control systems:**

<table>
<thead>
<tr>
<th>Project team</th>
<th>Administrative controls</th>
<th>Planning controls</th>
<th>Cybernetic controls</th>
<th>Reward and compensation</th>
<th>Cultural controls</th>
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*Table 1 – Influence of increased job autonomy on the importance of the types of control of the MCS package of PT1: Project team Heat Exchangers.*

The change of job autonomy has resulted in a change of the package of management control systems (Malmi and Brown, 2008), which will be discussed by following table 1 from left to right. Following the theoretical expectations, the introduction of a team based approach has initiated a reduced importance of administrative controls. In the former functional organization a formal translation was made from external requirements from legislation and standards to internal accountability by using administrative controls with clear responsibilities and working methods. With the introduction of the project team SPM1 has been given organizational team responsibilities on top of his executive role in managing projects. Project responsibilities have remained fairly clear, but organizational responsibilities have always been considered as very unclear. Agreements have been made only about training courses. For other issues, such as scheduling and procedural issues, general management still has to be involved. Employees are deployed on their strengths with expectations of a greater sense of responsibility. New working methods often arise unconsciously, without a trigger for modifying procedures: “I think they gradually become muddier” (SPM1).

Introduction of the team based approach has initiated a reduced importance of planning and cybernetic controls. In the functional organization planning controls were based on long-term planning taking into account external requirement and use of cybernetic controls on management level in order to realize cross-departmental improvements. With the introduction of the project team, planning controls have shifted from a long-range planning to more action planning. In the initial stage of the team setting long-term targets were described, but after some time that process was stopped. Organizational objectives are considered unclear now: ”What I really miss, is the dot on the horizon” (SPM1). By making ninety percent of goals and actions project-oriented own team goals have gained importance. Main goals are on-time delivery, staying within budget, ensuring client satisfaction and learning from projects as a team. Intrinsic objective is to retain staff by creating a good working
atmosphere and ensuring team development as focus of improvement. However, a systematic approach is considered helpful for supporting cross-team improvements in a more structured way, company level cybernetic controls are not used effectively anymore. Organizational measurements, such as the annual staff satisfaction measurement, are considered as not very useful: “My staff satisfaction is mainly about my team or people having a good time.” (SPM1). Issues about dissatisfaction are discussed immediately with the involved employees.

Introduction of the team based approach has initiated an increased importance of reward and compensation controls and cultural controls. In the functional organization continuity of a systematic approach was supported by cultural controls with sufficient disciplinary effort for following up organizational procedures, without necessity of using rewards as incentive tool. Development of salaries is still based on annual assessments with help of job profiles. With the introduction of the project team, complimenting and celebrating team results have gained priority as element of rewarding and compensation. Employees consider complimenting as very stimulating. This is encouraged by naming and explaining good performance. Closing of huge projects and periods of hard working are celebrated within the team. Rewards are directed toward project results rather than achieving departmental goals. Cultural controls have been changed by an emerging team culture with own beliefs and values with openness and mutual personal interest as important conditions for stimulating team spirit. This helps solving problems jointly, with a very structured way of working as distinctive aspect of the team. Little use is made of mission and vision, which is considered as vague. Different disciplinary approaches within the team are more dependent on the personal characters of different employees than as result of a departmental clan culture.

The case study shows that in combination with increased job autonomy indeed the package of management control systems has been changed as was expected in the formulation of proposition 1. In accordance with the theoretical expectations, the importance of administrative controls on company level has been reduced by attaching less importance to intra-departmental procedures. What also appears from the case study, is a decreased attention for meeting external requirements that are imposed on the organization not related to projects and meeting standards that are underlying many certifications. The emergence of a team culture with a focus on team spirit has resulted in a lack of clarity about responsibilities and ambiguity about internal accountability. As result for many decisions general management must be involved. In accordance with the theoretical expectations, the focus of planning controls has shifted to more action planning with loss of importance of cybernetic controls as long-term organizational instrument. The case study shows that cybernetic controls not have disappeared, but now are used in a different way. Instead of instrument for achieving companywide
improvements in a structured manner it is used for rewarding and celebrating team performance for creating a good working atmosphere. In accordance with the theoretical expectations, more attention is given to rewarding and cultural controls. It is noticeable that the team is not guided by organizational mission and vision.

**Change in tightness of coupling:** Increase of job autonomy also has led to a change in tightness of coupling of the management control system as was expected in the formulation of proposition 2. In accordance with the theoretical expectations the case study shows that the vertical coupling between hierarchical levels (van Hengel et al., 2014) has become looser. The former functional organization mainly was aimed meeting the characteristics of a high-reliability organization as good as possible. After team implementation prioritizing good team results and a strong team culture the gap between the autonomous team and the functional organization has increased. Mission and vision are considered as vague and organizational objectives are considered as unclear by the team. In accordance with the theoretical expectations the case study shows that the horizontal coupling between intentions and actions (van Hengel et al., 2014) has become tighter. A more operational focus has led to a shrinking gap between intentions and actions. The package of management control systems is influenced by the intention to retain staff, planning controls by ensuring a good working atmosphere and team development, cybernetic controls by focussing on learning from projects and a personal approach of staff satisfaction, reward and compensation by paying more attention to complimenting, administrative controls by following own working methods and cultural controls by a team culture of openness and mutual personal interest.

Change of management control is a path-depending process that actually will be shaped only after institutionalization of job autonomy (Burns and Scapens, 2000). The horizontal coupling only became tighter after some time. In the transitional stage it was looser because of the existing business-like focus. Van Hengel et al. (2014) state that in such cases there can be some symbolic displaying of internal practices and actions for external legitimacy-seeking. Example of symbolic displaying that the case study shows is the description of long-term targets by the team that were used for showing that the new approach was based on an organizational mission and vision. This approach has been taken over from main clients and can be considered as a form of mimetic isomorphism (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). After some time this process was stopped. In the course of time routines emerged, such as steps in the preparation of inspections: "That has grown in the past period. It just became standard, while we actually did not realize it ourselves, because it went well anyway" (SPM1). This has resulted in more difficulties in flexibility in taking over activities among the teams and a lower awareness of the agreements made, resulting in an experience of more difficulties in taking
over activities among specialized disciplinary colleagues. As a result, people automatically will follow their own road. In line with Hallett and Ventresca (2006), who state that in case of safety people will be inclined to follow rules strictly, in practice rules related to risks are followed tightly: "You have to, because if you do not stick to this you will not get a product out of our factory" (SPM1).

4.6.2 Case study project PT2: Project team Air cooled Heat Exchangers

Change of job autonomy: The change to job autonomy has resulted in a new project team. Project team Air cooled Heat Exchangers consists of a senior project manager (SPM2), two project managers, three mechanical engineers, a project buyer, a production operations engineer and a quality control engineer and was formed after introducing the team based approach in 2013. Personnel controls were encouraged by giving the senior project manager managerial and some human resource responsibilities. He got the opportunity to redesign his work and making it easier with increased job crafting. Initially, some degree of self-organizing was expected, but employees carried out their work as they were used to and only took over some sub-tasks to a limited extent. Only after staff departure of colleagues employees were given opportunities to redesign their work and task-based autonomy was increased for them. Alternative work arrangements were not changed.

Change of the package of management control systems:

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<th>Project team</th>
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<td>Administrative controls</td>
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<td>PT2</td>
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Table 2 – Influence of increased job autonomy on the importance of the types of control of the MCS package of PT2: Project team Air cooled Heat Exchangers.

The change of job autonomy has resulted in a change of the package of management control systems (Malmi and Brown, 2008), which will be discussed by following table 2 from left to right. Following the theoretical expectations, the introduction of a team based approach has initiated a reduced importance of administrative controls. In the former functional organization a formal translation was made from external requirements from legislation and standards to internal accountability by using administrative controls with clear responsibilities and working methods. With the introduction of the project team SPM2 has been given managerial duties and some human resource responsibilities on top of his role as project manager. Despite scope sessions with the management team it always remained unclear what the limits of the team responsibilities were. For many decisions still permission is needed from general management. The employees have been given the joint responsibility for carrying out
projects from start to finish with a high degree of freedom and independence. For encountering uncertainty random personal instructions were drawn up. By considering standard procedures as required only for functioning of the organization out of the team scope functioning of the administrative controls was reduced. New working methods were discussed with the other senior project managers on weekly base, but it turned out to be very difficult agreeing standards. Working processes are adjusted only informally: “Often it is agreed by word of mouth, but always confirmed per email.” (SPM2).

Introduction of the team based approach has initiated a reduced importance of planning and cybernetic controls. In the functional organization planning controls were based on long-term planning taking into account external requirement and use of cybernetic controls on management level in order to realize cross-departmental improvements. In the initial stage after introduction of the project team annual plans and objectives were converted directly from vision and long-term objectives of the owner, without involvement of general management. In the year 2016 objectives have been adjusted, but considered as not-realistic, and intrinsically used for team motivation: “Reason was that we wanted to show for Bronswerk there were improvements to be made” (SPM2). After a while planning controls have shifted from a long-term planning to more action planning with hard project-oriented goals and some softer goals on personnel level. By using KPIs for sharing results within the team in order to motivate employees cybernetic controls have shifted from focus on company level to focus on team level. Improvement proposals have been drawn up, but execution stagnated after some time. A ‘management radar’ has been developed for assessing project results, but is perceived as not-reliable. Financial calculations are considered as not-realistic and therefore no fair conclusions can be drawn.

Introduction of the team based approach has initiated an increased importance of reward and compensation controls and cultural controls. In the functional organization continuity of a systematic approach was supported by cultural controls with sufficient disciplinary effort for following up organizational procedures, without necessity of using rewards as incentive tool. With the introduction of the project team small team based rewards have gained priority as motivational tool. In a conscious way attention is given to team motivation if good results are achieved: “What is most engaging and motivating actually are small things. Sometimes having a drink, sometimes going for a day-out or sometimes giving a cake in case a project has completed well” (SMP2). A strong team culture is explored by emphasising team spirit stimulating the feeling of freedom in order to motivate employees making extra efforts. Influence of a departmental clan culture hardly plays a role, but the characteristic organizational culture of making decisions quickly and based on gut feelings without considering consequences has remained. Although much attention was given to a new mission and
vision, it actually does not play a role in control: "Well, if I have to look it up and can’t recite it immediately, it doesn’t really mean anything of course" (SPM2).

The case study shows that in combination with increased job autonomy indeed the package of management control systems has been changed as was expected in the formulation of proposition 1. In accordance with the theoretical expectations, the importance of administrative controls on company level has been reduced by attaching less importance to intra-departmental procedures. What the case study also shows is that the SPMs still did have the intention to adjust procedures in order to confirm new working methods, but their attempts failed because no mutual agreements could be made. In accordance with the theoretical expectations, the focus of planning controls has shifted to more action planning with loss of importance of cybernetic controls as long-term organizational instrument. The case study also shows that cybernetic controls are arranged otherwise and used in a different way. Instead of using cybernetic controls as instrument for ensuring long-term organizational improvements a structured way, they are used now for motivating the team and showing improvement opportunities for the team. To this end, new instruments have been developed that ultimately not appeared effective. In accordance with the theoretical expectations, more attention is given to rewarding and cultural controls. The case study shows also that many effort was given for operationalization of a newly developed mission and vision, but in the end it is not used for managing the team.

**Change in tightness of coupling:** Increase of job autonomy also has led to a change in tightness of coupling of the management control system as was expected in the formulation of proposition 2. In accordance with the theoretical expectations the case study shows that the vertical coupling between hierarchical levels (van Hengel et al., 2014) has become looser. The former functional organization mainly was aimed meeting the characteristics of a high-reliability organization as good as possible. After team implementation prioritizing motivational purposes and a strong team culture in which feeling of freedom is a core value the gap between the autonomous team and the functional organization has increased. Organizational mission and vision does not play a role in control and project-oriented goals have gained priority by the team. In accordance with the theoretical expectations the case study shows that the horizontal coupling between intentions and actions (van Hengel et al., 2014) has become tighter. A more operational focus has led to a shrinking gap between intentions and actions. The package of management control systems is influenced by the intention to motivate the team, planning controls by establishing softer goals on personnel level, cybernetic controls by using KPIs for sharing results within the team in order to motivate employees, reward and
compensation by team motivation using small things, administrative controls by only informal adjustment of working processes and cultural controls by emphasising team spirit.

Change of management control is a path-depending process that actually will be shaped only after institutionalization of job autonomy (Burns and Scapens, 2000). The horizontal coupling only became tighter after some time. In the transitional stage it was looser because of the existing business-like focus. Van Hengel et al. (2014) state that in such cases there can be some symbolic displaying of internal practices and actions for external legitimacy-seeking. Example of symbolic displaying that the case study shows is the introduction of annual plans and objectives for team motivation and showing good results by the team. In the former functional organization, the image existed that no real changes were made. In order to show that the new approach was more effective improvement proposals have been drawn up, but that process stagnated after some time. Following this a new ‘management radar’ was developed in order to show that results could be monitored in a more efficient and modern way. However, after some time this instrument was perceived as non-reliable. In line with Hallett and Ventresca (2006), who state that in case of safety people will be inclined to follow rules strictly, in practice project related rules are followed tightly: "You just have to follow the rules. And to deviate from that is not done" (SPM2). Internal procedures are handled more loosely.

4.6.3 Case study PT3: Project team Systems

Change of job autonomy: The change to job autonomy has resulted in a new project team. Project team Systems consists of a senior project manager (SPM3), five mechanical engineers and a project buyer and was formed after introducing the team based approach in 2013. Personnel controls were encouraged by giving the senior project manager hierarchical responsibility as team leader with freedom for making proposals for increasing his scope. By sharing his own tasks with two other employees he was able to focus on his personal qualities, resulting in job crafting. Employees could take over tasks from each other with help of a knowledge matrix. The team had freedom in developing new resources to make their work easier, such as the Plant4D program. Job autonomy of the employees was mainly task-based supplemented with some degree of job crafting. Alternative work arrangements were not changed.

Change of the package of management control systems:

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The change of job autonomy has resulted in a change of the package of management control systems (Malmi and Brown, 2008), which will be discussed by following table 3 from left to right. Following the theoretical expectations, the introduction of a team based approach has initiated a reduced importance of administrative controls. In the former functional organization a formal translation was made from external requirements from legislation and standards to internal accountability by using administrative controls with clear responsibilities and working methods. With the introduction of the project team SPM3 has been given hierarchical responsibility, including organizing performance interviews and coaching of people. Employees are expected to be autonomous, which resulted in a higher level of involvement. The limits of autonomy always stayed unclear, even after participating in scope sessions. Not formalizing importance of control led to a change of attitude: “When you simply had the guts to decide without aligning (with general management), maybe afterwards you were addressed to it and you went to defend it” (SPM3). Mutually alignment of newly developed working methods with the other teams gradually was done less often. Organizational vision about expected team performance remained unclear, which made it difficult setting up appropriate objectives. Team and personal objectives have been developed, but were never confirmed by general management.

Introduction of the team based approach has initiated a reduced importance of planning and cybernetic controls. In the functional organization planning controls were based on long-term planning taking into account external requirement and use of cybernetic controls on management level in order to realize cross-departmental improvements. With the introduction of the project team, planning controls have shifted from a long-range planning to more action planning. Own team goals have gained importance by drawing up weekly specific project objectives and actions on base of overarching project plans, with meeting delivery times as main goal. Systems are used for projects related purposes and documentation, such as planning, material purchases and invoices. Figures and objectives are missing, but is not considered as a problematic issue: “Not much is measured. More is thought on basis of feelings” (SPM3). New working methods arise out of personal initiatives. They are simply introduced and are not compared with existing formalised methods. By focusing on team results company level cybernetic controls are not used effectively anymore.

Introduction of the team based approach has initiated an increased importance of reward and compensation controls and cultural controls. In the functional organization continuity of a systematic
approach was supported by cultural controls with sufficient disciplinary effort for following up organizational procedures, without necessity of using rewards as incentive tool. After introduction of the project teams, salaries are still adjusted on base of annual performance appraisals. Transparency has increased slightly, but general management still makes the decisions without linking to goal or result achievements. Motivating individuals and creating a good team atmosphere rather than results have gained priority as element of rewarding and compensation. Sometimes additional rewards are given, such as vouchers, a bunch of flowers or payment of overtime and annually team outings are organized. At first, the different disciplinary cultures were taking into account in approaching employees. Gradually a pleasant team culture has emerged which is concerned as extremely important: "In the end, as a team leader, I believe that my greatest goal is ensuring a good working atmosphere" (SPM3). During a period of time it is tried to concretize the new formulated mission and vision, but in the end these activities were stopped. Now just doing the job in an ordinary way is seen as the most important value.

The case study shows that in combination with increased job autonomy indeed the package of management control systems has been changed as was expected in the formulation of proposition 1. In accordance with the theoretical expectations, the importance of administrative controls on company level has been reduced by attaching less importance to intra-departmental procedures. What also emerges from the case study is that not formalizing power structures has led to a change in attitude of the team. Initially general management was involved in making organizational decisions in advance. After some time the senior project manager made such decisions by himself and defended these afterwards. In accordance with the theoretical expectations, the focus of planning controls has shifted to more action planning with loss of importance of cybernetic controls as long-term organizational instrument. The case study also shows that not only a more action-oriented focus has influenced the cybernetic controls, but also that more action is taken on the basis of feelings instead of measurements. Further, new working methods are not compared with the existing ones and not can be judged whether an improvement has consequences for other parties involved or is effective as is supposed. In accordance with the theoretical expectations, more attention is given to rewarding and cultural controls. The case study shows that general management still makes decisions about salaries without linking to goal or result achievements. Despite attempts concretizing a new formulated organizational mission and vision in the end it does not play a role in managing the team.

**Change in tightness of coupling:** Increase of job autonomy also has led to a change in tightness of coupling of the management control system as was expected in the formulation of proposition 2. In accordance with the theoretical expectations the case study shows that the vertical coupling between
hierarchical levels (van Hengel et al., 2014) has become looser. The former functional organization mainly was aimed meeting the characteristics of a high-reliability organization as good as possible. After team implementation prioritizing motivating individuals, ensuring a good team atmosphere and a team culture which emphasises own values the gap between the autonomous team and the functional organization has increased. Concretizing organizational mission and vision has stopped after a while and own team goals have gained importance. In accordance with the theoretical expectations the case study shows that the horizontal coupling between intentions and actions (van Hengel et al., 2014) has become tighter. A more operational focus has led to a shrinking gap between intentions and actions. The package of management control systems is influenced by the intention to motivate individuals and creating a good team atmosphere, planning controls by development of team and personal objectives, cybernetic controls by improvement on basis of feelings and personal initiatives, reward and compensation by giving additional rewards and organizing team outings, administrative controls by taking decisions without reflecting and cultural controls by emphasising a team culture.

Change of management control is a path-depending process that actually will be shaped only after institutionalization of job autonomy (Burns and Scapens, 2000). The horizontal coupling only became tighter after some time. In the transitional stage it was looser because of the existing business-like focus. Van Hengel et al. (2014) state that in such cases there can be some symbolic displaying of internal practices and actions for external legitimacy-seeking. Example of symbolic displaying that the case study shows is the development of new working methods in the initial stage for showing that real changes could be made by the team within the new approach. These new methods were based on feelings and not compared with existing methods. After some time it turned out to be very difficult to realize real improvements. Another example of symbolic display was the setting of long-term objectives in order to show that structural improvements could be implemented in an efficient and substantiated way by following organizational mission and vision. This process has never been completed and after some time was stopped. Initially, agreements were made for coordinating working methods between the teams, but that process was also stopped: "In the beginning we always had that Monday morning consultations and after a while it diluted and things went more automatically" (SPM3). Changes now are being made random and situational dependent without examining existing rules: "That is absolutely not how it should be, but that is how it is" (SPM3). Legal rules are far from the team and never will be conflicting. In line with Hallett and Ventresca (2006), who state that in case of safety people will be inclined to follow rules strictly, in practice project related rules are followed as tightly as possible, sometimes with use of some creativity as result of conflicting requirements.
4.6.4 Case study PT4: Project team Complex Heat Exchangers

**Change of job autonomy:** The change to job autonomy has resulted in a new project team. Project team Complex Heat Exchangers consists of a senior project manager (SPM4), two project managers, four mechanical engineers, a project buyer, a production operations engineer and a quality control engineer and was formed after introducing the team based approach in 2013. Personnel controls were encouraged by giving the senior project manager responsibility for the team. Within a limited budget employees could decide quicker and through different paths with increased task-based autonomy. The team pushed boundaries and considers itself as a pioneer in initiating new ways of working. In the beginning of the new approach many working instructions and companywide procedures have been adjusted, including the ISO and ASME manuals. The team dares to take risks, for example in case of switching to new unknown suppliers without following standard assessment procedures. There was a clear increase of job crafting among the senior project manager and the employees. Alternative work arrangements were changed by giving more liberty for working at home and more flexibility in working times.

**Change of the package of management control systems:**

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Table 4 – Influence of increased job autonomy on the importance of the types of control of the MCS package of PT4: Project team Complex Heat Exchangers.

The change of job autonomy has resulted in a change of the package of management control systems (Malmi and Brown, 2008), which will be discussed by following table 4 from left to right. Following the theoretical expectations, the introduction of a team based approach has initiated a reduced importance of administrative controls. In the former functional organization a formal translation was made from external requirements from legislation and standards to internal accountability by using administrative controls with clear responsibilities and working methods. With the introduction of the project team SPM4 has been given team responsibility. From the beginning a clear scope was missed. In consultation with all senior project managers and general management for some issues agreements were captured on paper. In case of the remaining grey areas decisions were made on base of feelings. By involving employees in the entire project flow they feel more responsibility: “Everyone in the team knows the projects, owns these projects and is partly responsible for it” (SPM4). Mainly in the first year a high degree of freedom was taken in handling companywide procedures. Many instructions,
procedures and manuals have been adjusted. After some time procedures were adjusted only incidentally. By handling companywide procedures without organizing follow up administrative controls have been undermined.

Introduction of the team based approach has initiated a reduced importance of planning and cybernetic controls. In the functional organization planning controls were based on long-term planning taking into account external requirement and use of cybernetic controls on management level in order to realize cross-departmental improvements. With the introduction of the project team, long-term objectives which were drawn up by the owner by means of mission, vision and strategy were converted to team goals and KPIs and formally approved by general management. By choosing delivery on time, staying within budget and delivery according required quality as main objectives own team goals have gained importance. Planning controls have shifted from a long-term planning to more action planning by subordinating former organizational objectives to the team objectives, such as non-conformities. In forming new objectives there was no alignment with the functional departments. Newly devised KPIs, such as for additional work, were taken over by the other teams. SPM4 states that goal setting was based on personal opinions: "I just think you have to deliver ninety or ninety-five percent on time." Financial and non-financial objectives were adjusted on base of personal opinions and expectations of the future instead of judging previous results. Cybernetic controls were influenced by personal opinions and the need for showing good results in order to present the benefits for the organization of changes made by the team. In addition, presentations during the MRM meetings with management have become less extensive.

Introduction of the team based approach has initiated an increased importance of reward and compensation controls and cultural controls. In the functional organization continuity of a systematic approach was supported by cultural controls with sufficient disciplinary effort for following up organizational procedures, without necessity of using rewards as incentive tool. With the introduction of the project team, attention for rewarding personal performance has increased by nominating people for earning extra financial injections. Within the team freedom is taken where and when to work. A team culture has been formed with complimenting each other frequently and attention for celebrating successes in an exuberant way: "We even purchased a device for it: the globe" (SPM4). Successes are celebrated with the team around ‘the globe’. Good communication, cooperating well and humour are other characteristics of the team culture. In order to increase team building outings are organized several times a year.
The case study shows that in combination with increased job autonomy indeed the package of management control systems has been changed as was expected in the formulation of proposition 1. In accordance with the theoretical expectations, the importance of administrative controls on company level has been reduced by attaching less importance to intra-departmental procedures. Nevertheless, the case study also shows that in the initial stage companywide procedures were adjusted by the team anyway. Not organizing follow up has contributed in reduction of the importance of the administrative controls. In accordance with the theoretical expectations, the focus of planning controls has shifted to more action planning with loss of importance of cybernetic controls as long-term organizational instrument. The case study also shows that cybernetic controls no longer were fed by measurements and results from the past, but were mainly based on personal opinions, expectations of the future and the need for showing good team results and improvements in the interests of the organization. In accordance with the theoretical expectations, more attention is given to rewarding and cultural controls. What emerges from the case study is that the team deviates from organizational rules in a conscious way and has a remarkable attention for celebrating successes in an exuberant way.

**Change in tightness of coupling**: Increase of job autonomy also has led to a change in tightness of coupling of the management control system, as was expected in the formulation of proposition 2. In accordance with the theoretical expectations the case study shows that the vertical coupling between hierarchical levels (van Hengel et al., 2014) has become looser. The former functional organization mainly was aimed meeting the characteristics of a high-reliability organization as good as possible. After team implementation explicitly celebrating successes and prioritizing team building and own believes the gap between the autonomous team and the functional organization has increased. Organizational mission, vision and strategy initially were converted to team goals and formally approved by general management, later on own team goals gained importance and alignment with functional departments was stopped. In accordance with the theoretical expectations the case study shows that the horizontal coupling between intentions and actions (van Hengel et al., 2014) has become tighter. A more operational focus has led to a shrinking gap between intentions and actions. The package of management control systems is influenced by the intention to celebrate successes, planning controls by goal setting on base of personal opinion, cybernetic controls by extensive presentations of improvements to the team, reward and compensation by exuberant attention for celebrating successes, administrative controls by adjusting companywide procedures and cultural controls by emphasising celebrating successes.
Change of management control is a path-depending process that actually will be shaped only after institutionalization of job autonomy (Burns and Scapens, 2000). The horizontal coupling only became tighter after some time. In the transitional stage it was looser because of the existing business-like focus. Van Hengel et al. (2014) state that in such cases there can be some symbolic displaying of internal practices and actions for external legitimacy-seeking. Example of symbolic displaying that the case study shows was the high degree of freedom was taken by the team in the first year for adjusting companywide instructions, procedures and manuals in order to show the actual course of working methods in a modern way and to present these changes throughout the company. After one year this process was stopped, without ensuring follow-up of the renewed procedures. Influenced by the intention showing good results cybernetic controls were influenced by personal opinions. Rational actors may make their organization increasingly similar in trying to change them (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). The case study shows that the team has freedom for developing their own methods. Some ideas, such as the newly developed KPIs, are taken over by the other teams. In order to show that the new approach is efficient, decisions are made quickly and risks are taken by buying from unknown suppliers without following the assessment procedures: "Sometimes we walk on paths that are not allowed at all" (SPM4). Legitimacy is found in stating necessity for business development and following new technological developments on the market. In line with Hallett and Ventresca (2006), who state that in case of safety people will be inclined to follow rules strictly, technical codes for devices such as ASME and the PED are always tightly met: "We just have to comply with that. If you do not meet that, it just stops" (SPM4). Because customer specifications are becoming more and more extensive they are handled more flexibly: "There are so many rules now that you also have some loopholes in the law, left and right" (SPM4). Internal procedures are used flexibly.

### 4.7 Theoretical implications

By examining four cases in the previous paragraph it has been determined to what extend the propositions that have been set up in chapter 2 are applicable in practise.

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It appears to be many similarities between the different cases, as represented in table 5. For all cases increase of job autonomy has resulted in a change of the package of management control systems (Malmi and Brown, 2008). To a large extend there are similarities with the theoretical expectations that were formulated in proposition 1. The importance of administrative controls on company level indeed has been reduced by attaching less importance to intra-departmental procedures, the focus of planning controls indeed has shifted to more action planning, with loss of importance of cybernetic controls as long-term organizational instrument, and indeed more attention is given to rewarding and cultural controls. In accordance with the theoretical expectations formulated in proposition 2, the case studies show also that increase of job autonomy also has led to a change in tightness of coupling of the management control system. In all cases the vertical coupling between hierarchical levels (van Hengel et al., 2014) has become looser. The former functional organization mainly was aimed meeting the characteristics of a high-reliability organization as good as possible. After team implementation the gap between the autonomous teams and the functional organization has increased. Further, in all cases the horizontal coupling between intentions and actions (van Hengel et al., 2014) has become tighter. A more operational focus has led to a shrinking gap between intentions and actions. The package of management control systems is influenced by the different intentions of the teams, mainly driven by motivating the teams. Following the theory of Burns and Scapens (2000), in practice can be observed that change of management control is a path-depending process that actually will be shaped only after institutionalization of job autonomy. In the initial stage horizontal coupling was looser because of the existing business-like focus of the teams and only became tighter after some time. In line with van Hengel et al. (2014), in the first years after introducing the teams there was some symbolic displaying of internal practices and actions for external legitimacy-seeking, where senior project managers tried to make their teams similar in trying to change their teams, following the theories of Meyer and Rowan (1977) and DiMaggio and Powell (1983). In line with Hallett and Ventresca (2006), who state that in case of safety people will be inclined to follow rules strictly, in practice rules related to risks are followed tightly or at least as tightly as possible. In addition to the confirmation that the propositions can be supported in practice, the case studies also provided some refinements relative to the theory.

Following the theoretical expectation formulated in proposition 1, by increase of job autonomy the importance of administrative controls in practice has decreased. Sripirabaa and Maheswari (2015) state in their definition that within a high level of job autonomy there is substantial freedom in
scheduling the work and determination about use of procedures. The new rule of job autonomy was implemented in a very short time, but what is clearly visible in all case studies, is the involvement of general management in many issues. From the perspective of general management this partly can be devoted to the duality of the principle of autonomy and meeting the regulation in which in particular high-reliability organizations face, as is explained by Grote et al. (2009). In addition, it is not known to what extent employees can bear responsibility, which according to Sripirabaa and Maheswari is necessary to prevent undesired outcomes. From perspective of the teams the level of involvement of general management can be dedicated to missing a clear scope for their teams within autonomous decisions can be taken. Initially, many decisions needed to be discussed with general management. In order to get more clarity, scope sessions with the management were organized. After making agreements about a limited number of issues, such as training courses, the level of involvement of general management was decreased. After some time another attitude arose among the teams and they dared to take more risks by taking decisions by themselves. This leads to the first refinement.

Refinement 1: The rule of job autonomy can be implemented in a very short time period; with a long lead time for embedding of the change.

This refinement shows that organizational arrangements are the result of evolutionary processes. The success of control changes depends to a large extent on the connection with routines in the daily activities of employees. Therefore, the first refinement shows the added value of the old institutional economic approach (OIE).

Following the theoretical expectation formulated in proposition 1, by increase of job autonomy the importance of cybernetic controls has decreased in practice. On base of the theory of Langfred and Rockmann (2016) it was expected that in combination with increased job autonomy performance standards, feedback systems and improvements would be carried out more on personnel or team level with the aim of making work easier. The case studies show that the cybernetic controls indeed have moved from company to team level. What strikes is that the cybernetic controls mainly in the initial stage were used in a different way compared to the former functional situation. In the functional organization they were used for technical business improvement on base of long-term tendencies in a very structured way and taking into account external requirements. The cases studies show that the situation now is less predictable and teams have developed their own systems in order to motivate employees. What strikes is that they have found other ways for ensuring improvements. More emphasis is placed now on rewarding and celebrating successes. Cybernetic controls are used now for facilitating motivation and creating a good working atmosphere. There is more attention for feelings
instead of measurements and improvements are not based on long-term tendencies and compared
with existing methods anymore. Following the theory of van Hengel et al. (2014), who state that
symbolic displaying of internal practices and actions, mainly in the initial stage cybernetic controls
were influenced by personal opinions for legitimizing purposes in order to show good results. This
leads to the second refinement.

**Refinement 2: The importance of cybernetic controls is decreased in combination with increased job
autonomy; with a changed use of these controls.**

This refinement shows that legitimacy and mindfulness are important motives in the arrangement of
controls, leading to ceremonial use of management control systems. Therefore, the second refinement
shows the added value of the new institutional economic approach (NIS).

Following the theoretical expectation formulated in proposition 1, by increase of job autonomy the
importance of cultural controls has increased in practice. It was expected that in combination with
increase of job autonomy team cultures would emerge with own beliefs, values and social norms in
which emphasis would be placed on a sense of responsibility in addressing increased freedom (Grote
et al., 2009). By comparing the cases indeed different team cultures have emerged, but what is
noticeable, is that the team cultures are significantly influenced by the personal values and beliefs of
the senior project managers, which by themselves are can be characterized as: “a very structured way
of working” (SPM1), “feeling of freedom” (SPM2), “ensuring a good working atmosphere” (SPM3) and
“celebrating successes” (SPM4). What is even more noticeable, is that the personal characters are
decisive for the performance of the teams and for the extent to which new working methods are
implemented. Differences in personal characters are expressed in team methods and opinions about
the teams. For example, the manufacturing departments are very satisfied with the modest and very
structured approach of project team PT1: Project team Heat Exchangers. By contrast, in PT4: Project
team Complex Heat Exchangers a lot of attention is paid on celebration of successes that is expressed
by showing the celebrations around a striking object, ‘the globe’. PT4 takes many initiatives and dares
to take risks in order to push boundaries, while PT1 is more focused on retaining.

**Refinement 3: The importance of cultural controls is increased in combination with increased job
autonomy; with a significant influence of personal characters of individuals.**

5 Conclusion, limitations and recommendations
5.1 Conclusion

The following main research question has been formulated:

How does increase of job autonomy influence the tightness of coupling of a management control system within a high-reliability environment?

For answering the main question two propositions were set up:

- **Proposition 1**: Increase of job autonomy leads to a change in the package of a management control system; with a decreasing importance of planning, cybernetic and administrative controls and an increase of reward and compensation and cultural controls.

- **Proposition 2**: Increase of job autonomy leads to a change in tightness of coupling of a management control system; with a looser vertical coupling and a tighter horizontal coupling.

Both propositions were tested by carrying out four case studies. Theoretical implication is that both proposition 1 and proposition 2 were confirmed. The case studies also provided the next refinements relative to the theoretical implication:

- **Refinement 1**: The rule of job autonomy can be implemented in a very short time period; with a long lead time for embedding of the change.

- **Refinement 2**: The importance of cybernetic controls is decreased in combination with increased job autonomy; with a changed use of these controls.

- **Refinement 3**: The importance of cultural controls is increased in combination with increased job autonomy; with a significant influence of personal characters of individuals.

5.2 Potential limitations results

In order to get useful results much attention has been given to validity and reliability aspects. The validity of the conclusion is ensured by confirming both propositions. It is confirmed that that the level of job autonomy influences the arrangement of a management control system. For testing the propositions four case studies have been carried out in the real-life context of Bronswerk Heat Transfer. In order to qualify the case organization as relevant for a high-reliability environment a comparison is made with the characteristics of a high-reliability organization, with help of the theory of Saunders (2015). For generating results with a high level of reliability, consciously four teams were selected as units of analysis. The construct validity is ensured by a very structured and transparent research approach. Most valuable sources of input were interviews with seven selected managers, who all have worked in the former functional organization and therefore could provide relevant insights regarding the management change. In advance a questionnaire was prepared on basis of the theoretical framework in figure 2 (see attachment 1). Prior to the interviews, background information
was given and the purpose of the study has been discussed with the managers. Other sources were used in a limited way and provided only few additional information. For all managers the same questionnaire was used. Results of the interviews were transcribed in detail and on base of the literature review key words were placed next to the text with highlighting of quote-worthy sentences (see attachment 2). In the description of the results illustrative quotes are widely used. External validation is ensured by using exclusively academic relevant peer-reviewed theories. Results of the different cases have been compared with each other, with use of insights from the general manager and two functional managers for triangulation. A third functional manager has left the organization short before scheduling the interviews, what is expected to have no relevant influence on the outcomes. For an appropriate comparison of the case studies and differentiate similarities and differences, the same structure was used for describing the case studies. Taking into account possible social desirable answers, in relation to the own role as quality assurance manager in the case organization, an open confidential atmosphere was facilitated. By joining the teams during the period of research observations could be made in a natural way and interpretation issues and findings could be discussed easily. Potential limitations for the external validity of the study, is that all case studies have been carried out in one case organization. Therefore, the effects cannot be generalized to other organizations without additional research.

5.3 Recommendations for further research

The study has shown how increase of job autonomy has influenced the tightness of coupling of a management controls system within a high-reliability environment. On base of four case studies it is stated that, in combination with increased job autonomy, the package of management control systems and the tightness of coupling have changed. The results of the study are limited by carrying out the case studies in one single organization. To be able to generalize the results, the study has to be extended to other organizations within a comparable environment.

Further, the study has yielded some refinements that are suitable for further research. It appears that it takes a long time for the change to be embedded in the organization. The connection with existing routines appears to be an important factor. This raises the question whether the specific high-reliability environment influences the speed of taking place changes in reality. The study can be extended by researching the interaction with existing routines from the old institutional economic approach (OIE).

It appears that the importance of cybernetic controls has decreased. What is striking, is that the use of cybernetic controls has changed. Instead of ensuring that systems are adjusted on base of rational
assessments, in turns out to be that these controls to a large extent are influenced by legitimacy and mindfulness aspects. The study can be extended by researching the use of cybernetic control systems in combination with increased job autonomy from the new institutional social approach (NIS).

Finally, it appears that the importance of cultural controls has increased. What is striking, is that personal characters have a major influence on the performance of the teams and influence management control at company level. Although it tends to a topic for psychology, it can be interesting to investigate the influence of personal characters on management control systems.

5.4 Recommendations for practise
The study clearly illustrates the effects of increased job autonomy within the case organization. At personnel level a better use is made of personal capacities and at organizational level there are significant benefits in terms of communication and efficiency. After a period of time, also some side effects emerged. The balance between increased job autonomy and compliance with external organizational requirements can optimized by paying attention to the principle of loose coupling and managing the tightness.

External parties like to see that the organization acts in a structured and safe manner. Therefore, it is important being able to show customers, certifying parties and other external parties that structured methods are being used. From the case studies appear a predominantly operational focus and difficulties in catching joint working methods. Documented procedures are no longer maintained and there is no visible use of cybernetic controls at company level anymore. Therefore, it is advised to reorganize the administrative controls at company level with help of the coupling principle. Risk-based elements must be tightly coupled with a central system, other elements may be dealt more loosely. In order to meet all, sometimes contradictory, external requirements some level of ceremonial use will always be needed.

In order to frame risks related to suppliers and subcontractors, it is important making good internal agreements about purchasing activities. It turns out that deviating from supplier selection procedures affects strategic purchasing activities causing risks. Therefore, it is important to ensure a tight coupling between supplier selection procedures and purchasing activities of the teams. This facilitates good relationship management with making appropriate agreements.
Literature


Attachments

Attachment 1. Interview questions.

Attachment 2. Interview transcriptions (can be retrieved).


