Team development and team performance. Responsibilities, responsiveness and results
Kuipers, B.

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2005

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Download date: 25-12-2018
PART IV RESPONSIBILITIES: Complexity and Location of Regulation Tasks and Their Relationships with Team Responsiveness
Chapter 6
Responsibilities: Management Structure of the Team-Based Organization

In this chapter, I will explore the management structure of the team-based organization. This structure determines the team’s responsibilities to which a team responds. Although there is little literature focusing on characteristics of the overall management structure in relation to the functioning of teams “on the bottom”, a first attempt shall be made here to provide insight into these characteristics and their effects on team responsiveness.

6.1 Introduction to the Literature

The issue of control plays an important role in the literature of autonomous or self-managing teams. Increased autonomy of teams in organizations results in a transfer of responsibilities and decision making power - in other words, control - from management to employees on the ‘floor’ (Van Eijnatten & Van der Zwaan 1998). The internal control function of work teams has been described and studied extensively, often referred to by the term autonomy. A great deal of literature in this respect focuses on the task-design of teams. The autonomy of teams is often described and assessed in terms of both control needs and control capacity. The task characteristics of the work on a micro-level, and (mostly) on the lowest organizational level, are subject to numerous studies (cf. Schouteten, 2001). However, little attention is paid to the importance of implementing an overall control structure for the team-based organization, in other words, to the management structure external to teams. Some literature on cross-functional teams stresses the need for “eliminating or radically changing the role of the traditional functional management structure” and “tailoring almost all aspects of the organization to support the new reality that teams... are the basic performing unit of the organization”, “in order to create true collaboration” in these teams (Mohrman, Tenkasi, & Mohrman 2000). LP literature reports on the “gap between the old and the new organization” after implementing teams with a higher degree of
Responsibilities: Management Structure of the Team-Based Organization

responsibilities; this took away one supervisory level in the organization (Karlsson & Åhlström 1996).

As I said, there is a limited amount of literature about the overall management structure of organizations working with semi-autonomous teams. There is some literature with a sociotechnical background on the issue, for instance, Thompson and Wallace (1996) refer to the “governance structure”. However, their study mostly focuses on the role of the team leader. The role of the team leader or manager is also subject to the study by Doorewaard, Van Hootegem and Huys (2002). They focus on “the division of job regulation tasks between team leader and team members” in the “team responsibility structure”. De Sitter (1994) and Van der Zwaan (1999) developed a model, which distinguishes between internal versus external and routine versus non-routine regulation tasks (see table 32). They argue that contrary to classical functional organizations - where working groups have no responsibility and first line supervisors are responsible for all routine tasks - all internal and external routine tasks in team-based organizations are delegated to the team, while all non-routine tasks are the responsibility of the team manager (coordinator).

Table 32 Task Complexity and Task Location in a Traditional Organization and a Team-Based Organization

<table>
<thead>
<tr>
<th>Task Complexity and Task Location</th>
<th>Traditional working group</th>
<th>Semi-autonomous team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task allocation</td>
<td>Absent</td>
<td>Task allocation</td>
</tr>
<tr>
<td>Workers’ abilities</td>
<td>Absent</td>
<td>Workers’ abilities</td>
</tr>
<tr>
<td>Quality &amp; maintenance</td>
<td>Absent</td>
<td>Quality &amp; maintenance</td>
</tr>
<tr>
<td>Personnel force</td>
<td>Absent</td>
<td>Personnel force</td>
</tr>
<tr>
<td>Materials procurement</td>
<td>Absent</td>
<td>Materials procurement</td>
</tr>
<tr>
<td>Receipt &amp; delivery</td>
<td>Absent</td>
<td>Receipt &amp; delivery</td>
</tr>
<tr>
<td>Budget control</td>
<td>Absent</td>
<td>Joint-consultation</td>
</tr>
<tr>
<td>Process innovation</td>
<td>Absent</td>
<td>Budget control</td>
</tr>
<tr>
<td>Purchasing policy</td>
<td>Absent</td>
<td>Process innovation</td>
</tr>
<tr>
<td>Rush orders</td>
<td>Absent</td>
<td>Purchasing policy</td>
</tr>
<tr>
<td>New products</td>
<td>Absent</td>
<td>Rush orders</td>
</tr>
</tbody>
</table>

Source: Van der Zwaan (1999)

There is other LP and Continuous Improvement literature dealing with organizational structures around teamwork (Delbridge & Barton 2002; Lindberg &
The type of teams referred to in this field of literature often concerns parallel teams (see 1.1) or so-called off-line teams, such as quality circles.

Nevertheless, what is lacking in both LP and STS literature are fully elaborated models for characterizing the management structure of the overall team-based organization, as a frame of reference, or a clear empirical basis concerning the effects of the management structure on the functioning of work teams. This constraint of both traditions might lead to a *misfit* between the typical characteristics and needs of semi-autonomous teams on the shop floor on the one hand, and a “traditional functional management structure” (Mohrman, Tenkasi, & Mohrman 2000) and similar support system within the organization, on the other hand. Kuipers and De Witte (2005b) call this the “double control structure” of an organization, in which both bottom-up and top-down control are used simultaneously.

In this study I aim to contribute to the body of knowledge concerning the overall management structure (in particular its division of control), particularly in relation to team responsiveness; the effects of this structure on the functioning of teams are underexposed. The following two chapters will further elaborate the thinking presented in chapter 1. This means I will define the team responsibilities that form the framework or maneuvering space of teams. In short, team responsibilities means what teams can or are allowed to do, whereas team responsiveness shows to what extent teams are really doing this. So far, we have seen how three dimensions of responsiveness can characterize the developmental processes of teams and how these three dimensions lead to certain team results. Now, in chapter 6 and 7, I will explore how the responsiveness dimensions of teams can be affected by shaping the team responsibilities.

In these chapters, I will combine insights in the characteristics of team delegated tasks with the (few) theories on the overall management structure design of the team-based organization. To do this, I will develop a framework of responsibilities in team-based organizations. First however, I shall need to go back to earlier literature to describe the distinction between operating and managing systems as important elements of the management structure.

### 6.2 Operating and Managing Systems

To provide insight into the management structure of team-based organizations Rice (1953; 1958) and Miller (1959) generally differentiate between *operating* and *managing* systems in organizations. Rice (Rice 1958) describes how the organization can be differentiated into different order systems. These orders are more or less comparable to hierarchical layers (Mintzberg 1979). The lowest order is the undifferentiated primary production system. The primary production concerns input, throughput (or conversion) and output of raw materials into products. At this level, in industrial jargon called the shop-floor, “separate operating systems cannot be discretely identified, and primary production systems are reached, in which
management, control, and service are internally structured” (Rice 1958). This is the level of the work team, “which comprises a set of activities that make up a functioning whole ... the basic unit” (Trist 1981), in other words, the semi-autonomous team with a complete task. Needless to remark, larger organizations can contain many teams, more than one primary production system and several orders of differentiation (Rice 1958).

The system external to the operating system is the managing system (Rice 1958). Rice & Trist (1952) defined this as “the system, external to the production unit, which controls, coordinates and services its activities”. The authors also call the overall set of systems “the governing system” or “general management”. Henceforth, I will use the term management structure. In the managing system, a management order is situated on the boundaries of the operating systems, since the management concerns “the mediation of relationships between the (operating) system and its environment” (Rice 1958). In other words, the relationships between the teams and other aspects in the teams’ environment need to be managed; to this effect both a control and a service function are used. Teams contain the service and control of the primary process and the managing system contains the service and control of the teams. Rice states that “the greatest operational efficiency is achieved when the functions of control and service are contained in the managing system of the same order as the operating system controlled and serviced” (1958: 43); in other words, the management and support of production should be positioned as close as possible to the shop-floor operations. The exact border between control and service proves hard to define, since they are both “managerial functions at different places on a continuum” (Rice 1958).

Doorewaard et al. (2002) do not refer to control or service, but discern three types of tasks in the management structure. They name these “three groups of job regulation tasks”; “work preparation”, “work support” and “work control”, based on De Sitter (De Sitter 1994). Doorewaard et al. (2002) discuss to what extent the team is responsible for these regulation tasks, or whether the team leader is in charge of them. With that perspective they consider only a two-order differentiation, with a team level and a team leader level, while Rice (1958) considers the order differentiation of the entire organization, including all hierarchical levels as well as service functions. Both authors relate the management structure to performance. Rice (1958) hypothesizes that “a managing system should contain all the functions necessary for effective performance and that their location outside the system, for whatever reason, decreases effectiveness”. Doorewaard et al. (2002) conclude their study based on the opinions of line managers and HRM staff, with the notion that locating responsibilities at the teams increases the performance. However, the
division of responsibilities between teams and other levels in terms of concrete regulation tasks is not clearly defined by any author (De Sitter 1994; Van der Zwaan 1999). Most authors distinguish only between control located inside or outside the team, while this position outside the team is limited mostly to the level of team manager or coordinator. I conclude that in the literature the management structure of team-based organizations is hardly elaborated.

6.3 Responsibilities and the Management Structure

Trist (1981) mentions how autonomous teams are learning systems and as such increase their decision space. The approach of my study is that teams do not increase their decision space all by themselves, but that control and service have to be delegated first. In my model, I will consider the teams’ responsibilities as this decision space, noting that the concept of team responsibilities encompasses all the regulation tasks that have been delegated from the management structure downward to the team. It is this space, which is actually a property of the management structure, to which teams react in terms of team responsiveness. The important elements of the management structure and the resulting team responsibilities are summarized below:

1. The management structure of an organization has a hierarchy consisting of different orders, containing both operating systems and managing systems.

2. Operating systems, which are work teams that are responsible for a part or the whole of one or more of the primary processes of an organization.

3. Managing systems. Managers throughout the organization control and service the operating systems - not the primary process - by managing the boundaries between teams and their environment.

4. Control and service activities concern specific regulation tasks with certain characteristics that relate to performance objectives.

5. The location of control and service is either in an operating system, a managing system or a functional department.

6. Control and service located with the operating systems determine the team responsibilities, also called the decision space of the team.

Based on the model by Rice (1958) and including the previously discussed elements, a schematic representation can be drawn from the management structure in a team-based organization (see Figure 9). It should be noted that the model does not show the location of regulation tasks (which are defined later in 6.6.1 and in Chapter 7), but only the possible location of control and service regarding specific regulation tasks. The figure represents an example of an organization with three hierarchical levels: teams at the bottom, two management layers and a number of support functions, for instance maintenance and HR. Each two teams are managed by a second order managing system, a team manager for 86
example, while in turn the two managers are positioned under a first order managing system, like a department manager. Each of the systems, operating or managing, contain service and control functions regarding specific regulation tasks. The overall organization is serviced on all three levels by support functions.

Figure 9  Management structure of the team-based organization, based on Rice (1958)

6.4 Characteristics of the Regulation Tasks

So far, the management structure has been described in rather abstract terms, referring to systems, functions and regulation tasks. I also introduced the concept of team responsibilities, being the set of all regulation tasks at team level. In order to empirically investigate the management structure and team responsibilities, a few characteristics need to be determined. Some characteristics can be found in the previously introduced divisions of the mode of control by Van der Zwaan (1999) and De Sitter (1994) (see section 6.1). They indicate the relationship between task complexity, routine/non-routine and intern/extern, and the location of regulation tasks. These characteristics will be further elaborated in the following sections so as to further study the management structure and the resulting team responsibilities.
6.4.1 Complexity of Regulation Tasks

Two aspects need to be considered concerning the complexity of tasks. One is that the level of routine plays a role, and the second important aspect is the boundaries with other teams.

Starting with the first, according to Van der Zwaan (1999) and De Sitter (1994) a task is either routine or non-routine. However, in reality this issue is more complicated, since the level of routine of a task depends on a number of aspects. Molleman (2001; 2002) states that the more questions concerning the what, how, when and who can be answered in advance, the more routine that task is. Two of these issues I discuss elsewhere. “What” refers in my perspective to the specific regulation task that will be determined later. “Who”, on the other hand, refers to the function in the organization where control and service are located, and therefore is dealt with in the following sub-section. “How” and “when” can be translated to two very pragmatic questions to decide the level of routine of a regulation task. The first is how often the task needs to be performed, relating to the frequency; the second concerns the predictability of the task, in other words the knowledge about when the task needs to be performed. Consequently, a task is routine when it has a high frequency and is predictable, and it is non-routine when it has a low frequency and is unpredictable.

The other aspect that indicates the complexity of a regulation task, is whether this task crosses the team boundaries (De Sitter 1994; Rice 1958; Van der Zwaan 1999). For this reason, Rice positions the management exactly on the boundaries between the teams (1958). I refer to this aspect of complexity as the level of dependency (Kuipers & De Witte 2005b), which is similar to Thompson’s concept of interdependence (1967). If a regulation task relates only to an individual team and no interaction with other teams is required to perform this task, the team is independent. However, if interaction with one or more other teams is required, the team is dependent for the performance of this task. The more teams are involved with the same task, the more complex this task is.

6.4.2 The Location of Regulation Tasks

In this section, I will explore the definitions of the service and control function within the management structure, so I can use them in my study. Rice (1958) formally does not define the terms “service and control”, he leaves it up to the organization to regard a function either as service or control. For service he uses the example of production engineering, for control he mentions quality control. However, it is possible that they are regarded as both service and control.

Concerning the location of regulation tasks, two more aspects need to be considered. These are the authority and expertise of tasks. For the purpose of analyzing the management structure, I shall make a further distinction between service and control. I see the service function as specific expertise, while I regard
the control function as authority. In case of quality control there is a certain expertise about what quality is and how to deal with it, besides there is the authority to ensure that a certain quality is delivered. I shall further elaborate on both in this section.

The expertise for a regulation task has to be located somewhere in the organization. This can be at an operating system (a team), a managing system (a team manager), a functional department (like the quality department) or even outside the organization (outsourced services). In comparing expertise to terms that are used in literature, I found two definitions. In terms of Molleman (2000), expertise can be seen as the can modality of teamwork, which expresses “the skills and abilities of the workers”. Karlsson and Åhlström (1996) address this issue by referring to the training given to teams in different functional areas, but also by taking note of indirect tasks11 either performed by the team or by support functions. The question is where the expertise for a certain regulation task is located best to ‘service’ team responsiveness.

The same question is valid for the control function, in my terms, the authority for a regulation task. I regard authority as the formal entitlement of executing regulation tasks (Kuipers & De Witte 2005b). Entitlement is a difficult term which ends in a lot of confusion, not least within the daily affairs of organizations. Authority will be referred to here as being in charge of, or in command of, performing a certain regulation task. It is not the actual execution of regulation tasks that matters here, but the formal authority entitled to make arrangements and final decisions; this to avoid the subtle difference between delegated control and formally entitled control. The term authority shows similarities with Molleman’s may of teamwork modalities (2000), which “has to do with the distribution of control within an organization and refers particularly to local autonomy and decentralized control”. Karlsson and Åhlström (1996) in this respect, refer to the decentralization of authority and relate these to “the number of hierarchical levels in the manufacturing organization”. In other words, authority can be located lower or higher in the organization. Also, authority and expertise need not necessarily be on the same location. It is very well possible, as is the case in most line organizations with support functions, that the formal authority is located in the line of command, while expertise is provided by parallel support functions or even by functions outside the organization, for instance, external consultants.

6.5 Relating Team Responsibilities to Team Responsiveness

In this section, I will focus on the hypotheses surrounding the third research question. What are the management structure’s inputs that generate team responsiveness? Although this question is mainly explorative, some theoretical

---

11 By indirect tasks they mean tasks that do not form part of the production function itself.
assumptions are available to formulate a few hypotheses. These assumptions, which were generally discussed previously in this chapter, are depicted schematically in Figure 10.

Figure 10 shows how the management structure breaks down into the complexity and location of specific regulation tasks. Following Van der Zwaan (1999), it has been argued that location is expected to depend on the complexity of these tasks. The location of regulation tasks can be measured in two ways: the proportional distance of authority and expertise towards teams in the organization, and the total number of regulation tasks delegated to the team. Both indicate the location of team responsibilities, and team responsibilities are expected to have an impact on team responsiveness. The numbers provided in the figure refer to the hypotheses that will be formulated next.

![Diagram of management structure and team responsibilities](image)

**Figure 10** From management structure to team responsibilities and the relationship with team responsiveness

The first assumption is that the complexity of regulation tasks is related to the location of these tasks in the management structure. It is expected that the level of routine and the level of dependence affect the location of the expertise and authority in an organization. I assume that in team-based organizations, complex regulation tasks (infrequent, unpredictable and interdependent) are located higher in the organization, while simple regulation tasks (frequent, predictable and independent) are located lower in the organization. The first hypothesis concerning the relationship between complexity and location of regulation tasks is as follows:

**Hypothesis 8:** The lower the complexity of a regulation task is - in other words, the more frequent, predictable and independent from other teams - the lower the location of expertise and authority will be in the organization.

The complexity of tasks itself is not expected to affect team responsiveness; for complexity does not tell us whether the team is responsible or not, while the
location of a task does. Therefore, the second assumption concerns the effects of
team responsibilities on team responsiveness. Employing the framework of Rice
(Rice 1958) for the management structure, the team responsibilities concern the
location of service and control, which I have translated into expertise and authority.
Teams cannot be expected to fully independently “absorb certain…functions” as
Trist (1981) suggests. Instead, the expertise and authority for these functions
(regulation tasks) are located somewhere in the organization, and as such are
delegated or not to the working team. It is the proportional distance between the
team and the actual location of expertise and authority for a certain regulation task
that determines the responsiveness of teams. Rice (1958) formulated the following
proposition:

“The greatest operational efficiency is achieved
when the functions of control and service are
contained in the managing system of the same
order as the operating system controlled and
serviced.”

The assumption that follows from this proposition is this:

“The inclusion of a control or service function in a
managing system of a different order from the
operating systems controlled or serviced, implies
an organizational weakness (Rice 1958).”

These assumptions refer to the location of authority and expertise for regulation
tasks, which are indicative for the team’s responsibilities. Two sub-hypotheses can
be derived from this in relation to team responsiveness.

Hypothesis 9a: There is a positive relationship between the proximity of
expertise and authority for a regulation task to a team and a team’s
responsiveness, with expertise and authority located closer to the team
resulting in higher levels of responsiveness.

Hypothesis 9b: There is a positive relationship between the number of
regulation tasks that is fully delegated to the team and the team’s
responsiveness.

Hypothesis 9a refers to the management structure indicative for the overall
organization. The proximity, in other words, the distance between the team and the
actual location of the regulation tasks in the organization, is of importance here.
For this hypothesis, I need to consider the actual location of expertise and authority
for each specific regulation task at either the team level, one of the managerial
layers or the functional departments.

For hypothesis 9b, I consider the issue of team responsibilities differently. Here,
the total number of tasks delegated to the team is of importance. The suggestion is
that teams that generally have a higher number of responsibilities show more
responsiveness. By counting the number of tasks for which the team has authority
and for which it has expertise and by relating this to the team’s responsiveness, the hypothesis can be tested.

The hypotheses cannot be specified for each responsiveness dimension, since theory regarding such relationships is not available. Instead, team responsibilities are expected to affect each of the dimensions positively, both in a cross-sectional as well as in a longitudinal model.

### 6.6 Methods and Measures of the Management Structure

Before the hypotheses can be tested, I need to discuss the three steps to be taken in diagnosing the total management system. These steps follow from the model depicted in Figure 10:

1. Determine the most important regulation tasks that are contributing to the performance of the primary process.
2. Determine the complexity of these regulation tasks in terms of frequency, predictability and level of dependence.
3. Determine the location of regulation tasks in the organization, by the proximity of authority and expertise in terms of hierarchical position, and by the total number of tasks delegated to teams.

In the following sections I will discuss each of the steps to be taken, starting with determining the measures for each of the concepts. Subsequently, I will go into further detail regarding the methods used to test the hypotheses.

### 6.6.1 Determining Regulation Tasks

So far I discussed literature that referred rather generally to control tasks or regulation tasks located on team level or team manager level. Each of these publications introduced only some examples of regulation tasks (Van der Zwaan 1999). Trist (1981) provides the example of maintenance as a support service, Rice (1958) mentions production engineering and quality control as examples of control and service functions, and Doorewaard et al. (2002) name a few examples for work preparation, work support and work control tasks. Of course, it is almost impossible to provide a full list of all possible regulation tasks in an organization in general, since this is fully dependent on the type of organization and the primary process to which its regulation tasks should be supportive. Nevertheless, none of the authors introduces suggestions to list an organization’s regulation tasks. As a consequence, I will need to develop a model myself.

The first step is to make an inventory that lists all the main functions in Volvo. I will do this by mapping the organization’s production and support departments and by interviewing key-persons from these departments. The result is a first list of main areas, or functions, and an accompanying set of regulation tasks. Since both Rice
(Rice 1958) and Doorewaard et al. (2002) indicate that regulation tasks need to support the performance of the primary process, I have used Suzaki’s QCDSM (1993), see also 3.2, to determine the most important regulation tasks. I did this by interviewing team managers from every production department and asking them to order the regulation tasks according to the contribution to QCDSM in the production process. They were also asked to extend the list of regulation tasks where required. I then combined these outcomes and determined the crucial regulation tasks to be further considered in the study. To this purpose, I used a combination of a survey and interviews with all team managers from the production departments.

6.6.2 Measures for Complexity

For each of the crucial regulation tasks I shall determine its complexity. In 6.4.1 I have defined the aspects of complexity as a combination of frequency, predictability and the level of dependence.

The most objective method to measure frequency is to ask a team manager to indicate how often the regulation task needs to be performed. On the interview scheme this results in the possibility to write down how many times per hour, day, week, month or year a task need to be executed. Subsequently, the answer is recalculated in numbers per day, with effectively 8 working hours per day, 5 days per week, 20 days per month and 240 days per year.

For predictability it is impossible to use a more or less objective measure, as it was for frequency, and therefore the use of a scale is preferred. This scale ranges from 1 to 4, in which 1 refers to “very predictable” and 4 refers to “very unpredictable”. Since frequency and predictability need to be measured in such different manners, I do not combine the two scales into one variable for “routine”.

Dependency can be measured objectively again. Here it is possible to ask for the actual number of teams involved with the performance of a specific regulation task. It should be noted that this item only refers to teams on the same level, such as production teams, and not to any supporting teams, like those from the quality or maintenance department.

6.6.3 Measures for Location

Authority refers to the location of the formal entitlement to a regulation task in the organization. To start with, I have operationalized proximity of authority by the hierarchical level to which authority is located. Volvo Umeå has five hierarchical levels. At the lowest hierarchical level there is the team (1) as the basic organizational unit. The second level is that of the team coordinator (2), which can be a team group coordinator or a special coordinator for specific tasks, such as maintenance or quality. This latter type of coordinator exists primarily in the body-in-white department, where specific technical expertise is required to work with the welding-robots. The third level is that of the team manager (3). Department
managers that supervise the team managers of the same department belong to the fourth level (4). The highest level (5) is for the plant management. The team managers were asked to indicate on which of these five levels the authority for a regulation task is located.

A different classification of proximity is used for expertise. The division of expertise in the organization cannot be as strict as for authority, since expertise often is shared, whereas formal authority is not. Generally, four different locations of expertise can be distinguished: 1) supporting agents or departments as full experts, 2) supporting agents or departments with support or input from the team, 3) the team with support or input from supporting agents or departments, and 4) the team as full expert. At level 1 the expertise is located fully at a person or department external to the team, while at level 2 this person or department is dependent on input from the team. The latter is a form of shared expertise in which the external department or person is leading. At level 3 the opposite is the case: here the expertise is shared, but it is the team which has the leading expertise and the supporting department or agent only plays a supporting role. At level 4 the team is the autonomous expert and no external inputs are required. The team managers were asked to indicate on which of the four levels the expertise for a regulation task is located.

I have operationalized the location of authority as the number of regulation tasks delegated to the team. Therefore, I will simply count per team for how many tasks the manager indicated a level 1 for authority. I will use the same procedure to count the number of regulation tasks for which the team has the expertise.

6.6.4 Methods and Summary of Hypotheses

Following the steps mentioned in the previous section, I will first make a diagnosis of the management structure, after which I will test the hypotheses. In 2001, I first made an inventory of the regulation tasks to be considered in the analyses of team responsibilities. Since there were only few suggestions in the literature on what kind of tasks there are, I assembled a list of regulation tasks, which were indicated by experts from different functional areas. Subsequently, this list has been verified with team managers from each production department, after which the most important regulation tasks were determined. As the model for the management structure suggests (see Figure 9), the analyses refers only to shop-floor teams. The first reason for doing so is that it is easier in this explorative study to use one set of regulation tasks that can be compared over all teams used in the analyses. The second reason is that many of the regulation tasks refer to functional areas in which other teams are a functioning unit. For example, the frequency of a maintenance task and the interpretation of its location are very hard to compare.

\[12\] Comparable distinctions dividing the nature of expertise can be found in Van Amelsvoort & Scholtes (1994) and Wanrooy (2001).
Responsibilities: Management Structure of the Team-Based Organization

between an assembly team and the maintenance team itself. Therefore, all supporting departments are excluded from the analyses.

In 2002 and 2003 this list was used in questionnaire-sessions with all team managers from the production departments. This questionnaire, which was translated into Swedish, was used in sessions in which all team managers from one production department participated. During these sessions, possible language barriers with the explanation of the questionnaire and interpretations of the respondents’ answers could be overcome by peer-assistance. The managers were asked to determine the frequency, predictability, dependency, location of expertise and location of authority of each regulation task and for each of their teams. However, in cases where the teams are identical in their task and the team manager deals with them equally, the answers on each questionnaire form could refer to several teams at once. The items for the characteristics of the regulation tasks were operationalized previously. An overview of the hypotheses and the used methods of analyses are provided in table 33.

Table 33 Overview of Hypotheses and Analyses for Team Responsibilities and Team Responsiveness

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Complexity</th>
<th>Location</th>
<th>Responsiveness</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Higher frequency, higher predictability, less dependent</td>
<td>Proximity of authority and expertise close to team</td>
<td>Higher joint, job and boundary management</td>
<td>Correlation</td>
</tr>
<tr>
<td>9a</td>
<td>Proximity of authority and expertise close to team</td>
<td>Higher joint, job and boundary management</td>
<td>Cross-sectional and longitudinal regression model</td>
<td></td>
</tr>
<tr>
<td>9b</td>
<td>Higher number of regulation tasks located at team level</td>
<td>Higher joint, job and boundary management</td>
<td>Cross-sectional and longitudinal regression model</td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis 8 is tested with a correlation analysis. Frequency, predictability and the level of dependence for each regulation task are correlated with the location of authority and expertise for that task. If the majority of relationships are significant, the hypothesis is confirmed for the Volvo situation.

Hypotheses 9a and 9b are each tested with a regression model. For hypothesis 9a, the proximity of authority for all regulation tasks are entered into the regression model, and one by one the effects on joint, job and boundary management are tested. The same model is used for the proximity of expertise. The hypothesis is accepted in case the majority of tasks shows a positive and statistically significant relationship, meaning that locations of regulation tasks lower in the organization result in higher team responsiveness.
For hypothesis 9b, the number of regulation tasks for which the team has authority as well as those for which the team possesses the expertise are counted. These total numbers are entered into a cross-sectional and a longitudinal regression model and related to all three dimensions of team responsiveness. The hypothesis is accepted if there is a significant positive relationship between the number of tasks for which the team possesses the authority and the expertise for at least two of the responsiveness dimensions.

The exploration of the relationships between team responsibilities and team responsiveness will take place in the next chapter, ending with a test of the three hypotheses.