

Result-Oriented Team Development Processes: A Longitudinal Study of Self-Managing Work Teams

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ABSTRACT

An extensive literature review of team development literature was carried out, resulting in an overview of three general team processes. These processes, internal relations, task management and external relations and improvement, were explored at more than 150 blue-collar and white-collar self-managing work teams (SMWTs) during a three-year study in a Swedish Volvo plant. The three processes were found consistent over time and appeared to relate to objective performance measures for product quality, number of sick-occasions and long-term sick-leave. Each process showed distinctive effects on one-year-later performance of SMWTs. A result oriented team development approach is proposed, in which the achieved results determine the processes to develop SMWTs.

Keywords: self-managing work teams, team development, team processes, business performance, quality of working life

INTRODUCTION

The popularity of self-managing work teams (SMWTs) has led to several publications in professional journals and the applied press (O'Connell, Doverspike, & Cober, 2002). The focus in several of these publications is on the development of teams towards self-management. The main line of thought in these publications is that the development of SMWTs can be described in distinct linear phases (see e.g. Zenger, Musselwhite, Hurson, & Perrin, 1994; Katzenbach & Smith, 1993; Van Amelsvoort & Benders, 1996). O'Connell et al. (2002) claim that these publications seldom contain empirical support for their ideas on SMWTs.

Although some serious research has been done to investigate these prescriptive ideas of phases (e.g. (Miller, 2003)), the debate on team development in academic journals has focused more on theoretical descriptive frameworks and taxonomies of team processes (see Marks, Mathieu, & Zaccaro, 2001). Unfortunately, these articles are seldom based on real, in-context empirical data. And if they do, as is the case for the work of Gladstein (1984), common work teams instead of SMWTs are studied.

This implies that there is little consensus on the idea of the overall development processes of SMWTs in particular. Although authors agree on the fact that SMWTs may develop in some way towards more self-management, and thereby increased performance and quality of working life, there is by no means agreement on the mode in which this occurs and the type of outputs (performance) that can be expected. In this paper a number of approaches to team development and team performance will be reviewed, as they can be found in the literature. Based on this review a number of team processes can be characterized. These team processes will be related to team performance indicators (product quality and absenteeism) in a study among more than 150 SMWTs at a Swedish Volvo plant. The outcomes indicate possibilities to develop teams in a result-oriented fashion.

TEAM DEVELOPMENT LITERATURE

Several streams in the literature that deal with the subject of developmental processes of teams can be distinguished. In the following sections the important literature for each of these streams will be discussed. Each has its own strengths and weaknesses. However, all of them provide valuable and comparable aspects. Generally the following streams could be found:

- 1 Group dynamic phase models
- 2 Consultancy phase models
- 3 Sociotechnical phase models
- 4 Recurring phase models
- 5 Process models

Group dynamic phase models

Most commonly used and cited in group-dynamics literature (Miller, 2003) is the group development theory by Tuckman (1965), later extended by Tuckman and Jensen (1977). Tuckman built his theory on the conception of ‘interpersonal stages of group development’ and ‘task behaviors’ based on the ‘contention ... that any group, regardless of setting, must address itself to the successful completion of a task. At the same time, and often through the same behaviors, group members will be relating to one another interpersonally’. He based his stages of forming, storming, norming and performing on an extensive literature review of findings in therapy groups, training groups and natural and laboratory groups.

Despite the popularity of Tuckman’s model, there is also some fundamental criticism on phase (or stage) theories like Tuckman’s. This criticism is threefold. The first is that team development often deviates from the sequential steps in phase development (Forsyth, 1999). Groups omit certain phases as defined by Tuckman, move through the phases in different order or develop in ways that cannot be described by Tuckman’s phases (Seeger, 1983). The second is that no exact demarcation between the phases can be placed, because certain group dynamical aspects do not occur through time, nor in sequential order (Arrow, 1997). Thus, teams in practice do not always develop according to clear distinguishable phases. Third, the phases are based on the temporal patterns of time-limited therapy and laboratory groups, and it is questionable whether these patterns well-describe the development of work teams in an organizational setting. As Cohen and Bailey emphasize: “The findings from studies of undergraduate psychology or business students are much less likely to apply to practicing managers, employees or executives” (1997). Further, many of the studies performed in laboratories do not examine the organizational features external to teams (Cohen & Bailey, 1997).

Consultancy phase models

Although Tuckman’s phases have several limitations, the most popular teamwork phase theories use these as a basis. Katzenbach and Smith (1993), for example, define five different phases of team development in their ‘team performance curve’: the team starts with being a working group, and ends by being a high-performance team. Another well-known best practice model by Wellins, Byham, and Wilson (1991), describes a similar method for empowering teams, by increasing levels of job responsibility and authority. Important elements of each of the phase models are: the development of joint accountability, goal direction and performance focus in the team, all related to the team’s group dynamical phases. Although these models are highly prescriptive and poorly defined for scientific use, their role in team development practice should not be underestimated. Offerman and Spiros (2001) report that Katzenbach and Smith’s book on ‘The Wisdom of Teams’ (1993) is the “most commonly cited” book used by both “full-time practitioners” and “academic practitioners”.

Sociotechnical Phase Models

Based on the sociotechnical principles (Morgan, 1993) Van Amelsvoort and Benders (1996) developed a phase model for SMWTs, which is also inspired by Katzenbach and Smith (1993) and Tuckman and Jensen (1977). In every phase, aspects of the sociotechnical concept are involved (cf. Van Amelsvoort et al., 1996; Van Amelsvoort & Van Amelsvoort, 2000; Hut & Molleman, 1998; Kuipers & De Witte, 2005):

- Phase 1; A bunch of individuals with a focus on technical proficiency, implies the broadening of the types of tasks performed. It increases the job content by focusing on the redundancy of functions and multi-functionality. All members of the team must be able to perform the primary tasks of the team.
- Phase 2; The group with a focus on managerial autonomy, implies empowering team members by adding more decision-making authority to their tasks, and thereby increasing the team's responsibility. The principal characteristic of this phase is also called "minimal critical specification" (cf. Morgan, 1993). Managers, from production as well as from supporting departments, delegate some of their responsibilities to the team such as quality and planning activities.
- Phase 3; The team with a focus on social maturity; is described as the 'self-reliance of the team'. The team has to work as a team, and this involves teambuilding, working on communication, and joint decision-making. The team grows in autonomy independent of its supervisor.
- Phase 4; The open team with a performance focus. The principles of this phase are 'double-loop learning', the capacity to solve most non-routine problems. Put differently, it concerns improving one's own initiative, and 'management of team boundaries'. This latter aspect is based on Katz & Kahn (1978) and has to do with building relationships with other teams, customers and suppliers.

Empirical support for the model by Van Amelsvoort & Benders (1996) is very scarce. The authors mention to have investigated 267 teams by a "quick-scan", but the items of this scan and the methods of measurement remain unclear. However, they report that 26% of the teams were just established, 63% were in phase two, 8 % entered phase three and none of them reached the fourth phase.

Hut and Molleman (1998) further developed the previous model by integrating it with the theories of Wellins, Byham, & Wilson (1991) and Campion, Medsker & Higgs (1993). They show that the studied teams cannot be positioned in one single phase at a time. Instead, teams develop in all four phases at the same time. Nevertheless, for three of the sampled four teams the first phase had been developed the most, followed by the second, the third and finally the fourth phase; this overlapping pattern of the phases suggests that teams move from "simple to complex" tasks. A recent larger study, applying the instrument developed by Hut and Molleman (1998) at 37 teams in the automotive industry, also shows a simultaneous development of teams in these phases at the time, however, no particular patterns could be discovered (Kuipers & de Witte, 2005).

Recurring Phase Models

Criticism regarding Tuckman-like successive phase-theories lead to another perspective on phases of teamwork. Many scholars in this field argue that the developmental process is much more complex than a number of sequential phases. Seeger (1983) notes, for instance, that groups move through phases in different orders or develop in ways that cannot be easily described by Tuckman's model. Gersick (1988; 1989) studied the development of groups and introduced two main recurring phases, instead of four or five (Tuckman, 1965; Tuckman & Jensen, 1977). Her punctuated equilibrium model describes an initial phase, which in the mid-point of the group's time-span undergoes a transition, after which the team comes into a certain action phase to reach its deadlines. Gersick's model is an accepted

alternative to Tuckman's phase-theory (Miller, 2003) and as such has delivered input to other models, such as the recurring phase theory by Marks, Mathieu and Zaccaro (2001). Marks et al. (2001) define team processes as "members' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioral activities directed toward organizing task work to achieve collective goals". Their much more descriptive approach is based on the "idea that teams perform in temporal cycles of goal-directed activity, called 'episodes'" (Marks et al., 2001). They describe ten sub-processes that are part of a transition and action phase, called episodes, and interpersonal processes occurring "throughout both transition and action phases, and typically lay the foundation for the effectiveness of other processes". These ten sub-processes are divided over the two episodes and the interpersonal process. The transition phase: mission analysis, goal specification, and strategy formulation and planning. The action phase: monitoring progress toward goals, systems monitoring, team monitoring and backup, and coordination. The interpersonal processes: conflict management, motivation and confidence building, and affect management. Both the theories of Gersick (1988; 1989) and Marks et al. (2001) can be labeled as *recurring phase theories*, with transaction and action taking turns through time for different tasks or sub-tasks.

Process Models

Kuipers and de Witte (2005), as referred to earlier, suggest considering team development not in terms of phases, but instead see these "phases" as simultaneous processes that occur during the existence of a SMWT. In their study, they could not find any support for the linear development of teams in phases either: "very few teams exhibited a linear pattern" (Kuipers & de Witte, 2005). They introduce the term "parallel dimensions", which can be developed separately, as an alternative approach to the same four phases. Their results also show that the development of teams in job enlargement and job enrichment seem to be stronger related to indicators of Quality of Working Life, whereas the dimensions of cooperation and high-performance "seem to be more closely related to the BP (Business Performance) criteria".

Another more process-oriented theory linking teamwork to performance in this context is Gladstein's concept of group processes (1984). In her study among 100 small sales teams (2-4 persons), she showed that her measurement of group processes was clearly dividable into an *intra-group process* and a *boundary management process*. The first includes aspects such as open communication, supportiveness, conflict management and discussion of strategies. The concept of boundary management on the other hand, she defines as the "degree of misunderstanding with external groups" (Gladstein, 1984). She stresses the importance of the difference between the two types of processes: "Clearly, in organizational settings many groups cannot work in the isolation enjoyed by groups in a laboratory setting. These groups need to manage their boundaries and adapt to their organizational environment" (Gladstein, 1984). A strength of Gladstein's theory is that it intends to describe the processes occurring in teams without trying to order what comes first and what comes last. Gladstein (1984) considers the intra-group processes and boundary management as parallel processes.

Dunphy and Bryant (1996), on the other hand, define three team attributes that are "...creating an agenda for team development". These attributes are not directly defined as processes, but easily can be regarded as such. Their three team attributes are: 1) *technical expertise*, 2) *self-management* and 3) *self-leadership*. In technical expertise "team members may broaden their technical skills through multi-skilling to enable them to perform a wider subset of the team's task" (Dunphy & Bryant, 1996). Self-management concerns the delegation of "operational responsibilities" from the manager to the team. Self-leadership involves both elements of cooperation and continuous improvement. Teams developed in this attribute are regarded as the self-governing basic units of the organization, playing a strategic role and providing "better and faster communication both within and outside the team's boundaries" (Dunphy & Bryant, 1996). The authors link their team attributes to three sets of performance outcomes; Costs, Value and Innovation. Like Kuipers and De Witte (2005) and Gladstein (1984), Dunphy and Bryant (1996) emphasize the relationship between their attributes and team performance.

SUGGESTIONS FOR GENERAL TEAM PROCESSES

Concluding on the literature review, one can say that many theories adhere to a phase approach. A number of important critical remarks have been made to these, mostly normative used, phase theories. Findings of previous studies on SMWTs in industrial settings (Hut & Molleman, 1998; Kuipers & de Witte, 2005; De Leede & Looise, 1999) and those of research within the field of group dynamics in general (see e.g. Gersick, 1989) support the idea that teams do not develop in linear phases. This stresses the necessity to review some of the ideas concerning team development and to come to a common and general perspective of what team development is. It is also necessary to take serious notice to the implications of team development on team results. This is because team development should not be a goal in itself, however, is better to be considered as a means to reach certain desired outcomes of teamwork, such as improved business performance and quality of working life. For these reasons the definition of team development processes used in this paper, and which is based on a combination of earlier discussed perspectives, is as following: *Team development is the overall set of group processes reflecting a team's actions and behavior to given tasks, goals and challenges, resulting in desired outcomes of teamwork.*

When going through the previously discussed literature, generally three main processes of team development can be distinguished. Almost all of the authors refer to relational processes between the members of a team; e.g. Katzenbach & Smith (1993) explain the difference between a group and a team by the way team members cooperate, Van Amelsvoort and Benders (1996) refer with their third phase to the social maturity of the team, Marks et al (2001) refer to the team's interpersonal processes and Gladstein (1984) distinguishes the intra-group process from the external relationships of a team. A second process that can be distinguished relates to the degree of self-management of team tasks. Wellins et al. (1991) refer to this by increased levels of job responsibility and authority, which is rather similar to the technical proficiency and managerial autonomy of Van Amelsvoort and Benders (1996) and Dunphy & Bryant's technical expertise and self-management (1996), whereas Marks et al. (2001) refer to this by the action phase. A third process that can be generated from the literature is one regarding the external relations or boundaries of the team; Katzenbach and Smith (1993) call this the high-performing team, Van Amelsvoort and Benders (1996) use the term open team, whereas Dunphy and Bryant (1996) regard this as self-leadership and Gladstein uses the specific terminology of boundary management (1984).

All of the discussed theories put different emphasizes within these general distinguished processes, which together may form a number of aspects each relating to a specific process. In table 1 these team development aspects, which can be found across the presented approaches and theories, are grouped according to previously distinguished main processes.

Table 1 Literature overview of aspects of team development and the relation with team results

| Aspect | Characterization | Authors | Model type | Performance orientation |
|---------------------------|--|---|------------|--|
| <i>Internal relations</i> | | | | |
| Goal orientation | Determining team goals | Katzenbach & Smith (1993), Marks et al. (Marks et al., 2001), Wellins et al. (1991) | 2,4 | Self-reported effectiveness, work satisfaction, customer |
| Planning activities | Team planning of work and support activities | Wellins et al. (1991), Dunphy & Bryant (1996), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 2,3,4 | satisfaction (Gladstein, 1984), value creation (Dunphy & Bryant, 1996) |
| Feedback | Motivation, assessment and constructive feedback in task performance | Marks et al. (Marks et al., 2001), Gladstein (Gladstein, 1984), Hut & Molleman (1998) | 3,4,5 | |
| Conflict | Handling cooperation | Marks et al. (Marks et al., 2001), Gladstein | 4,5 | |

| | | | | |
|---|--|---|---------|--|
| management | and behavior problems | (Gladstein, 1984) | | |
| <i>Task management</i> | | | | |
| Multifunctionality | Task flexibility and appliance of multi-skilling | Dunphy & Bryant (1996), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 3,5 | Affective & behavioral responses (Dunphy & Bryant), work satisfaction (Gladstein, 1984), individual performance, costs, value creation (Dunphy & Bryant, 1996) |
| Delegated management & support tasks | Carrying out and arranging routine production support activities | Wellins et al. (1991), Dunphy & Bryant (1996), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 2,3,5 | |
| Work communication | Sharing work-related information | Gladstein (Gladstein, 1984), Wellins et al. (1991), Van Amelsvoort & Benders (1996) | 2,3,5 | |
| Decision making & control | Joint performance of managerial tasks | Wellins et al. (1991), Dunphy & Bryant (1996), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 2,3,5 | |
| Performance management | Actions to improve the team's performance | Katzenbach & Smith (1993), Marks et al. (Marks et al., 2001), Wellins et al. (1991), Dunphy & Bryant (1996), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 2,3,4,5 | |
| <i>External relations and improvement</i> | | | | |
| Improvement activities | Initiating and supporting product and process improvements | Katzenbach & Smith (1993), Marks et al. (Marks et al., 2001), Wellins et al. (1991), Dunphy & Bryant (1996), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 2,3,4,5 | Self-reported effectiveness, work satisfaction, customer satisfaction (Gladstein, 1984), innovation (Dunphy & Bryant, 1996), 'high performance' (Van Amelsvoort & Benders, 1996; Wellins et al., 1991; Katzenbach & Smith, 1993) |
| Customer & supplier relations | Maintaining relations with internal and external customers | Gladstein (Gladstein, 1984), Katzenbach & Smith (1993), Wellins et al. (1991), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 2,3,5 | |
| Advanced management & support activities | Carrying out and arranging non-routine production support activities | Wellins et al. (1991), Dunphy & Bryant (1996), Van Amelsvoort & Benders (1996), Hut & Molleman (1998) | 2,3,5 | |

* 2 Consultancy phase models; 3 Sociotechnical phase models; 4 Recurring phase models; 5 Process models

The processes labeled in table 1 can be defined as following:

The first process is based on Gladstein's intra-group process (1984) and the team's social maturity by Van Amelsvoort and Benders (1996). This process will be referred to as the *internal relations* of the team and shows the internal cooperation and common accountability of the team. Internal relationships include all activities that potentially connect the members as a team, such as goal orientation, planning activities, as well as the relational processes of feedback and conflict management.

The second process relates to the task-dimension by Hut and Molleman (1998) and to Dunphy & Bryant's (1996) technical expertise and the part of their concept of self-management related to increased responsibilities. This process will be referred to by *task management*, which stands for the extent to which the team manages the broadening and deepening of its function. It includes aspects of both job enlargement and job enrichment, such as multifunctionality, delegated management support tasks and decision making and control. Also it includes basic work-related communication and performance management.

The third process relates to Dunphy & Bryant's self management (1996), Gladstein's boundary management (1984) and the outwards directed side of Hut & Molleman's final dimension (1998). This process will be referred to as *external relations and improvement* meaning the extent to which the team explores and develops its boundaries. As such it is broader defined than Gladstein's concept of boundary management. She defined this as the degree of misunderstanding between the

team and individuals and groups outside, whereas in this paper besides customer and supplier relations, improvement activities and the advanced managerial and support function of the team are involved.

TEAM DEVELOPMENT AND PERFORMANCE

Each of the development theories introduced earlier in this paper mention the performance of teams implicitly or explicitly as a result of one or more of the stages or attributes a team goes through. Katzenbach and Smith's learning performance curve (1993) and Dunphy and Bryant's connection between team attributes and team performance are the clearest examples in this case. But also Tuckman (1965) calls one of the team stages 'performing'. However, most of the authors remain unclear about which performance can be reached, what can be expected. Unfortunately the relationship between team development and results is hardly defined and has little empirical basis. In the last column of table 1 the team results are listed that in the discussed team development literature are mentioned as outcomes of the defined aspects.

Generally, we can differentiate between two types of team results (cf. Dunphy et al., 1996; Kuipers & de Witte, 2005). One is the quality of working life (QWL); referring to the well-being of people in organizations, in terms of absenteeism, satisfaction, involvement and more. The other is business performance (BP), also called organizational performance, referring to indicators such as product quality, productivity, costs and delivery precision.

Researchers complain about the lack of studies available on objective team performance (cf. Dunphy et al., 1996) and the difficulties with obtaining suitable objective outcome measures (cf. Parker, 2003). Nevertheless, empirical studies using appropriate measures are important to prove to managers the potentials of teamwork in terms of performance (Dunphy et al., 1996). Therefore this paper focuses on the relationship between team development and objective measures for both QWL and BP.

Marks, et al. (2001) state that "interpersonal processes ... typically lay the foundation for the effectiveness of other processes". The relations found by Gladstein (1984) between intra-group processes and self-reported group effectiveness support this idea; Campion et al. (1993) also report "the importance of proper group processes to the functioning of effective work groups". In line with these arguments, positive relationships can be expected to be present between the internal relations of SMWTs and both their BP and QWL. The expectation is that especially external relations and improvement will affect BP, because in the literature its aspects are often related to high performance (Van Amelsvoort et al., 1996; Wellins, Byham, & Wilson, 1991; Katzenbach et al., 1993), customer satisfaction (Gladstein, 1984) and innovation (Dunphy & Bryant, 1996). Historically job related aspects have always been connected with the quality of working life (QWL). Hackman & Oldham (1980) reported positive effects of job enlargement and job enrichment on motivation, quality of work, satisfaction and turnover, and so did many other studies (cf. Yeatts & Hyten, 1998). Yeatts & Hyten report that especially enriched work environments have shown consistently in all those studies to have positive effects on employee satisfaction (1998, p. 249). Also Parker (2003) shows in a longitudinal study how due to the introduction of lean production practices lower "job autonomy, skill utilization and participation in decision making" have negative effects on the well-being of employees. In other words, development in task management is first and most of all expected to affect QWL (see also table 1).

In the next steps of this paper first the three distinguished team processes with their underlying aspects, will be explored at a practical setting. Subsequently, each of the processes will be related to measures for BP and QWL.

METHODS

With a one year intermediate period questionnaire data were collected during three measurements among 2200 employees of more than 150 SMWTs in a Volvo Trucks plant in Sweden. Response rates for 2001, 2002 and 2003 were subsequently 73%, 76% and 68%, while data were obtained for respectively 152, 168 and 167 teams. The vast majority of employees and teams are production teams (about 75% of the population) working in one of the five production departments (blue-collar teams) of the plant. The remaining 36-38 other teams were service and supporting teams (white-collar teams), ranging in function from engineering to financial administrators. Paper questionnaires were used for this study, which were spread by the team managers and answered during working time at one of the weekly team meetings.

For BP and QWL objective measures were used, that were provided by Volvo. BP data were available only for blue-collar teams, whereas data for QWL were available for both blue-collar and white-collar teams. Unfortunately, these performance data were not available for all teams.

To explore the three team processes the data for all teams between 2001-2003 are compared with a factor congruency test. The relationships between the three processes and BP and QWL are tested by longitudinal regression models: the scores of team processes in 2001 serve as input to BP measures in 2002 and average QWL measures over the period 2002-2003. The sample size for these latter analyses are dependent on the availability of data (see also below).

MEASURES

The questionnaire consists of 46 self-reported Likert-type items (1 = “strongly disagree”, 5 = “strongly agree”) based on the aspects as mentioned in table 1 and originating from Hut and Molleman (1998), the Work Groups Effectiveness Model by Campion et al. (1993), De Leede and Looise (1999) and (Kuipers et al., 2005). These items (table 2) cover the previously defined twelve key-aspects. The table provides an overview of the number of items used for each aspect, example items, and the Cronbach’s Alpha’s calculated for each aspect (showing sufficient reliability) per year of measurement. The items specifically reflect actions and behavior of teams, in other words, *no* items refer to emergent states (cf. Marks et al., 2001) or actions and behavior of *individual* team members.

Table 2 Measures for team processes

| Key-aspects | No. of items | Example item | Cronbach’s alpha’s* |
|--------------------------------------|--------------|--|---------------------|
| <i>Internal relations</i> | | | |
| Goal orientation | 2 | Team goals are formulated by the team and based on the company’s goals | .76, .76, .74 |
| Planning activities | 4 | The team formulates its own weekly production plan | .79, .76, .78 |
| Feedback | 3 | The team members address to each other in case of mistakes in the task performance | .70, .63, .67 |
| Conflict management | 4 | The team members solve internal cooperation problems without management interference | .78, .77, .81 |
| <i>Task management</i> | | | |
| Multifunctionality | 5 | The team members often interchange tasks | .78, .77, .79 |
| Delegated management & support tasks | 4 | The team carries out the routine maintenance | .74, .75, .75 |

| Key-aspects | No. of items | Example item | Cronbach's alpha's* |
|--|--------------|--|---------------------|
| Work communication | 2 | The team members share information about the work | .64, .70, .66 |
| Decision making & control | 6 | The team divides the tasks | .76, .84, .86 |
| Performance management | 3 | The team acts on mistakes | .68, .67, .70 |
| Improvement activities | 4 | <i>External relations and improvement</i> The team members often take initiatives for improvement | .76, .76, .77 |
| Customer & supplier relations | 4 | The team solves problems with internal customers | .87, .86, .88 |
| Advanced management & support activities | 5 | The team arranges back-up and support when necessary | .69, .72, .73 |

* The samples range between n=1293 (lowest in 2001) and n=1507 (highest in 2002)

Also three objective performance measures were used (see table 3); one for business performance (product quality) and two for quality of working life (number of sick-occasions and long-term absenteeism). Unfortunately, these measures were not available for all teams. The measure used for product quality, only used for production teams, is a percentage of so-called Direct OK, which is the percentage of products that are produced without any faults the first time by a particular team. The product quality figure is an average measure for the product quality delivered by a team during the same weeks as the questionnaire was answered. For sick leave Volvo offered data on the number of sick occasions and the percentage of long-term sick leave in the organization. The data for sick-leave are only available as averages for an entire year period. This period starts on the date that the questionnaire was answered and lasts for the whole year-after period. Both measures are available for both blue-collar and white-collar teams. For 73 teams (43% of the total number of teams) data about product quality could be collected, whereas for 57 teams (34% of the total number of teams) data could be collected about sick leave.

Table 3 Data on Business Performance and Quality of Working Life (average per team)

| | | 2002 | 2002-2003 |
|--------------------------------------|------|-------|-----------|
| Product quality | n | 73 | |
| (Blue-collar teams) | M | 91.96 | |
| | s.d. | 4.79 | |
| Short term sick-leave | n | | 57 |
| (Blue-collar and white-collar teams) | M | | 2.39 |
| | s.d. | | 1.70 |
| Long term absenteeism | n | | 57 |
| (Blue-collar and white-collar teams) | M | | 1.25 |
| | s.d. | | 2.43 |

n = number of teams; M = mean; s.d. = standard deviation

RESULTS

Factor analysis team development

With the 46 items for team processes a factor analysis (principal components) was carried out for each year of measurement separately. The varimax rotated solution resulted in a total of three factors (see appendix). A factor congruency test has been carried out with the formula of Gorsuch (1974), in order to test if the three factors are similar for each of the years of measurement. Outcomes of 2001 were compared with those of 2002, of 2001 with 2003 and the outcomes of 2002 with those of 2003. The outcomes for each of those three tests had respectively a congruency of .98, .96 and of .98, therefore all scores are clearly above .9, the minimum level for claiming replication of the factors (Gorsuch, 1974). The explained variance for each of the three factors lies between 10 and 20 percent per year, with a total explained variance for all three factors between 41 and 43 percent per year. Finally a Cronbach Alpha analysis of reliability showed that each of the three item-scales had a score above 0.8, for each of the years (see appendix). The three factors found by the factor analysis confirm the previously defined team processes.

Effects on team performance

The results of the regression model in table 4 show a significant positive relationship between two of the team processes and the level of product quality in a team. Both the level of task management and external relations and improvement in 2001 positively relate to one-year later product quality. The expectation that especially external relations are of importance for product quality seems to be right, although it appears that task management has a slightly stronger effect. The SMWTs craftsmanship owing to job management, and its customer and improvement orientation as a result of external relations, may make the team deliver higher quality products.

The regression models for absenteeism were statistically controlled for an effect of blue-collar versus white-collar workers. It appears that only in case of the number of sick-occasions there is a significant difference between the two types of SMWTs. Generally blue-collar teams score higher numbers of sick-occasions than white-collar teams, whereas for long-term absenteeism no significant difference was found.

External relations and improvement seems to have a significant negative relationship with the number of sick-occasions; i.e. higher scores for external relations are related to lower one-year later sick-occasions numbers. No other significant relationships were found for this sick-leave measure. Maintaining customer-supplier relationships may make people more committed to be at work and to decide less easy to stay home in case they do not feel that well. They might feel more responsible, if not pressured, to be at work to satisfy the customers' needs. Also improvements in the process, initiated by the team through external relations, may also contribute to a healthier working place.

Internal relations show a significant negative relationship with long-term absenteeism. This team process seems to be the only process with a significant effect with higher scores for internal relations related to lower one-year later long-term absenteeism. The internal relations and the group attitude might help to prevent long-term sick leave in earlier stages, since team members pay attention to each other. For the same reason it might help to avoid from going from short-term sick leave to long-term sick leave, when there is a feeling that the team cares for you and you care for the team.

Although especially task management was expected to relate to both measures of absenteeism, it appears that this expectation cannot be supported by the data. Instead, both external and internal relations seem important indicators for team absenteeism.

Table 4 Regression results for one-year-later BP and QWL measures

| | Product quality | Number of sick- occasions | Percentage of long- term absenteeism |
|----------------------------|-----------------|------------------------------|---|
| | β -values | | |
| Control: Blue-collar teams | n.a. | .603*** | .311 |
| Internal relations | -.019 | -.057 | -.368* |
| Task management | .311** | -.145 | -.086 |
| External relations | .308** | -.394** | .017 |
| df | 47 (3) | 42 (4) | 42 (4) |
| R ² | .279 | .794 | .211 |

*p<.05, **p<.01, ***p<.001

CONCLUSIONS AND DISCUSSION

In this paper some important theories concerning team development were discussed. By combining related issues that were found across several of the theories a model was suggested to characterize team development by three processes, involving behavior and action of teams. These processes, *internal relations*, *task management* and *external relations and improvement*, were supported by data of more than 150 SMWTs in production and service at a Volvo plant in Sweden. Also, they were tested for their longitudinal relationship with objective team performance indicators for BP and QWL. The results show how each of the processes might have its own distinct effects on different indicators.

Further research will need to involve other objective performance indicators of QWL and BP, to make a more general application of the model possible. Organizations are also interested in improving costs, productivity and delivery precision and it is important to know for them if and how internal relations, task management and external relations may have an effect on other team performances as well. Further research will also be necessary to conduct in other types of organizations. Despite the fact that different types of teams are involved in this research, from different types of production departments and supporting departments, a more general approach to team development will gain from studies carried out in other settings as well, such as healthcare or commercial service industries.

The relationship of the three processes with product quality and absenteeism, presented in this paper, emphasized the importance of team development for long term team results. If the three processes will be related to more team results, i.e. including other indicators for BP and QWL, this also means that a different approach for the development of teams can be taken. Dunphy and Bryant (1996) already suggested that for different aspects of performance, different accents in team development are required. An organization then can concentrate on developing those processes that will improve specific performance that currently is needed in the organization. Where phase theories are specifically meant to go through the full range of phases, performance related dimensions can be accentuated separately.

A phase approach (e.g. Tuckman, 1965; Van Amelsvoort & Benders, 1996; Wellins, Byham, & Wilson, 1991; Katzenbach & Smith, 1993) on the other hand, might easily result in considering team development as a goal in itself. The steps to go through become the goal. Instead team development should be considered as a means to reach better team results, both in terms of business performance (BP) and quality of working life (QWL).

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APPENDIX - Factor analyses of team responsiveness dimensions (rotated factor loadings in absolute values)

| items | 2001 | | | 2002 | | | 2003 | | |
|----------|--------------------------|------------------------------|------------------------------|--------------------------|------------------------------|------------------------------|--------------------------|------------------------------|------------------------------|
| | Factor 1 Task mgt. | Factor 2 External rel. | Factor 3 Internal rel. | Factor 1 Task mgt. | Factor 2 External rel. | Factor 3 Internal rel. | Factor 1 Task mgt. | Factor 2 External rel. | Factor 3 Internal rel. |
| task01 | .598 | | | .485 | | .424 | .505 | | .356 |
| task02 | .562 | | | .460 | | .386 | .458 | | .352 |
| task03 | .340 | | .451 | .438 | | | .468 | | |
| task04 | .647 | | | .502 | | | .564 | | |
| task05 | .596 | | | .447 | | | .458 | | |
| task06 | .706 | | | .513 | | .333 | .563 | | .359 |
| task07 | .673 | | | .635 | | | .653 | | |
| task08 | .630 | | | .631 | | | .676 | | |
| task09 | .370 | | | .636 | | | .662 | | |
| task10 | .617 | | | .566 | | .331 | .580 | | .316 |
| task11 | .556 | | | .467 | | .385 | .512 | | .365 |
| task12 | .500 | | .323 | .474 | .323 | | .487 | | .345 |
| task13 | .517 | | .348 | .504 | .362 | | .496 | .328 | .385 |
| task14 | .494 | | | .672 | | | .700 | | |
| task15 | .458 | | .304 | .573 | | | .581 | | |
| task16 | .591 | | | .633 | | | .664 | | |
| task17 | .482 | | | .539 | | | .522 | | |
| task18 | .491 | | | .540 | | | .599 | | |
| task19 | .526 | | .383 | .380 | | .352 | .499 | | .406 |
| task20 | .545 | | .336 | .462 | | .367 | .602 | | |
| task21 | .478 | .360 | | .489 | .404 | | .580 | .370 | |
| ext01 | | .711 | | | .686 | | | .701 | |
| ext02 | | .829 | | | .807 | | | .827 | |
| ext03 | | .709 | | | .686 | | | .726 | |
| ext04 | | .838 | | | .807 | | | .825 | |
| ext05 | | .642 | | | .657 | | | .659 | |
| ext06 | | .702 | | | .686 | | | .698 | |
| ext07 | | .379 | | | .541 | | | .481 | |
| ext08 | | .596 | | | .671 | | | .613 | |
| ext09 | .417 | .426 | | .393 | .434 | | .538 | .388 | |
| ext10 | | .464 | .398 | | .483 | | | .457 | .357 |
| ext11 | | | .429 | | .365 | | | .410 | |
| ext12 | .389 | .463 | .308 | .327 | .462 | .337 | .416 | .452 | |
| ext13 | .390 | .459 | | .350 | .465 | .330 | .403 | .452 | .337 |
| int01 | | | .577 | | | .319 | | .330 | .435 |
| int02 | | | .772 | | | .406 | | .318 | .480 |
| int03 | | | .716 | | | .452 | .345 | | .438 |
| int04 | | | .411 | | | .448 | | | .498 |
| int05 | .568 | | .361 | .326 | | .631 | .376 | | .612 |
| int06 | .483 | | .373 | .339 | | .478 | .422 | | .403 |
| int07 | .493 | | .380 | | | .665 | | | .689 |
| int08 | .460 | | .375 | | | .609 | .316 | | .651 |
| int09 | .442 | | .424 | | | .689 | | | .701 |
| int10 | .321 | | .499 | | .371 | .432 | .371 | .328 | .350 |
| int11 | .479 | | .493 | .343 | | .547 | .494 | | .424 |
| int12 | | | .431 | | | .542 | | | .615 |
| α | .9054 | .8724 | .8641 | .9179 | .8832 | .8480 | .9274 | .8878 | .8648 |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Factor loadings smaller than .30 are suppressed.

Loadings in bold indicate to which factor the item was assigned.

α = Cronbach's alpha's for scales