
Innovation, improvement and operations: an exploration of the management of alignment

Jan de Leede, Jan C. Looise
and Ben C.M. Alders

Faculty of Technology & Management, University of Twente,
PO Box 217, 7500 AE Enschede, The Netherlands
E-mail: j.deleede@sms.utwente.nl

Abstract: Based on the assumption that the three functions of operations, improvement and innovation within companies need to be aligned to improve company performance, this article addresses two internal alignment mechanisms: structural and social-dynamic alignment. A survey of 267 companies confirms that successful companies use non-functional organisational structures to align the three functions. Case studies of three firms suggest that alignment can be characterised as exchange relationships between people representing the three functions. They show in more detail how alignment can be achieved. It appears that both structural and social-dynamic aspects, such as power and trust, play a significant role.

Keywords: Operations; improvement; innovation; structural and social-dynamic alignment; non-functional structures; survey; case study.

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Biographical notes: Jan de Leede (1968) is an Assistant Professor in Human Resource Management at the faculty of Technology and Management, University of Twente. In 1997 he finished his doctorate thesis on the contribution of self-managing teams in manufacturing companies to improvement and innovation. His current research interests are in participation, innovation, teamwork and flexible labour. In 1999 he was a visiting researcher at the University of Strathclyde, Glasgow, Scotland.

Jan Kees Looise (1949) is a Professor in Human Resource Management at the Faculty of Technology and Management at the University of Twente and head of the department of Human Resource Management. He holds an MA in Organisational Sociology from the Free University, Amsterdam, and a PhD in Management from the University in Twente. Before he joined Twente University, he worked as a research officer and policy advisor for the Dutch Trade Unions for ten years, and as a project leader of a large research project on works councils on behalf of the Dutch Ministry of Labour for three years. He has published extensively on worker participation, industrial relations, human resource management, labour flexibility and social aspects of innovation.

Ben Alders (1956) is a Senior Project Manager at TSM Business School, and responsible for developing contract research projects with a particular interest in SMEs. In the past he has been involved in a large number of research projects with a micro-economic (production organisation, labour organisation, HRM) and meso-economic focus (economic sector studies).

1 Introduction

Daily practice in today's business world shows – if you want to see it – a continuous struggle to integrate operational activities with improvement and innovation activities. The linkages between the routine operational activities and the non-routine improvement and innovation activities are manifold, and not easy to manage. The traditional business solution is to allocate responsibilities for these activities separately to three different kinds of departments: production (operational activities), support (improvement activities) and R&D (innovation activities). This functional organisation type with a high degree of departmentalisation is still common. However, more integrative organisational forms are becoming more common, or at least companies are trying to use them.

The history of organisation theory reflects this quest for better alternatives for the mechanical, functional type of organisational structure. Examples of this are Burns and Stalker [1] with their organic structure, and the sociotechnical systems perspective of Trist [2] and many others. Modern innovation literature does not prescribe a departmental allocation and separation of the three activities. The key is integration [3–5], which means that the operational, improvement, and innovation activities are performed within one independent unit. However, it is still unproven whether integration is desirable or even possible. In most companies, the three departments still exist, despite decades of pleas for integration!

Our position in this debate is that for an organisation to be an effective one, the three functions (operations, improvement and innovation) need to be aligned rather than separated or integrated. Complete separation of the functions will not be effective, as is demonstrated by the functional 'throw-over-the-wall' approaches to new product development [6]. More integrated, non-functional approaches are needed. But integration of what, and to which degree? *Total integration* of the three functions may not be feasible in many cases and are at the expense of the efficiency of functional departments. Still, the three functions need to be aligned. This means that the three activities need to complement, support, and fit with each other. This alignment needs to be organised and managed. In this article we want to contribute to the conceptualisation and the practice of the management of alignment. Our central research problem is as follows: *how do successful companies organise and manage the alignment of operations, improvement, and innovation?*

This article is organised as follows. First, in the theoretical framework (section 2), the concept of alignment is defined and related to other literature. Then the research methods are outlined (section 3). Next, the basic assumption of this article (alignment of operations, improvement and innovation leads to better performance than separation or integration) is tested in a survey (section 4.1). Subsequently, the concept of alignment is further clarified in the analysis of three cases in which self-managing teams are used in operations (section 4.2). The article is concluded with a discussion of the results (section 5) and implications for practice and theory (section 6).

2 Theoretical framework

What do we mean by alignment? The concept of alignment is very much related to the concept of fit, which is considered to be a fundamental concept underlying both the practice and theory of strategic management [7,8] and organisation theory [9].

The basic distinction between ‘process’ and ‘content’ in theories of strategic management implies two different conceptualisations of fit. *Process theories* view strategy as the process of aligning the organisation and the environment and outline the processes of strategy formulation and implementation. Strategising then is the structuring of the patterns of interactions or series of decision steps needed to arrive at a desired match between the organisation and the environment. Content theories view strategy as one of the elements to be added to and fitted with other system elements. In this school, the focus is more on the content of the strategy, specifying the strategic actions to be taken in order to match organisations and environment effectively. Furthermore, Venkatraman and Camillus [8] present three different domains of fit: external, internal and integrated. The external domain of fit is mostly addressed by strategy formulation, while the internal domain of fit relates to the strategy implementation. The integrated domain of fit includes both domains.

The notion of ‘fit’ is also central to contingency theories of organisation [9]. Contingency theory explores the fit between the structure of an organisation with certain contextual factors (culture, environment, technology, size and task). Drazin and Van de Ven [9] distinguish three conceptualisations of fit, stemming from three approaches, which they label the selection, interaction and systems approaches. For the selection approach, fit is the assumption underlying some congruence between context and structure. The interaction approach has a more complex conceptualisation of fit, regarding it as an interaction effect of both context and structure, which affects the performance of the organisation. Within the systems approach, the concept of fit acknowledges the multiple contingencies, the many structural alternatives and the broad set of performance indicators influencing context-structure-performance relationships. For this approach, several structural alternatives can be equally effective, with each configuration (a combination of structure, process, culture, technology, size and task) being internally consistent and with each configuration externally consistent with the environment [10].

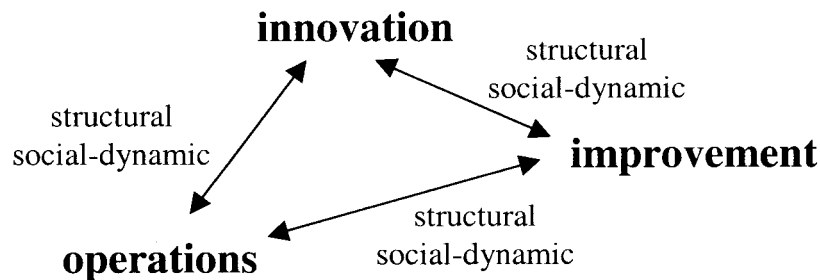
In this article, we limit ourselves to the internal fit between three functions: operations, improvement and innovation. We are interested in how companies have organised and managed the fit between these three functions. We try to understand why the three functions fit with each other or not. Of course, there is a very important link between each of the functions and the environment. However, we only look at a limited number of performance indicators indirectly related to the external environment (growth of turnover and number of employees) and focus on the degree of internal fit. The primary objective of the research is to identify and assess the degree of fit, and to develop a better understanding of the alignment of the three functions.

Limiting ourselves to the internal fit is not enough, given the immense variety of elements to be considered, such as goals, technical and social processes, organisational arrangements, tools and techniques. One further restriction is therefore the focus on the structural and social-dynamic aspects of internal fit (see Figure 1).

Structural alignment refers to the formal linkages set up between the functions of operations, improvement, and innovation. It includes the division and coordination of activities as it is implemented through job design, group design, and organisation design. Extra-organisational factors are not considered in this article. Social-dynamic alignment refers to the social and informal aspects concerning these linkages and includes the power and trust relationships within and between the three functions. In this article we refer only

to intra-organisational alignment mechanisms [11–13] that organisations put into place to attain both structural and social-dynamic alignment.

Figure 1 Structural and social-dynamic alignment of operations, improvement and innovation



Our basic hypothesis is that the better the structural and social-dynamic alignment, the better the overall performance of all the three functions: operations, improvement and innovation. This seems to be obvious, leading to the more interesting question: *What intra-organisational mechanisms do successful companies use to organise and manage structural and social-dynamic alignment between operations, improvement and innovation?*

3 Research methods

In this article we draw upon two studies, a survey and an in-depth multiple-case study. The survey is used to get a preliminary understanding of the relationship between alignment and success. The case study adds to this by showing in detail how alignment can be organised and managed, and what aspects play a significant role in striving for structural and social-dynamic alignment. This is necessary to further develop understanding of the nature of structural and social-dynamic alignment.

3.1 The survey

The survey was aimed at identifying characteristics that discriminate high-performance from low-performance organisations. High-performance organisations are defined as organisations with an above average growth in sales of five years (1992–1996). This is calculated by using the adjusted growth index (AGR) that is: $(\text{sales}_{1996} - \text{sales}_{1992})^{0.25} \times ((\text{sales}_{1996} - \text{sales}_{1992}) / \text{sales}_{1992})$ see [14]. Low-performance organisations have an AGR of less than 0.5 (N=57), high-performance organisations have an AGR of 8.0 or more (N=80). To reach an AGR of 8.0 or more, a company (with sales of 20 million) has to realise an annual sales growth of at least 4.3%. Company size in the years after 1992 is relative to size in 1992. In order to make the findings more informative, we distinguished a sub-group within the high performers, called the super-high performers. These super-HPOs have an AGR on sales of at least 10.0 and an AGR on employees of at least 2.5. The group of 139 companies (50%) between LPO and HPO is not addressed in this

article, as it is our intention to show the differences between low and high performing companies in dealing with alignment issues. The extremes are more illustrative on this point than the average performers.

The study was based on a questionnaire and involved telephone interviews with the CEO or production manager of 276 industrial and service companies in the Netherlands [15]. In Table 1, the companies are classified according to size and AGR-sales.

Table 1 Characteristics of the companies included in the survey

<i>Size (number of employees in 1996)</i>	<i>1–99</i>	<i>100–199</i>	<i>>200</i>	<i>Unknown</i>	<i>Total</i>
	139 (50%)	47 (17%)	82 (30%)	7 (3%)	276
<i>AGR on sales</i>	<i><0.5 (LPO)</i>	<i>0.5 – 8.0</i>	<i>>8.0 (HPO) of which >10.0 (super HPO)</i>		
	57 (21%)	139 (50%)	80 (29%)	20 (7%)	

In the questionnaire, seven key processes are distinguished, ‘market and competition strategy’, ‘management’, ‘organisation structure and job design’, ‘product and process innovation’, ‘collaboration and networking’, ‘human resource management’ and ‘export strategy’, respectively. Here, we report only on those variables close to the concepts of structural and social-dynamic alignment. These variables pertain to the key processes ‘organisation structure and job design’, ‘product and process innovation’ and ‘human resource management’.

3.2 The case studies

The second study reported here is a multiple-case study involving three manufacturing companies. This study examined the contribution of shop floor teams to improvement and innovation [16]. The focus of the study was on the alignment of shop floor teams with their relevant environment. The contribution of the teams was measured using surveys among the team members themselves, as well as assessments of managers and staff from support departments. The characteristics of the teams, the processes of improvement and innovation were investigated using observation, company documentation, and analysis of interviews with team members, staff and management. The case studies were carried out between 1994 and 1996.

4 Results

4.1 Results of the survey

4.1.1 Organisation structure and job design

Here, the analysis produced two interesting findings. First, the high-performance organisations (HPO) structure appears to differ significantly from the structure of the LPOs (see Table 2). Fifty-four percent of the LPOs have a functional structure in place, compared to only 35% of the HPOs. Super-HPOs changed their structure even more into

non-functional ones: 11% of super-HPOs have product/process based structures and 63% have a hybrid form in place. However, HPOs did not transform their functional structure to a pure process-based or product-based structure, but tend to prefer a hybrid form in between a functional and process-based structure. Company size is an important co-varying variable: in small (0–99 employees) and medium-sized (100–200 employees) companies we found no significant relationship between HPOs and LPOs. For the big companies, the data suggest a stronger positive relationship with hybrid forms than with pure product/process based forms. Furthermore, with respect to job-design, the results indicate that supporting tasks (planning, maintenance, administration, quality control) are part of the tasks of all shop floor workers in most pure product/process based companies.

Table 2 Organisation structure and AGR on sales

	<i>Size</i>	<i>LPO</i>	<i>HPO</i>	<i>super HPO [17]</i>	<i>Average</i>
Functional structure	0-99	55%	53%	29%	
	100–199	67%	36%	0%	
	>200	43%	19%	27%	
	<i>Average total</i>	<i>54%</i>	<i>35%</i>	<i>26%</i>	<i>48%</i>
Product/process based structure	0-99	16%	16%	14%	
	100–199	22%	18%	0%	
	>200	21%	15%	9%	
	<i>Average total</i>	<i>19%</i>	<i>16%</i>	<i>11%</i>	<i>17%</i>
Hybrid form	0-99	29%	32%	57%	
	100–199	11%	46%	100%	
	>200	36%	65%	64%	
	<i>Average total</i>	<i>28%</i>	<i>49%</i>	<i>63%</i>	<i>35%</i>

The second interesting finding is the use of structural alignment mechanisms, such as cross-functional teams, quality control circles and job-rotation. We found no correlation between the use of cross-functional teams and job-rotation, and AGR on sales. There is a negative correlation between the use of quality control circles and AGR. This indicates that HPOs use quality control circles less often than LPOs. Again, size is an important co-varying variable: big HPOs make use of all three alignment mechanisms more often than small HPOs do (see Table 3). This finding suggests that in smaller companies, the need for formal alignment mechanisms is less significant than in bigger companies, whether or not they are HPOs.

Table 3 Use of structural alignment mechanisms and AGR on sales

	<i>Size</i>	<i>LPO</i>	<i>HPO</i>	<i>super HPO [17]</i>	<i>Average</i>
Cross-functional teams	0-99	61%	53%	33%	
	100–199	80%	40%	0%	
	>200	71%	92%	100%	
	<i>Average total</i>	<i>65%</i>	<i>61%</i>	<i>46%</i>	<i>64%</i>
Quality control circles	0-99	54%	21%	17%	
	100–199	80%	60%	0%	
	>200	42%	67%	86%	
	<i>Average total</i>	<i>53%</i>	<i>41%</i>	<i>34%</i>	<i>51%</i>
Job-rotation	0-99	45%	26%	33%	
	100–199	40%	50%	0%	
	>200	57%	68%	87%	
	<i>Average total</i>	<i>46%</i>	<i>42%</i>	<i>42%</i>	<i>43%</i>

4.1.2 Product and process innovation

The data do not suggest any relationship between the amount of expenses for product development and AGR on sales (see Table 4). In other words, HPOs do not spend more money on product innovation. In addition, no significant difference is found between LPOs and HPOs as regards the frequency of introducing new products. Here, size of the company is more important: the bigger the company, the more often new products are released. Also, no correlation is found between AGR on sales and the degree of radical product innovations (defined as both new product functions and use of new production technology). HPOs do not have more radical product innovations than LPOs; the same applies for product improvement. With respect to process innovation, we have more or less the same findings. Only in small companies was a positive correlation found between the amount of expense for process innovation and AGR on sales. Furthermore, no significant relationships were found between the use of a number of instruments/methods for product innovation – such as reverse engineering, cross-functional teams, design for manufacturing – and AGR on sales. On the other hand, some variances were found related to size and sector: big companies seem to use these instruments and methods more often than small companies and service companies use them more often than industrial companies.

Table 4 Cost of product development (% of sales) related to size and AGR on sales

<i>Cost of product development</i>	<i>Size</i>	<i>LPO</i>	<i>HPO</i>	<i>super HPO [17]</i>
1–2%	0–99	47%	50%	0%
	100–199	44%	46%	100%
	>200	70%	60%	83%
	<i>Average total</i>	<i>52%</i>	<i>51%</i>	<i>42%</i>
3–5%	0–99	37%	47%	67%
	100–199	22%	31%	0%
	>200	30%	28%	17%
	<i>Average total</i>	<i>31%</i>	<i>37%</i>	<i>39%</i>
>6%	0–99	16%	15%	33%
	100–199	33%	23%	0%
	>200	0%	13%	0%
	<i>Average total</i>	<i>14%</i>	<i>15%</i>	<i>17%</i>

4.1.3 Human resource management

Here, two findings, both related to education and training, are of interest. Firstly, for all types of personnel (management, specialists, direct employees) we found that HPOs and especially super-HPOs spend more time on education and training. The second finding concerns the content of training and education. Although there is some co-variance with size (the larger the company, the greater the amount of training), we can safely state that HPOs, and especially super-HPOs, spend more days on training their direct employees, not only in task-related skills, but also in information and communication technology and team skills (see Table 5).

Table 5 Percentage of companies with much/very much education/training in these areas (5-point scale: very little, little, neither little nor much, much, very much)

	<i>LPO</i>	<i>HPO</i>	<i>Super-HPO</i>
Information and communication technology	23%	30%	45%
Production technology	35%	42%	45%
Team skills	19%	28%	45%
Service skills to client	47%	53%	50%
Quality management	32%	23%	15%

4.1.4 Conclusion

To summarise the findings of the survey, we can conclude that a statistical relationship exists between (super) high performance companies and non-functional organisation structures. Furthermore, company size is a better predictor of specific structural alignment mechanisms than rapid growth in sales. The same applies for some characteristics of product and process innovation: size is more important than being a low or high performer. Thirdly, investing in the education of (direct) employees is correlated to rapid growth. Our main conclusion from the survey is that non-functional structures and high amounts of training contribute to high performance, but that we still do not know the nature of the alignment of operations, improvement and innovation. Therefore, in the multiple case study we address the nature of structural alignment mechanisms in more detail and bring the social-dynamic aspects of alignment to the fore.

4.2 Results of the multiple case study

Three manufacturing companies were analysed in order to identify the factors that explain the contribution of self-managing teams. In Table 6 the characteristics of the companies are summarised. To a large extent the companies are comparable. All companies have self-managing teams in place, one of whose tasks it is to improve their products and processes. Company C is in the most dynamic market, manufacturing a product that is early in the product life cycle. All companies are part of a parent company, but company B is the most autonomous one. The process technology is somewhat different. Companies A and C can be identified as flow-oriented production with large runs, often longer than the shift time. Company B has a discrete manufacturing process, which is operated in one shift.

What is the contribution to improvement and innovation of the self-managing teams in these companies? We distinguish three types of contributions: observations, suggestions and proposals. All three types can be delivered during the concept, design, and implementation phase of the new or improved product or process. All three types of contribution can also have different contents, e.g. manufacturability, product quality and work organisation. In Table 7 the contributions of the self-managing teams are presented. These qualitative data are derived from surveys among and interviews with team members, team leaders, staff and management.

Table 6 General characteristics of case companies

	<i>Case A</i>	<i>Case B</i>	<i>Case C</i>
Product	Salt products	Central heaters	Ceramic multi-layer actuators
Market	Mature, slowly moving, increasing competition	Mature, technology pull, tough competition	Young, dynamic, tough competition
Size (No. of employees)	175	145	140
Part of mother company	Yes	Yes, but relatively independent	Yes
Production technology	Process, high automation, flow-production with large and small batches	Assembly, low automation, unit and small batch production	Process, moderate automation, flow-production with large batches
Work organisation	5 shift-system, each shift is self-managing team, responsible for a product area (total of 10 teams)	No shifts, self-managing teams, responsible for a well-defined process part (total of 7 teams)	5 shift-system, 5 shifts form 1 mini-company, responsible for well-defined segment in flow (total of 6 mini-companies)
Vocational education employees	50% middle, 50% low	10% middle, 60% low, 30% none	20% middle, 60% low, 20% none

From Table 7, it appears that the mini-companies of case C are the most successful ones. They contribute to process improvement like the other self-managing teams but they are also most likely to contribute to product improvement, and play a rather significant role in process innovation. The mini-companies of case C are involved in nearly every phase and contribute to all types of improvement and innovation. To explain this result, we analysed the nature of product and process innovation, the context, the team characteristics, and the links between the teams and their relevant environment.

Table 7 Contribution of the self-managing teams/mini-companies to improvement and innovation

	<i>Case A</i>	<i>Case B</i>	<i>Case C</i>
<i>Product innovation</i>	None	None	
Type			Some observations
Phase			Concept, implementation
Content			Manufacturability
<i>Product improvement</i>	None		
Type		Some suggestions	Many observations and suggestions
Phase		Concept, implementation	Concept, design, implementation
Content		Manufacturability	Manufacturability, efficiency
<i>Process innovation</i>	None		
Type		Some observations and suggestions	Many observations and suggestions
Phase		Concept, implementation	Concept, design, implementation
Content		Manufacturability	Manufacturability
<i>Process improvement</i>			
Type	Many observations, suggestions and proposals	Many observations, suggestions and proposals	Many observations, suggestions and proposals
Phase	Concept, design, implementation	Concept, design, implementation	Concept, design, implementation
Content	Manufacturability, work instructions, safety	Manufacturability, ergonomics, QWL	Manufacturability, process quality, ergonomics, QWL

With regards to the nature of product and process innovation, two observations are important. The complexity of the innovations and improvements of company C is not lower than in the other cases, which could explain the higher possibility for employees to cooperate in improvement and innovation activities. In fact, the activities are complex, and experts from different disciplines are involved. In addition, the educational level of the employees of company C is only slightly higher than in company B, and lower than in company A. However, the operators of company C do get considerable training in improvement activities. Still, the nature of product and process innovation does not explain all the differences found in the contribution of the mini-companies.

The context of the three companies is comparable in terms of their relationships with the parent companies. The market conditions for all three companies are becoming more dynamic and competitive. However, company C's market is the most dynamic one. This company faces big and unpredictable fluctuations in demand, combined with a new product that is not fully developed. The dynamics of this market are illustrated by the fact that attempts to create other markets for their products failed to such an extent that the

plant was closed in 1997, due to a collapse in demand for the product by their single most important customer.

The characteristics of the self-managing teams of companies A and B are similar, except for the complicating factor that company A operates a five shift system. In both cases the teams are responsible for a well-defined part of the process, have many responsibilities, and are autonomous to a certain comparable extent (operations, routine maintenance, daily planning, and quality control). The teams in company C have hardly any differences, with the exception of two relatively small design issues. Firstly, unlike company A, in which each shift is a self-managing team, the mini-companies in company C consist of all five shifts together. This calls for more cooperation between the shifts, as they are jointly responsible for the final results. Secondly, the mini-companies are responsible for a broader set of tasks than the teams in the other cases, including safety and morale. Yet, it is hard to believe that these differences can explain the relatively big contribution of the mini-companies to improvement and innovation. Therefore we have to look at the position of the mini-companies within the company.

By analysing the mini-companies' links with their environment some striking differences become apparent. In both case A and case B the self-managing teams are viewed within the company as something solely for the production department. In case C this is certainly not the case. Here, the mini-companies have strong relationships with the other actors within the company. The linkages among the mini-companies and between the mini-companies and other relevant actors are organised similar to client-supplier relationships [18]. The mini-company is the owner of a process, and has its suppliers and customers. The members of the mini-company formulate their own mission statement and identify relevant (internal and external) suppliers and customers. They visit their suppliers and customers regularly as part of an ongoing self-assessment exercise. The results are used as input to the improvement program. They prioritise the improvement actions and, in cooperation with management, action teams are set up to tackle these problems. These action teams consist of shift representatives from the mini-company and relevant experts from support departments. The results of improvement activities are presented to the management.

This suggests that strong linkages between the mini-companies and their relevant environment are one of the cornerstones of the mini-company concept. These linkages are a good example of structural alignment. The mini-company process is a well-structured mechanism of contacts between shop floor workers, maintenance people, factory engineers, and process developers. In interviews with two developers, both of them stated that they view the operators as 'their hands, eyes and ears on the shop floor'. The operators are invaluable especially with respect to data collection, which is always necessary within problem-solving activities and test-runs. To summarise, the client-supplier relationships established between the mini-company and its relevant environment provide a solid basis for structural alignment of operations, improvement and innovation.

What about the social-dynamic alignment of the mini-companies? Here, again the mini-companies of case C outperform the self-managing teams of case A and case B. Two variables are presented here, power and trust. Power and trust both seem to be important factors in analysing the social aspects of the structural linkages. We have measured the power of the hierarchical levels, as perceived by the operators, by using the control graph method of Tannenbaum [19]. The resulting control graphs of case A and

case C (see Figures 2a, 2b and 2c) are similar, although case C is somewhat 'flatter' and somewhat 'higher', indicating a more democratic style of leadership. Both represent high total amounts of power, indicating an effective organisation. The control graph of case B is different, representing low levels of power for the production manager and higher levels for the self-managing teams. Here, the total amount of power is relatively low. This indicates that the teams do not have much contact with other management levels.

Figure 2a Control graph case A (N = 88; 1 = very little influence, 6 = very much influence)

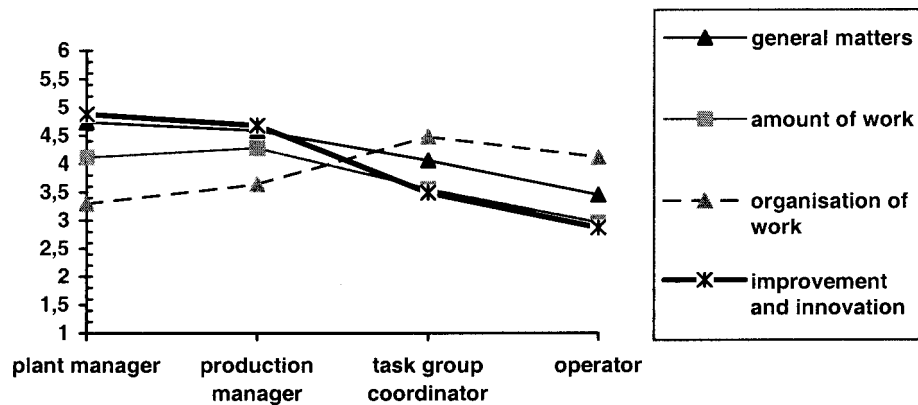


Figure 2b Control graph case B (N = 42; 1 = very little influence, 6 = very much influence)

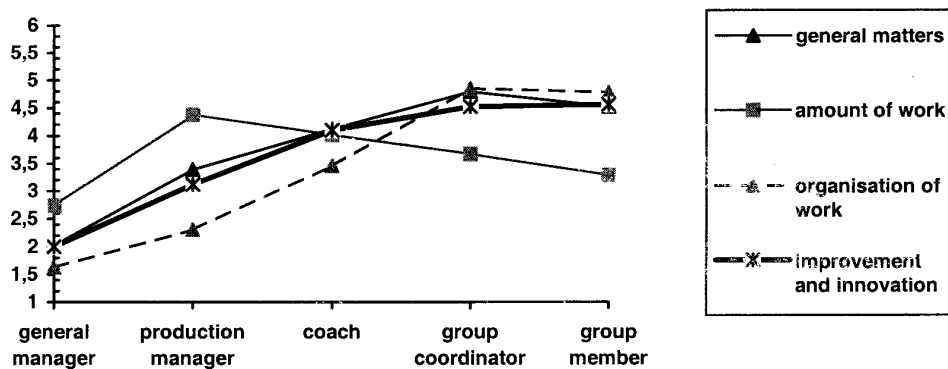
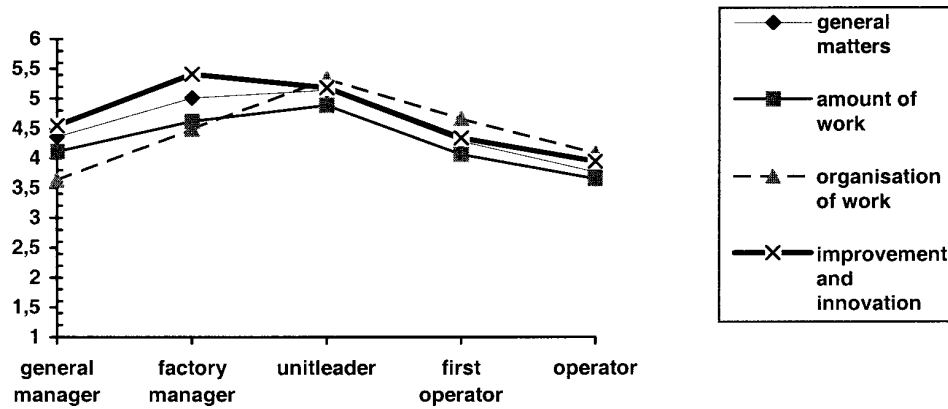


Figure 2c Control graph case C (N = 102; 1 = very little influence, 6 = very much influence)

With respect to trust the picture is even clearer. In case A, only 50% of the operators said they trusted management (“I have full trust in the management of ...”), whereas this is 59% in case B and 85% in case C. In other words, especially with regards to trust, which is an important issue in cooperation between different levels and between different functions, the members of the mini-companies are more positive than the members of the self-managing teams in the other cases.

The better structural and social-dynamic alignment of the mini-companies within the company are – together with the aforementioned dissimilarities – good explanations for their comparatively substantial contribution to improvement and innovation.

5 Discussion

The survey provides clear evidence that high performance organisations in general make much less use of functional structures. This finding confirms the suggestion that the functional separation of operations, improvement and innovation does not have positive effects on company performance. On the other hand, the survey does not provide strong support for process/product based organisational forms either. Most HPOs and super-HPOs have hybrid forms in place. This finding also confirms our proposition on the issue of integration. In many circumstances, full integration of such diverse activities as operations, improvement and innovation is simply not possible. Even teams consisting of individuals with such diverse backgrounds do not seem to be that effective [20]. The survey suggests that large HPOs make significantly more use of cross-functional teams. Apparently, smaller HPOs are able to coordinate people from diverse functions by using other, more informal mechanisms. In one way or another, the activities have to be aligned in order to achieve a fit, which is understood as being necessary for performance [7-9,11-13].

The results from the case study point to the importance of cooperation between the people who are responsible for operations, improvement and innovation. Cooperation and alignment are based on human interaction between people from operations, improvement

and innovation. The data presented in the case study show that both structural and social-dynamic aspects play significant roles but are not the only ones. There are supporting tools and techniques, for instance the use of information and communication technology, which facilitate alignment [12,21].

Alignment is not a magic word, it points to the – sometimes difficult – interaction and cooperation between people from different functions. Alignment needs to be organised. Structural linkages between the functions must be established, people must get the resources in terms of time, money, information and means to cooperate in a structural and meaningful way. These are the structural aspects of linkages. The social-dynamic alignment is the flip side of the same coin, it refers to the same exchange relationships between people. Within exchange relationships, aspects such as power and trust play a dominant role [22]. Some authors [23,24] have elaborated on the reasons for the relationship between total amount of power and effectiveness. The total amount of power is an indication of the intensity of the exchange relationships between the levels. It is necessary to have information exchange and joint decision making to increase this intensity. Information exchange or, even better, joint decision-making, is a prerequisite for effectiveness in many situations, especially when uncertainty is high. Then it is wise to incorporate as much knowledge and as many stakeholders as possible in decision making processes. Therefore, in cases of improvement and innovation it is important to create a structure fostering intense exchange relationships between the different hierarchical levels and between the different groups in production, development and support. Case C illustrates that the mini-company concept may represent a successful attempt to provide such a structure.

6 Implications for theory and practice

The main findings illustrate that the alignment processes of operations, improvement and innovation are based on the relationships between people from the diverse functions. These relationships are the focal point for the management of alignment. This holds four implications both for theory and practice.

Firstly, alignment needs to be understood as a human activity. If it is based on the relationships between employees, alignment is subject to such human interaction processes as power behaviour, trust patterns, leadership behaviour and communication skills. In addition, how the relationships are perceived is even more important in shaping behaviours, than ‘reality’ is. Many authors have focused on the structures, the formal mechanisms and the tools and techniques to arrive at a fit, but that is not enough. Alignment is at least as much dependent on human interaction processes.

Secondly, alignment is a dynamic process. As other authors have argued [7,8] alignment cannot be understood simply as a steady state of fit or misfit. Our analysis contributes to this finding in the sense that human perception shapes the alignment. For instance, trust and mistrust are build up during the process of cooperation between people. This implies that the history of the collaborative process is important. The alignment can easily be changed by the introduction of new actors in the interaction process, e.g., new management or new product developers, or by different behaviours of extant actors, e.g. change in leadership styles or training in communication skills.

Thirdly, further research on the determinants of alignment is needed. Too little is known on the influence of contextual characteristics such as size and sector of the

company, training and education levels of the employees, and urgency of cooperation. Furthermore, it is necessary to include other variables that may have an impact on the alignment, such as tools and techniques.

Fourthly, managers involved in the alignment of operations, improvement and innovation, can benefit by viewing alignment as a human and dynamic process. They need to pay attention to the full scale of aspects that are important. That means not only choosing the proper structure and creating the structural opportunities and devices for operational employees and process and product developers to interact with each other, it means also recognition of the social-dynamic aspects by improving the cooperative skills of employees, including team building activities. The key to the joint success of operations, improvement and innovation lies in the management of their alignment.

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 - b The total amount of power, represented by the level of the line (the higher the level of the line the higher the amount of power in the organisation). The respondents are the employees on the lowest hierarchical level (operators, group members). They answered questions like: 'How much influence do these persons/groups have on general matters?'
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