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Structuring of jobs: Employment relations in a multidimensional structural space

Arbeidsnotat RF – 2001/164

Prosjektets tittel:	Opplæring til hva? Hva skjer når jobbene oppløses?
Oppdragsgiver(e):	Norges Forskningsråd
Forskningsprogram:	KUV
ISBN:	
Gradering:	Åpen

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Forord

The paper discusses the dimensions of a multidimensional measurement scale of *job structuring* (developed and described RF 2001/163) and how it relates to Marsden's theory of employment systems. Theoretical arguments as well as empirical data are presented. Data have been collected by a questionnaire administered to 587 persons in 5 companies. The empirical distribution of jobs within a multidimensional space (3 dimensions: *formalization, routinization/autonomy and task complexity*) is presented and discussed.

Stavanger, 02.04.2001

Geir Nybø, prosjektleder

Structuring of jobs:

Employment relations in a multidimensional structural space*

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∗) This study is part of the project “Training to what? What happens when jobs are dissolving?” funded by the Norwegian Research Council as part of the program “Competency, education and value creation”.

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1 Introduction

"Jobs" have been the basic building blocks in most work organizations. In order to rationalize, coordinate and control work, job design has been an important tool for employers. A clearly defined and a well described job has also been a guide to employees and employers about the content of the employment relationship and a basis for various personnel related decisions. Most human resource systems are based on the idea that work is organized into jobs [Schippmann, 1999 #4; Sparrow, 1998 #45]. The job analysis has been a very important tool because it provides the information base for a wide variety of organizational and managerial functions [1]). The job description typically underpins decisions concerning central human resource decisions about selection, promotions and careers, performance appraisal, and training.

Several observers have claimed that *job* is going to loose its importance as a central structural category due to changes in the technological and economic environment and introduction of new principles for how to organize work (Drucker 1993; Appelbaum and Batt 1994; Bridges 1994; Rifkin 1995; Sparrow 1998; Sparrow and Marchington 1998). The techno-economic development and the corresponding search for cost-efficiency and flexibility not only lead to a destruction of jobs through rationalization and outsourcing but also to a radical change *within* firms in the way work is organized:

- The pyramidal organization is pressed together into fewer levels
- More emphasis on direct value-crating processes
- More emphasis on results than on tasks
- Team and project organization take over for the hierarchic organization
- Borders between functional departments are disappearing

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1) A comprehensive presentation of approaches and techniques is given by Gael Gael, S., Ed. (1988). The Job Analysis Handbook for Business, Industry and Government. New York, John Wiley & Sons, Inc.

Gael, S., Ed. (1988). The Job Analysis Handbook for Business, Industry and Government. New York, John Wiley & Sons.

These changes have been formulated into a number of different management concepts: “Business process re-engineering”, “lean production”, “modular production units” and the “virtual organization”. All of these developments are closely linked to the opportunities created by modern IT-technology. Many companies have been induced to re-examine their philosophy about work design and particularly their reliance on well-defined and structured individual jobs.

Some writers are seeing this development simply as a consequence of actual management and organizational strategies for more flexible organizational structures (Jenkins 1998; Sparrow 1998; Volberda 1998). Others are seeing the same as the beginning of the end of mass production and work organization connected with Industrialism: High-knowledge work is replacing routinized industrial work (Drucker 1993; Bridges 1994; Howard 1995). This “enskilling” model has its contrast in the “deskilling” thesis rooted in labor process theory, particularly influences by Braverman’s important book (Braverman 1974). We shall not take side among these opposing views about trends in job structure under modern capitalism. We will simply be addressing the issue of *contingencies* between human resource practices and structuring of jobs, and the issue of how the HR-approaches are being changed if jobs are more fluid.

The whole human resource system is often challenged when introducing new principles of work organization and job design. A number of researchers and practitioners have observed a mismatch between advised HR-techniques and procedures and the challenges coming from new ways of organizing work (Lawler 1992; Lawler 1994; Mohrman, Cohen et al. 1995; Sparrow 1998). According to Lawler and Sparrow the toolbox of most human resource practitioners are based on clear definitions and descriptions of individual jobs (Lawler 1994; Sparrow 1998). When new principles of job design are introduced, Sparrow foresees that job based systems and tools now available will break down. There is likely to be a growing gap between the actual challenges and the available tools. A new way of thinking and new systems and tools will have to be developed. Lawler was first to ask for a *competency based* approach to replace traditional job based approaches (Lawler 1994). If work content for the individual employees becomes more loosely defined and fluently changing, it will need a shift of focus for HR-routines: from jobs defined as specified sets of tasks to the people in the organization. Instead of taking the production process and the jobs as the starting point it will become more important to go directly to the persons involved: their resources, skills and competencies, potential capacities, flexibility, creativity and their achievements. The focus should be on how such capacities are related to various processes considered of strategic importance to the organization.

But what is a more fluid job? In an earlier work I have developed and validated an instrument for measuring structuring of jobs (Nybø 2001). The instrument is a multidimensional scale of

autonomy, formalization, routinization and complexity/learning. In addition variables like project organization, team-based organization and educational requirement were discussed. In this article I shall discuss the relations between these various dimensions and how they form a structural space in which jobs and contingent HRM practices will be distributed.

In the cited literature on more fluid jobs all these dimensions tend to be treated as one "syndrom" called the "new working life": more complexity, more autonomy, more task variety, less task formalization, more knowledge work, more flexibility, more project work, more team organization. When Lawler (Lawler 1994) and Sparrow (Sparrow 1998) are calling for more competency based human resource practices they are seeing it as a contingent response to this "new working life".

Figure 1 Preliminary hypothesis about organization of work and HRM system

		(1) Human resource management system	
		Job based	Competency based
Organization of work	Task based	*Contingent HRM system*	*Not contingent HRM system*
	Fluid jobs	*Not contingent HRM system*	*Contingent HRM system*

The purpose of this paper is to investigate the justification of such a view. I shall construct specific hypothesis about relationships between the structural dimensions that I have discussed earlier. I have selected the dimensions above because they are supposed to have some effect on information exchange between work activities and human resource decisions (Nybø 2001). I shall now try to build on a specific theory of the employment relationship and

job structuring developed by David Marsden (Marsden 1999) to formulate alternative hypothesis about the relationships between work organization and HRM practices.

2 Methodology

2.1 Research setting

The study was carried out in 1999-2000 in 5 different companies. Three of the companies are representatives of the most newly created modern industries – software development and production of automated equipment. These three companies all have a history of no longer than 15 years.

The first started in Stavanger, Norway, with the new oil industry as it's marked. Very soon they specialized in various equipment for automatic handling of a number of processes related to drilling, pipe handling, etc. The company is now part of an international corporation with about 250 employees in Stavanger. A second company is a newly merged software house with offices in all the largest cities in Norway. It has approximately 600 employees. The third is a small company with around 20 employees located outside Stavanger specializing in software for construction processes.

These *high-tech firms* are chosen because they represent the most extreme of *"the new"* industries. The use of information technology in the products and/or in automation of product processes is particularly strong. They are also most often new firms. The industry is little affected by structures and ways of thinking of past historical situations. The firms are in many ways starting from scratch. If at all, it is here that we expect first to find a looser job-structure. Human resource management is expected to be untraditional and adjusted to fast changes in markets and technology, and not formed by practices of traditional manufacturing industries and the epoch of "industrialism".

The other industry is *banking/finance*, representing an old and traditionally bureaucratic industry whose work processes have been highly transformed by the introduction of new computer technology. We have selected a savings bank with offices spread over Southern Norway. The second finance company is one of the larger Norwegian commercial banks.

Banking/finance is interesting because it is a traditional industry that in Norway during the last 10 years have been going through tremendous change. It has been heavily exposed to

global economic changes and development of modern information technology. Banking used to have a rather rigid and well-defined job structure. IT has completely changed the work processes of the industry over a relatively short time period. Banking therefore represents the *traditional* industry that *undergoes profound changes*. If this industry in addition to high-tech industry is characterized by a structural disintegration of jobs, then this is more likely to be a general characteristic of the post-modern society.

2.2 Data and design

After a round of interviewing of personnel officers, leaders and subordinate employees in one bank and one high tech company, two questionnaires were constructed, one for first line supervisors and one for their subordinates.

The questionnaire to non-leading employees contained a number of items measuring various aspects of *job structuring*. Four different indexes have been constructed: autonomy, formalization, routinization and work complexity. By use of factor analysis the indexes have been examined for multi-dimensionality, and various sub-indexes were created (Nybø 2001).

3 Different structural forms – relation between dimensions

3.1 Employment relationships and job organization

Marsden is writing about a *competency approach* to job design and allocation of work tasks to employees. In line with such an approach to designing jobs there is also some contingent human resource management practices (Marsden 1999). According to Marsden two critical problems have to be resolved in job design and specification of the employment contract in order to obtain a stable framework for employment: those of providing a suitable means of aligning job demand and worker competencies (*efficiency constraint),* and of assigning tasks to persons and protect against opportunistic behavior *(enforceability constraint).* I shall give a short presentation of his line of argumentation.

3.1.1 Enforceability and legitimate authority

Based on some reasonable assumptions about rational economic behavior, Marsden argues that organizing work into rather clearly defined jobs is due to the essence of the employment contract. The employment contract is never specified in every detail regarding what should be done and how. In those rare cases when it is possible to do so it will be more economically to use other types of contracts (spot bargaining). A fully specified employment contract will be of little interest to the employer because he will prefer some flexibility in the use of labor. To fill in on an unspecified contract the employer has taken (is given) a right of authority to assign work to employees. However, the employment contract cannot be completely unspecified as to what is the content of the job and with unlimited authority to the employer. That would bring us to the other ditch: An unlimited employment relationship will be of little interest to employees. Only those who have no other alternatives, that is secondary unqualified labor will enter such relationships. Qualified workers will prefer other employment or work as contractors (spot bargaining). The result is that for all employment contracts for qualified personnel jobs will have to be rather well defined with some agreed upon rules on how job tasks are assigned to workers (Marsden 1999).

According to Marsden there are two different approaches to ensure enforceability and avoid opportunism. One is to clearly define the scope of the job in advance in terms of certain attributes of the tasks themselves, such as tasks described in a job description, or the tools required for their execution. He calls this a *task approach* and the focus is the individual job. This approach to enforceability can be a source of rigidity in task allocation. The alternative solution is to focus on the function required by the organization. This *function approach* is defining jobs more closely to the final output and it provides only an indirect link between individual tasks and jobs.

Marsden also discusses the enforceability issue as a *trust relationship*, and his conclusion is that diffuse employment contracts based on trust are dynamically unstable (Marsden 1999, pp 62). Fox defines a *high trust* relationship as one in which:

> "..participants share certain ends or values; bear toward each other a diffuse sense of long-term obligations; offer each other spontaneous support without narrowly calculating the cost or anticipating any equivalent short-term reciprocation; communicate freely and honestly; are ready to repose their fortunes in each other's hands; and give each other the benefit of any doubt that may arise with respect to goodwill or motivation.
>
> Conversely, in a low-trust relationship the participants have divergent ends or values; entertain specific expectations that have to be reciprocated through a precicely

> balanced exchange in the short term; calculate carefully the costs and anticipated benefits of any concession; restrict and screen communications in their own separate interests; seek to minimize dependence of the other's discretion; and are quick to suspect, and invoke sanctions against, illwill or default of obligations " (Fox 1974, p. 362).

The mutual trust of the relationship is important for the need of *control* from both parties. Fox argues that high trust relationships are important for collaboration and autonomy in employment relationships. In Marsden's view trust-relationships are inherently unstable in employment relationships because of the changing nature of most product markets and the pressures it puts on trust when employers from time to time are forced to adopt policies at odd with the interests and expectations of employees. He further argues that the task approach is particularly robust to low trust relationships, while the *rule* of the functional approach is more stable than a diffuse trust relationship. However, a rule for functional allocation of work tasks does not exclude development of trust relationships and greater autonomy together with the rule.

Marsden is suggesting following indicators of task-oriented versus function oriented approach: control systems and assignment of responsibility for work, work-flow rigidity, functional specialization and segmentation of work roles, hierarchical segmentation, and patterns of functional flexibility. Our structural dimensions of *autonomy* and *specialization and learning opportunities* are close to this dimension. We shall also expect team organization to be associated with a functional approach to behavior control. Based on Marsden's theory we shall therefore expect that autonomy and specialization/learning opportunities will be correlated, and that they both are independent of formalization.

3.1.2 Matching workers and work

The matching of workers and work is the other important function that the employment relationship will have to serve according to Marsden (Marsden 1999). The job definition not only needs to cope with enforceability (enforceability constraint), it shall also give an efficient way of relating work and necessary competencies. Marsden calls this second demand the *efficiency constraint* on the employment contract. There are two different approaches to this function: one can either start with the work side and adjust people and their qualifications to the requirements of the work *(production approach)*, or, alternatively, one can start with the worker side, and assign tasks to workers according to their skills *(competency based approach)*. In the production approach tasks are grouped according to what is thought a rational production process (at the present or in the future), and workers are recruited and trained to meet those requirements. Within the production approach personnel are qualified within firm internal labor markets (ILM).

In the competency based approach, one starts by defining groups of qualifications or sets of skills that are required not in a specific job but in an organization now *and* in the future, for then to allocate tasks to those persons which are most competent doing them. In the literature on job analysis and job design both approaches are found [2]). The classical way of organizing industrial production is an example of a production approach, while when electricians or people in other craft occupations are assigned tasks according to their occupation it is a typical example of a competency approach. Within this approach personnel are qualified in occupational labor markets (OLM).

As indicators of production versus training approach, Marsden suggests various indicators related to job design: rules and procedures manuals, written job descriptions, written job instructions, job analysis and job evaluation, time and motion studies, documents of safety and hygiene, written performance records, documents on personnel evaluation [3]). These are very similar to our structural dimension of *formalization.* Mintzberg too have argued that formalization and training are basically substitutes. Depending on the work in question, the organization can either control it directly through procedures and rules, or else it can achieve indirect control by hiring truly trained professionals (Mintzberg 1979, p.101). Furthermore, formalization of tasks and procedures and formalization of output and results will often be functional alternatives which are contingent with routinized task defined jobs and broader functional defined jobs respectively.

3.1.3 Segmentation of employment relationships

According to Marsden the employment contract must ensure *both* enforceability and efficiency. As these two dimensions are independent it will give a two-dimensional space where any employment relationship can be put.

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2) For an overview see Shippmann, J. S. (1999). Strategic job modeling. Working at the Core of Integrated Human Resources. Mahwah,NJ, Lawrence Erlbaum Associates, Publishers.

3) He also suggests a number of indicators of human resource contingencies such as reward for seniority, wage systems, treatment of occupational skills in job classifications (see Marsden, D. (1999). A Theory of Employment Systems: Micro-Foundations of Diversity. Oxford, Oxford University Press.

Figure 2

		Efficient alignment of competencies and work	
		Production approach	Competency approach
Enforceability of the employment contract	Focus on specified tasks	”Work post rules”	“Job territory rule“
	Focus on function	”Competence rank rules”	”Qualification rule”

Work-
post rules

Marsden further argues that this will give four different and relatively stable institutional structures each with its own rules for matching work and people:

1. Identification of a set of complementary tasks, and their assignment to an individual jobholder who is held responsible for their execution. Training is adapted, most commonly by use of on-the-job learning *(work post rules within a firm-internal labor market)*

2. Identification of functions or work behaviors in relation to specific work processes. The work tasks related to these functions are grouped according to complexity and the most experienced and competent workers are assigned to the most complex tasks and workers with less experience to less demanding tasks. Training is supplied by more experienced to lesser skilled workers by on-the-job training *(competence rank rule within a firm-internal labor market)*

3. Identification of established bodies of knowledge or skills (for example occupations or professions) and assignment of tasks that falls within their occupation. Training is supplied in advance through vocational training *(job territory rules within an occupational labor market)*

4. Identification of broader competencies needed to carry out certain strategic functions, and assignment of tasks to workers on the basis of recognized qualifications *(qualification rule within an occupational labor market)*

Marsden further argues that these transaction rules tend to be relatively stable, *and also that they are exhaustive* (no other rules are stable over time). These are the only combinations that satisfy the constraint of efficiency, and at the same time serves the employers need for flexibility in labor utilization. On the employee's side the employment rules protect against unlimited demands by management and also give some protection against employment instability. They also provide information to both partie in internal as well as external labor markets. According to Marsden, the description of fluent and undefined jobs will only be found for unqualified personnel who have no other alternatives. It will not be a stable institutional form for more qualified personnel who have enough market power to seek other alternatives. Instead of going into such employment contracts they may seek employment elsewhere, or go for other types of contracts such as self-employed consultants, advisors or specialists (Marsden 1999).

If this line of reasoning is correct, employment relationships for qualified personnel will always be organized as either one of the four forms above, and these forms will tend to be relatively stable. Large groups of jobs or competencies will be grouped together and submitted to such institutionalized rules broadly applied to the whole group and not on an individual basis. Individual contracts, or what is often called "spot bargaining" will tend to be irrational.

A central point here is that Marsden argues that there are two job-based approaches and also two different competency based approaches. In the discussion of the new working life and its call for a competency based HRM systems, it has been contrasted with task defined jobs. More flexible work arrangements can, however, also be achieved by functional organization within a job or production based approach. On the other hand, competency based approaches can as we have seen be well within a task organization, as is often the case with occupationally defined jobs.

When Lawler called for more use of competency based models for the late 90's, he acknowledged that such models already were in use in consultancy companies and others offering professional services. However, he claims that the task of these firms are relatively simple because there are clearly established bodies of knowledge upon which they draw, such as accounting, law, finance and marketing (Lawler 1994). He saw a need to develop further such models and make them appropriate for other organizations and jobs with no traditional bodies of knowledge to draw upon. For people like managers, supervisors, sales people, advisors, developers, etc, the companies must themselves analyze and describe what

competencies they will need to develop. Such core competencies should be unique to the organization and contribute to its competitive advantage. While in the production approach the starting focus is the work activities defined into jobs, routines or procedures, the competency approach starts at a higher level, that is the organization as a whole and its need for certain competencies to meet the challenges of today and tomorrow.

4 Analysis

4.1 Test of Marsden's two-dimensional space

To test the hypothesis of a two-dimensional structural space of *enforceability* and *relating workers and work* I have done a factor analysis of 8 different sub dimensions: autonomy over work context, autonomy over work process, routinization, complexity of work tasks and, learning opportunities in the work process, formalization of tasks, formalization of output and formalization of supervision (see (Nybø 2001). All eight indexes are sufficiently approximate to being normally distributed and therefore acceptable in a factor analysis. All indexes are normalized with mean like zero. Standard deviations are between .5 and 1.0 and skewness and kurtosis are all between –1 and +1.

The results of table 2 are showing three different factors. First factor refers to a dimension that can be called *routinization* with *autonomy* as its other pole. Jobs are organized along a dimension going from repetitive tasks requiring constant attention to jobs with high degree of autonomy both with regard to working time, choice of coworkers, and what and how to do the work. This clearly refers to enforceability and control in Marsden's theory.

The second factor is indicating one single dimension of *formalization.* This dimension is also measuring to what degree the jobs are designed according to a production approach in Marsden's terms. This second dimension is orthogonal to or independent of the first, giving the structural space suggested by Marsden (see figure 2). We should also note the loading of FTASK (*formalization by job tasks and procedures)* on the first factor (routinization). This is showing that formalization by tasks and other forms of formalization, for example by results and goals are functional alternatives contingent on different levels of routinization. When highly routinized jobs are also formalized, they seems to be so by formalization of tasks and routines and less by specified goals and results, and routinization seems to some extent to go together with this form of formalization. Formalization by results and goals are linked to more autonomous and less routinized jobs.

Table 2 Factor analysis of indexes of structuration

	Principle components				Rotated components		
Items	Communalities	1.factor	2.factor	3.factor	1.factor	2.factor	3.factor
ACONTEXT *Autonomy over work context (hours and choice of coworkers)*	0,68	-0,67	0,38	-0,28	**0,80**	-0,05	0,19
SROUTINE *Repetitiveness and attentional requirement*	0,68	0,71	-0,05	0,41	**-0,79**	0,19	0,13
FFUNC *Formalization of results and goals*	0,75	0,68	0,47	-0,25	-0,22	**0,82**	0,11
FSUPER *Formalization by supervisor monitoring and control*	0,68	0,39	0,57	-0,44	0,12	**0,81**	0,10
FTASK *Formalization of jobtask and procedures*	0,68	0,79	0,15	-0,15	-0,43	**0,67**	-0,08
SLEARN *Learning opportunities in the work process*	0,67	-0,17	0,79	0,09	-0,21	-0,01	**0,89**
SCOMPLEX *Complexity of work tasks and decisions*	0,84	0,04	0,59	0,69	0,34	0,28	**0,68**
APROS *Autonomy over work process*	0,55	-0,46	0,57	0,07	**0,51**	-0,00	**0,54**
% of varance		30,8	25,6	12,9	24,8	24,0	20,5

The third factor refers to *work complexity and learning at work.* The variable APROS (*autonomy of work process)* has approximately equal loading in this factor and the first factor (routinization).

Based on the analysis I have constructed three new indexes:

FORMALIZ = (FFUNC + FSUPER + FTASK)/3

ROUTINIZ = (ACONTEXT + SROUTINE + 0.5*APROS)/2.5

COMPLEX = (SLEARN + SCOMPLEX + 0.5*APROS)/2.5

All these indexes are normalized with mean=0.

4.2 Professions, teams and projects

The level of competence requirement in a position is a central dimension of job structuring. This dimension is also closely related to the *role of the expert* and the new interest in *knowledge work* and *intellectual capital.* When talking about high-competence or knowledge work this is clearly something different than multiskill, job enlargement or even job enrichment. Mintzberg argues that training and formalization are basically substitutes in their function to obtain coordination (Mintzberg 1979, p.101). By standardizing skills in extensive training (*professionals),* behavior can be made predictable and less arbitrary. Depending on the work in question, the organization either obtains coordination and control directly through its own procedures and rules, or else, it can achieve it indirectly by hiring duly trained professionals.

The choice of focus, on *individual jobs* or on *groups/teams,* is another important design decision. There are a number of different design parameters on *how* to control behavior of the team and group to attain efficiency (Parker and Wall 1998). Hackman has argued that his job-characteristic model should be extended to the group-level (Hackman 1987). *A team-approach to behavior control may lead to a contingent team approach to HR-practices* (Mohrman, Cohen et al. 1995; Mohrman and Mohrman 1997).

The *time limited work assignment* is the essential characteristic of project work. A project can be both group based or have only one person. For the employee, the *type of work* may differ (or may also be the same) from project to project, and even the geographical location of the work place may differ from project to project. Extensive use of project work therefore makes it less to work with specified jobs: these may change considerably from project to project. Project work therefore essentially means less constancy in job structure, although within each project the tasks may be highly structured.

Projects often require *cross-disciplinary* teams. Such teams learn together as the projects evolve. This main arena for skill-development and work achievement is outside the immediate supervision, control and knowledge of the line-mangers. When the work process is *generally* organized into projects as is intended in BPR initiatives and other project-based organizations, the employees have only short periods in their base-organization before they again go to another project. Control shifts from the functional organization of bureaucracy to project teams. This is likely to create special challenges with respect to personnel development, work assessment, career planning, etc.

Table 3

Correlations

		Formalization	Routinization	Complexity	Education	Project work	Teamwork
Formalization	Pearson Correlation	1,000	,325**	,143**	-,320**	-,397**	,184**
	Sig. (2-tailed)	,	,000	,001	,000	,000	,000
	N	545	526	515	540	541	539
Routinization	Pearson Correlation	,325**	1,000	-,294**	-,480**	-,560**	,247**
	Sig. (2-tailed)	,000	,	,000	,000	,000	,000
	N	526	558	539	552	553	553
Complexity	Pearson Correlation	,143**	-,294**	1,000	,118**	,139**	,045
	Sig. (2-tailed)	,001	,000	,	,006	,001	,292
	N	515	539	548	542	544	544
Education	Pearson Correlation	-,320**	-,480**	,118**	1,000	,549**	-,154**
	Sig. (2-tailed)	,000	,000	,006	,	,000	,000
	N	540	552	542	579	573	571
Project work	Pearson Correlation	-,397**	-,560**	,139**	,549**	1,000	-,242**
	Sig. (2-tailed)	,000	,000	,001	,000	,	,000
	N	541	553	544	573	579	574
Team work	Pearson Correlation	,184**	,247**	,045	-,154**	-,242**	1,000
	Sig. (2-tailed)	,000	,000	,292	,000	,000	,
	N	539	553	544	571	574	578

**. Correlation is significant at the 0.01 level (2-tailed).

We are seeing here that project organization and team organization are alternative forms of organizing (negatively correlated). Formalization and routinization are negatively correlated with education and project work and positively with teamwork, while complexity is positively correlated with education and project work and negatively with teamwork. Project work is an organizational form for complex work carried out by highly educated personnel working with great deal of autonomy and little formalization of work routines, output demands or supervisor control. Teamwork on the other hand, is connected with less complex and more routinized and formalized work carried out by personnel with less education. We also see that there is some correlation between the three structural dimensions (formalization, routinization and complexity).

Table 4 is showing the relation between structural characteristics and average length of education, % of working time used in project work and % of employees working in teams. Within both combinations of complexity, project work is much more used together with little routinization (and much autonomy) and also little formalization. Project work is also closely related to longer education in the work force. Teamwork is on the other hand quite compatible with routinization as well as formalization and also relatively independent of task complexity.

4.2.1.1 Table 4 Educational requirements, use of project and teamwork in each segment (High>0, Low<0)

Formalization	***Low***				***High***			
Routinization	***Low***		***High***		***Low***		***High***	
Complexity/learning	***Low***	***High***	***Low***	***High***	***Low***	***High***	***Low***	***High***
Education (number of years)	14.6	14.8	12.2	12.8	13.8	13.3	11.9	12.0
Project work (% of working time)	64	64	4	9	24	28	1	9
Team work (% of all employees in segment)	27	31	55	73	33	51	60	59
Team work, self managed (% of employees in segment)	3	6	25	19	12	14	18	16
Team work with rotation (% of employees in segment)	6	9	25	26	9	16	31	24

Hence, the structural organization of project work is what we should expect from the literature on the new flexible work organization, where low degree of formalization, much self control in the work process, longer education and widespread use of project organization is part of the

"new paradigm". Team organization, however, is *not* linked to this concept of new flexible work organization.

4.3 Job structuring in different industries and firms

The analysis is showing a very strong relationship between work organization and industry. The differences between the two industries are considerable, while the differences between firms within the industries are rather small. For the high-tech companies these small differences between firm in structural work organization is somewhat striking considering the large difference between these firms (products and size). Around 75% of employees in high technology/computing are in the segments with low formalization and low degree of ruitinization/high autonomy. Two thirds of employees in banking are within segments with high degree of formalization.

Table 5 Employment in each segment by company (% of total employment in company). High>0, Low<0

Formalization	***Low***				***High***			
Routinization	***Low***		***High***		(i)		***High***	
Complexity	***Low***	***High***	***Low***	***High***	***Low***	***High***	***Low***	***High***
Type of company/industry:								
System construction, small company	0	77	0	8	8	0	8	0
System construction. larger company	44	29	5	2	7	10	0	2
Software house, larger company	25	49	1	3	4	15	0	3
Savings bank .	3	8	13	9	7	18	13	29
Commercial bank .	6	4	17	5	7	15	26	20

Even though there must have been a great del of change in banking toward more flexibility and autonomy in most positions, these jobs are still highly formalized. They now have other job titles then before, such as customer advisor, customer consultant, firm consultant, etc. (see table 6), and the tasks of the jobs are broader, but bank jobs clearly falls into other structural segments than IT-jobs.

Table 6 Occupational titles most frequently found in segment (High>0, Low<0)

Formalization	***Low***				***High***			
Routinization	***Low***		***High***		***Low***		***High***	
Complexity	***Low***	***High***	***Low***	***High***	***Low***	***High***	***Low***	***High***
Most used jobtitles in segments	Systems-consultant Engineer Professional adviser Company-consultant	Systems-developer Systems-consultant Company adviser Consultant	Professional advisor Client adviser	Professional advisor Client adviser	Client adviser Company adviser	Client adviser Company adviser	Client adviser	Client adviser

5 Discussion

In this paper I have discussed relations between various sub dimensions of structuration of jobs developed in another paper (Nybø 2001). It turns out that most of the variation in the sub dimensions is extracted by three orthogonal dimensions: *formalization, routinization/autonomy* and *work complexity. Project organization* in these data, is closely linked to less structured jobs (more complex, autonomous and less formalized and routinized work). *Team organization* on the other hand, is contingent with more structured jobs.

These findings seems only partly in line with Marsden's theory of employment relations and their postulated structuring by the constraints of enforceability and efficiency. Routinization/autonomy seems to measure type of enforceability (control at job level) at one end of the scale (routinization), but autonomy rather than specification and control on the level of function, on the other end. However, autonomy is also found together with high degree of formalization (from 8% to 25% of the employees in the five companies). This suggests that autonomy may be perceived on the *individual* level while formalization can be directed also on the broader function (formalization of goals and result) and on team level. The enforceability constraint carried out on the level of function therefore could imply a combination of autonomy *and* formalization. As we have seen and alternative interpretation could be that Fox is right that control and trust are functional alternatives when it comes to secure enforceability of the employment contract, and that more autonomy is in fact indication of a trust based relationship.
Work complexity and *educational requirements* is a characteristic of a job that is only indirectly related to *structuring* of the job. One of our findings is that this appears to be a third dimension, and only vaguely related to routinization/autonomy and formalization. However, it could be an important characteristic to explain variation in approaches to personnel development.

In this paper I have concentrated on relations between structural dimensions. In turn this will be used to analyze approaches to human resources in various organizations.

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7 Appendix

Table A1 Descriptive statistics: Dimensions of structure

Items	N	Mean	Std.Dev.	Skewness	Kurtosis
FTASK *Formalization of jobtask and procedures*	556	0,00	0,78	-0,29	-1,02
FFUNC *Formalization of results and goals*	573	0,00	0,76	-0,74	0,96
APROS *Autonomy over work process .*	569	0,00	0,59	-0,46	0,71
ACONTEXT *Autonomy over work context (hours and choice of coworkers)*	579	0,00	0,77	-0,30	-0,33
SCOMPLEX *Complexity of work tasks and decisions*	569	0,00	0,69	-0,58	0,39
FSUPER *Formalization by supervisor monitoring and control*	577	0,00	0,82	-0,44	-0,26
SLEARN *Learning opportunities in the work process*	569	0,00	0,70	-0,50	0,75
SROUTINE *Repetitiveness and attentional requirement*	574	0,00	0,81	-0,75	0,43

Correlations

		Formalization	Routinization	Complexity	Education	Project work	Teamwork
Formalization	Pearson Correlation	1,000	,325**	,143**	-,320**	-,397**	,184**
	Sig. (2-tailed)	,	,000	,001	,000	,000	,000
	N	545	526	515	540	541	539
Routinization	Pearson Correlation	,325**	1,000	-,294**	-,480**	-,560**	,247**
	Sig. (2-tailed)	,000	,	,000	,000	,000	,000
	N	526	558	539	552	553	553
Complexity	Pearson Correlation	,143**	-,294**	1,000	,118**	,139**	,045
	Sig. (2-tailed)	,001	,000	,	,006	,001	,292
	N	515	539	548	542	544	544
Education	Pearson Correlation	-,320**	-,480**	,118**	1,000	,549**	-,154**
	Sig. (2-tailed)	,000	,000	,006	,	,000	,000
	N	540	552	542	579	573	571
Project work	Pearson Correlation	-,397**	-,560**	,139**	,549**	1,000	-,242**
	Sig. (2-tailed)	,000	,000	,001	,000	,	,000
	N	541	553	544	573	579	574
Team work	Pearson Correlation	,184**	,247**	,045	-,154**	-,242**	1,000
	Sig. (2-tailed)	,000	,000	,292	,000	,000	,
	N	539	553	544	571	574	578

**. Correlation is significant at the 0.01 level (2-tailed).