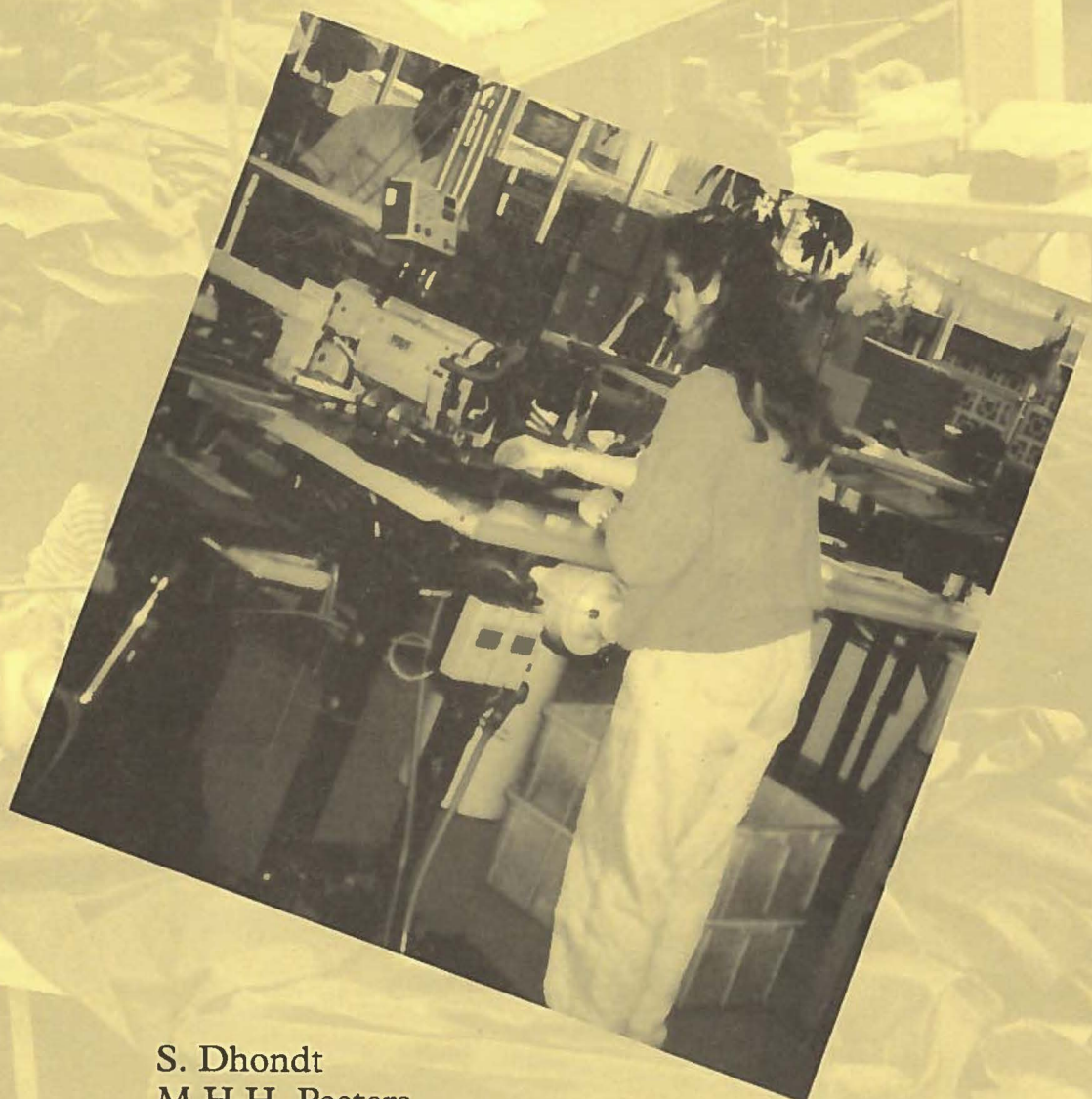


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New production concepts in the clothing industry

Nieuwe productieconcepten in de confectie-industrie



S. Dhondt
M.H.H. Peeters

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FORCE

Nederlands Instituut voor Arbeidsomstandigheden



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NEW PRODUCTION CONCEPTS IN THE CLOTHING INDUSTRY.
NEW WAYS OF WORK FOR UNPREDICTABLE MARKETS.
Results from a European survey.

October 1994

Steven Dhondt & Marc Peeters,
For: The European Teamwork Group.

NIA TNO
BIBLIOTHEEK
POSTBUS 713
2130 AS HOOFDORP
TEL. 023-5549 468

NR. 42409
plaats

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Introduction.

This brochure summarizes the results of a survey carried out among 86 clothing companies representing eight different West European countries. The research examined the effect of new ways of work in clothing companies on personnel policy, on the organisation of work and on the effectiveness of the companies. This research is of interest to company managers, trade unionists, trainers and personnel who are responsible for organising work in clothing companies. ‘New ways of work’, in this brochure is called ‘new production concepts’. Teamwork, decentralisation and job rotation are examples of such new production concepts.

In this brochure, you will find the answers to seven questions:

- Who carried out the survey?
- What is the aim of the survey?
- What are new production concepts in the clothing industry?
- What are the effects of new production concepts for the job of sewing machinist (seamstress)?
- What are the effects of new production concepts for the internal functioning of clothing companies?
- Can clothing companies profit from new production concepts?
- What support can clothing companies get when introducing new production concepts into their manufacturing departments?

At the end of this brochure, you will find a short list of terms, with explanations, which are used in this brochure.

Who carried out the research?

A network of research and training institutions from seven Western European countries was responsible for the survey. The project has also received support from the major training institutions in Holland and Belgium. In the following table, you can read more on the seven institutions which participated in the survey. Throughout the years, this network has acquired a special expertise in the field of team working in clothing companies which can be referred to in the ‘European Teamwork Group’.

This survey is financed by the FORCE-program from the European Commission.

Participants in the research project:	
■	TNO-Prevention and Health, Leiden (The Netherlands), projectleader,
■	The Nottingham Trent University, Nottingham (England),
■	GTТА - Garment and Textile Technology Association, Londonderry (Northern-Ireland),
■	FAS - Foras Áiseanna, Dublin (Ireland),
■	RIAT - Researchinstituut voor Arbeid en Tewerkstelling, Antwerpen (Belgium),
■	Bekleidungsfachschule Aschaffenburg (Germany),
■	DTI - Danish Technological Institute, Taastrup (Denmark).

What is the aim of the survey?

The West European clothing industry has drastically changed in shape during the last two decades. The industry has restructured from labour intensive and vertically integrated companies (companies which produce yarn, design, produce, market and sell the clothing) to companies which subcontract their production to low cost labour countries and limit themselves to design, marketing and selling of the clothing. A lot of companies, however, choose to retain a small production unit to be able to respond to market fluctuations and new requests from customers. In some cases, the local companies are specialised in high value products for which they do not expect immediate competition from low cost labour producers. All these companies have to deal with the problem how to structure the internal production organisation to respond effectively to the ever changing market demands. Increased attention is given to new production concepts such as teamwork, decentralisation and job rotation as a means accomplishing this goal.

A great deal of knowledge exists on new production concepts, but most of this knowledge is theoretical. Experiences on how these production concepts function in reality, how jobs are designed, which personnel policy is followed and how personnel costs look like are rather limited.

The goal of the survey was to deliver such practical knowledge by examining what is happening in clothing companies at the moment. Experiences from 86 clothing companies have been collected to find out to what degree job profiles for sewing machinists differ between clothing companies with new production concepts to clothing companies with rather traditional organisational forms, what differences there are in personnel management and in the way companies operate internally. The survey was carried out in 1993 and 1994.

What are new production concepts in the clothing industry?

A production concept is nothing less than the way in which a company shapes its production (= the production structure) and the way the company can ensure that this production will remain within the limits set (=the control structure). A company should look at its production structure and its control structure when trying to adapt itself to market developments.

The production structure can be adapted in two directions. Companies can divide sewing tasks into small units and allocate them to independent and specialised sewing machinists. Companies can also elect to do just the opposite by integrating as many sewing tasks as possible, letting sewing machinists rotate over these different tasks. A second direction would be to separate indirect tasks (maintenance, quality control, training) from the direct sewing jobs. Alternatively, a company can also choose to integrate these tasks into the main sewing jobs.

If both directions are combined, the following production structures appear:

- Production structures in which sewing jobs are highly divided according to individual sewing tasks and in which sewing jobs have no indirect tasks.
- Production structures in which sewing machinists rotate between sewing operations, but do not undertake any indirect tasks.

- Production structures in which sewing machinists rotate between sewing operations and undertake indirect tasks.

These combinations can be seen on the horizontal axis of Figure 1.

If companies choose to adapt their control structure, then they are looking at questions about centralisation of the planning and work preparation and at which level within their company they should orient their control decisions. Companies can choose to centralise or rather to decentralise control tasks; they can choose to orient their control decisions at the level of the individual operator or rather at higher levels such as teams or departments.

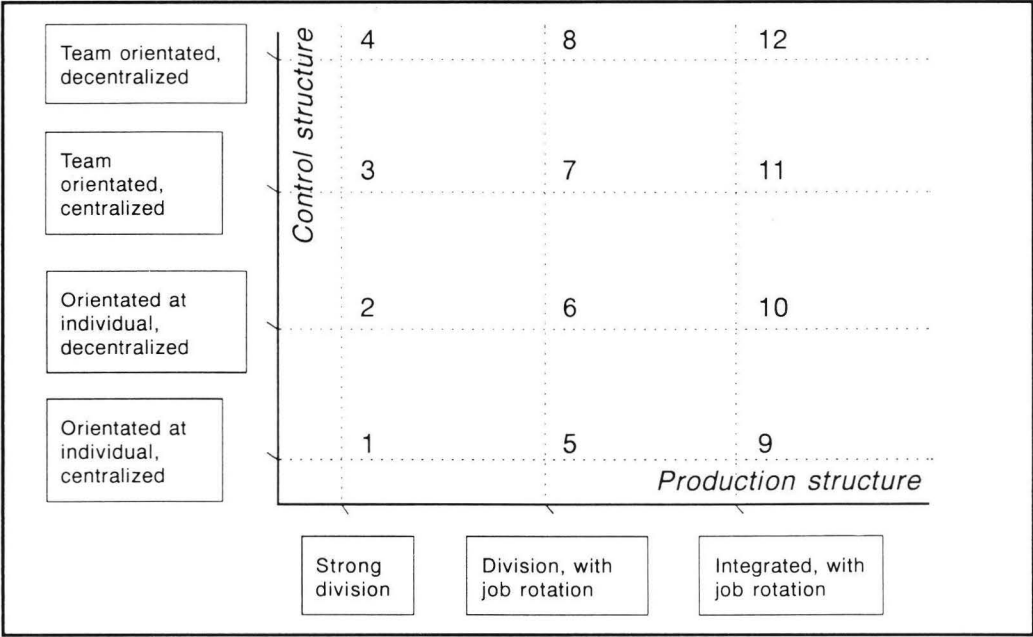
If both directions are combined, the following control structures appear:

- Control structures oriented at team level in which most decisions are devolved to the team (the decentralised version) or in which most decisions remain with the manager (the centralised version).
- Control structures oriented at the individual worker, in which a centralised and also a more decentralised version can be distinguished.

These combinations can be seen on the vertical axis of Figure 1.

When we combine the production structure and the control structure into one model, then we can distinguish twelve different production concepts. These are shown in Figure 1.

Figure 1. Research model for production concepts



4 Each of these production concepts has its advantages and its disadvantages.

- If a company chooses a centralised control structure, oriented at individual workers, then this has as a consequence that management will have to devote a lot of time to master a multitude of production information. Such a control structure makes companies less able to respond to external opportunities as each sales project must be adapted to complex internal regulations.
- More decentralised and team oriented control structures focus most control decisions at lower levels in the company. These lower levels adapt each of them their internal structures to external developments. These kind of companies can respond more quickly to market developments. Higher managerial levels in such companies can concentrate solely on strategic questions; lower company levels deal with all the operational decisions. The negative side of such control structures is that lower levels deviate more easily from established standards.
- If companies choose production structures in which indirect tasks are integrated into the direct work, and sewing machinists can rotate between the different sewing operations, then companies gain a high level of internal flexibility. The disadvantage of such a production structure is that workers may invest too much time in indirect tasks which leads to loss in productivity.
- Highly segmented job structures give the possibility to profit from the specialisation of sewing machinists. The disadvantage is that the company becomes quite inflexible. Adaptation to external fluctuations is slow.

Classical production concepts are mainly characterised by centralised and individualised control structures, coupled with strongly divided production structures (cell 1 in figure 1). These companies are specialised in the mass production of clothing, mainly cheap products with a predictable market demand. New productions concepts (cell 12 in figure 1) decentralise control tasks to the group level and try to integrate indirect tasks in the sewing jobs. Job rotation is common in such concepts. New production concepts allow companies to change over quite quickly to new products and to adapt to fluctuating market demand.

In the survey population, some 22 companies could be categorised as 'new production concept' (=NPC), 52 companies were categorised as 'classical production concepts' (=CPC) and the remaining 12 companies were non-categorised.

What are the effects of new production concepts for the job of sewing machinist?

The survey shows that sewing machinists in the different production concepts perform different jobs. Before we show what these differences are, it is important to know that NPC-companies do not have a higher percentage of indirect work than CPC-companies. Both type of companies show that sewing machinists use 90% of their time productively. NPC-companies do show quite different job profiles for their sewing machinists. Sewing machinists in these company need to execute different tasks than sewing machinists from CPC-companies. They have to be capable of executing more than one task. This 'capability' refers to 'skills'. Differences in skills also lead to longer on-the-job training periods, different recruiting strategies, longer recruiting times and other kinds of training afterwards.

We will clarify these differences.

1. NPC-companies require that their sewing machinists acquire more operational skills.

NPC lead to broader job profiles and therefore to other kinds of operational skills from sewing machinists. The following differences are of importance:

- In NPC-companies, sewing machinists are required to work with more types of sewing machines than sewing machinists in CPC-companies. In the research, we have made a distinction between ordinary sewing machines, specialised sewing machines (for example button machines, loops), semi-automatic machines (with moulds or contours) and programmable machines. In half of the NPC-companies, sewing machinists can work with at least three of these types of machines; sewing machinists are only this versatile in one fifth of the CPC-companies.
- Sewing machinists in NPC-companies have to be able to work with automated machinery and automated support systems (for example computers, product registration systems, automated transport systems).

2. NPC-companies require that their sewing machinists acquire communicative skills.

In most CPC-companies, the coordination and planning of work is tightly dictated by the supervisory and managerial levels in the company. In NPC-companies, job rotation and working within teams is central. These work systems require sewing machinists to mutually adjust their work with colleagues, supervisors and staff

functionaries. NPC-companies also report that the most important job element for sewing machinists is 'cooperating with colleagues'. In CPC-companies, the most important job elements for sewing machinists are 'quality of material' and 'fluctuations in production volumes'.

3. *NPC-companies require that their sewing machinists acquire organising skills.*

Sewing machinists in NPC-companies have to show a feeling for initiative:

These sewing machinists need to decide for themselves

- 'when' and 'how' to rotate between the different jobs.
- They need to organise meetings for themselves.
- They need to undertake the administrative support and the planning and work division themselves.

4. *NPC-companies follow a different personnel policy for their sewing machinists.*

Clothing companies recruit their sewing machinists from unqualified workers. In the recruiting process, the NPC-companies set higher standards than CPC-companies:

- New sewing machinists need to show 'all round practical knowledge', 'high commitment', 'cooperative thinking' and 'a feeling of responsibility'. In CPC-companies, the first two of these requirements are not demanded.
- On-the-job training of new sewing machinists until they achieve normal productivity levels is about one month longer in NPC-companies (152 days on average) than in CPC-companies (130 days).
- Both types of companies can get about the same number of applicants for their jobs. The time to fill a job with an acceptable candidate takes twice as long in NPC-companies (34 days) than in CPC-companies (14 days).
- NPC-companies train their sewing machinists in a different way than the CPC-companies. In CPC-companies, only the operational skills of sewing machinists are further developed. In NPC-companies, a lot of attention is focused on improving operational, communicative and organising skills.

What are the effects of new production concepts for the internal functioning of clothing companies?

5

We have also looked at the way supervisors, staff personnel work together with sewing machinists. It is important to look at this dimension if one wants to have all operations running smoothly.

The following remarks are of importance.

1. *NPC-companies need to follow a different style of leadership.*

Supervisory and managerial personnel are central figures in clothing companies. In all task domains (delivery of materials, repair and maintenance, quality control, administrative support, training, planning and work allocation, work meetings), these functionaries have a central role. In the following table, the division of tasks among supervisory personnel, sewing machinists, maintenance, training and quality control is given. The sewing tasks are not described in the table, it is clear that these are the sole tasks of the sewing machinist.

Table 1. Division of tasks in the two production concepts for the major functionaries. (n=82) (■ = task mainly executed by functionary)
Legend: M = managerial or supervisory; S = sewing machinist; Q = quality control; T = technical or maintenance; E = Education or training

		Classical production concepts					New production concepts				
Tasks:	Functionary:	M	S	Q	T	E	M	S	Q	T	E
a. Delivery of materials											
- delivery and transporting of unfinished and finished goods		■	■				■	■			
- delivery of smallware, requisites		■	■				■	■			
- materials planning/-ordering		■					■				
b. Setting up and maintenance of sewing machines											
- cleaning up and maintenance workplace		■	■		■			■			
- first line maintenance (yarn breakage, needle breakage, cleaning machine)			■					■			
- adjusting tensions		■	■		■		■	■		■	
- machine repair							■				
- preventive maintenance			■		■			■			
- setting up of the machine		■	■		■		■	■		■	
- adjusting stitch size of machines		■	■		■		■	■		■	
- adjusting speed of machines		■					■	■			
- testing machines		■	■		■		■	■		■	
- improving technical process								■			
- deciding on the buying of new machines		■			■		■			■	
- deciding on the buying of machine parts		■			■		■			■	
- adjusting of machines		■			■		■	■		■	
c. Quality control											
- entrance control material		■	■				■				
- quality control previous production step		■	■				■	■	■		
- quality control own tasks		■	■				■	■	■		
- quality control finished product		■	■				■	■			
- recording of errors		■	■				■	■			
- reworking of material (repairwork)		■	■					■			
- making use of special statistical control (e.g. pareto, fish bone diagrams)		■					■				
- defining quality demands		■		■			■		■		
- analyzing new operations		■					■				
d. Administrative tasks											
- administration of production		■					■	■			
- keeping a logbook		■					■				
- budget administration		■					■				
- vacation planning		■					■	■			
- lay out working environment		■			■		■	■		■	
e. Training - education											
- introducing, working in of new machinist		■	■			■	■	■			
- instructing practical skills		■	■			■	■	■			
- translating operations into practical training programmes		■				■	■				
- defining working instructions		■					■				
- monitoring the progress of new machinists		■				■	■	■			■
- keeping attendance records		■					■				
- giving performance training		■					■				■
- passing on theoretical knowledge by means of explanation, visual aids etc.		■				■	■				■
- consulting with the room supervisor when dividing work between employees		■					■				
f. Planning and work division											
- division of machinists over machines		■					■	■			
- production planning											
- deciding on sequences of jobs		■					■	■			
- orderplanning		■					■	■			
- internal logistics/tuning between workposts		■					■	■			
- looking after the progress and the execution of the production		■					■	■			
- improvement of working methods		■			■		■	■	■		■
- filling in when necessary		■	■				■	■			
-											
g. Meetings											
- calling working meetings		■					■	■			
- leading working meetings or consultations		■					■				

This table clearly shows that supervisory and managerial personnel in NPC-companies have to cooperate with sewing machinists in more fields than supervisory and managerial personnel in CPC-companies. Supervisory and managerial personnel in CPC-companies have a more solitary job. In NPC-companies, these functionaries support the sewing machinists at their work. It is the sewing machinists which carry the companies.

2. Staff support is not very different in both type of companies. We have looked at the way maintenance, quality control and training is taken care of in the different companies. In both types of production concept, these jobs look very alike.

- Maintenance personnel ensure that the adjusting and maintenance of machines is carried out. One tendency that seems to be rising, is that repair jobs have to be executed in much shorter delays in NPC-companies. Downtimes of machines in NPC-companies make a whole group of workers inactive. In CPC-companies, only one sewing machinist is affected by the break down of a sewing machine.
- Nearly all clothing companies continue to check each finished garment. Total Quality philosophies have not yet lead the companies to reduce their quality checks to random sampling.
- Most companies do not have a specialised trainer. The rule is that colleagues take care of training new sewing machinists. No differences could be found between NPC- and CPC-companies.

Can clothing companies profit from new production concepts?

The answer to this question is a prudent 'yes'. The answer is prudent because the survey was not designed to answer this question conclusively. We have not collected any information on the productivity or performance of the companies. The results do show that slightly more NPC-companies are found in highly unpredictable market environments. Unpredictable market environments are those environments which require customised production, production-to-order and small production batches. More research is needed to show if NPC-companies are also more profitable than CPC-companies in these environments. We do know from the companies in the survey, that these companies have consciously chosen to follow the NPC-path for these market environments. Results from previous investigations of the research group show that NPC-forms have better survival rates than CPC-companies.

What support can clothing companies get when introducing new production concepts into their manufacturing departments?

7

New production concepts can help companies to survive in difficult markets without losing productivity. Companies which change to NPC achieve a high degree of internal flexibility which can help them to adapt quickly to market fluctuations. If a company wants to change to NPC, it must be aware of the fact that investment in human resources is necessary to make the change a success. Companies can choose to make these investments themselves, but they can also elect to get support from external advisors and training institutions. The important fact is that a company should start from a strategic plan in which sufficient room is given for training. If a company needs external support to change to NPC, the European Teamwork Group can help companies to make NPC successful.

For more information on the Team Work-network, please contact in your region:

The Dutch report on which this brochure is made, can be ordered at following address:

TNO Prevention and Health
Steven Dhondt
PostBox 2215
2301 CE Leiden
The Netherlands.

GLOSSARY

European Teamwork Group	=	this is a network of partners which was created to investigate the possibilities in developing and disseminating human-centred forms of work organisation in the clothing industry. The network develops instruments for companies to improve their work organisations.
FORCE	=	FORCE is a European programme which is oriented at the improvement of professional training of the working population. The programme is co-ordinated by the European Commission.
production concepts	=	this has to do with the way a company shapes its production (-production structure) and controls the degree to which all decisions are carried out in an orderly way (=the control structure).
job rotation	=	this means that workers can and are allowed to carry out more than one task. If this is only rotation between operations, then this is called job enlargement. If the rotation also consists of indirect tasks, then the rotation is called job enrichment.
decentralisation	=	this means that most production decisions are taken at a low level in the company. This can be at departmental level, teamlevel or even at the level of the individual worker.
unpredictable markets	=	these are markets in which production batches are small, or in which the company only produces-to-order or in which companies only have customised production. Such companies have a hard time predicting how production will develop. Planning is a difficult thing.