

Arvanitis, Spyros; Hollenstein, Heinz; Marmet, David

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Numerical labour flexibility and economic performance: What can we learn from the experience of firms in small European economies? ; Some empirical evidence from firm case studies

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Arbeitspapiere/ Working Papers

Spyros Arvanits, Heinz Hollenstein and David Marmet

Numerical Labour Flexibility and Economic Performance: What Can We Learn from the Experience of Firms in Small European Economies?

Some Empirical Evidence from Firm Case Studies

Numerical Labour Flexibility and Economic Performance: What Can we Learn from the Experience of Firms in Small European Economies?

Some Empirical Evidence from Firm Case Studies*

Spyros Arvanitis, Heinz Hollenstein and David Marmet

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1 Introduction

Flexible working patterns have been the subject of considerable interest as well as the source of much controversy in the past twenty years. Particularly, what is regularly emphasized is the importance of human resource management practices that enable organizations to adapt quickly to rapid developments in technology, mismatch in labour markets, stronger price and non-price competition in product markets and financial restructuring in capital markets.

Flexibilization of labour has many dimensions. One of the most common and well-known classifications distinguishes between *numerical* and *functional* flexibility. Numerical flexibility is the ability of the firm to adjust the quantity of labour to meet fluctuations in demand. Functional flexibility is the ability to deploy employees to the best effect. In this study we focus on numerical flexibility; particularly, we deal with the question of the relevance of numerical flexibility with respect to firm performance.

This report, based on information from a series of firm case studies in five small European countries, is the second part of a larger project containing also national reports on structural and institutional aspects of labour flexibilization at the country level as well as microeconomic investigations.

In section 2 we briefly sketch the conceptional background of the study, formulate a series of hypotheses and describe the data sources. In section 3 we present information on different modes and characteristics of numerical flexibility: a) the incidence of several forms of numerical flexibility; b) the type of relationship between the single forms of numerical flexibility, c) the relationship between numerical flexibility on the one hand, and working time flexibility, labour turnover, compensation schemes and some institutional aspects (e.g. unionization) on the other. Furthermore, we discuss the motives of flexibilization and possible links of numerical flexibility to other types of firms' responses to changing economic conditions (adjustment of the firm structure, outsourcing).

In section 4 we address the question of flexibility and performance. First, the relationship between numerical flexibility and some key factors determining economic performance is analyzed: a) technology use (R&D intensity, introduction of innovations, information and communication technologies (ICT) and computer-based production technologies), b) human capital (education, training) and c) workplace organisation (team-work, job rotation, involvement of workforce in decision-making, occupational flexibility and/or mobility). Since the combination of these elements of workplace organisation is at the core of functional flexibility, second, we try to provide some insights into the interrelationship between numerical and functional flexibility. Finally, we present some results concerning the relation between numerical flexibility and some performance measures (innovativeness, efficiency/productivity, competitive position, sales, profits) and employment. Section 5 contains a summary and conclusions.

2 Conceptual Background and Data

Conceptual Background and Existing Literature

Numerical flexibility is defined, as already mentioned, as a process through which firms react to changes in the demand for their products/services by adjusting the amount of labour they employ. It is achieved through overtime, part-time work, variable working hours, fixed-time contracts or lay-offs. There is a further distinction among the various forms of numerical variation of labour which is both conceptually and empirically advisable to keep in mind: temporary and part-time work (which is often permanent work). A main reason for making this distinction is that “the motivation of employers for using the two types of labour is likely to differ, as are the problems facing employers in managing the two different labour forces” (see Osterman 1999, p. 55). In this context, temporary work includes temporary help firm employees, on-call workers (who work for a firm for a specific period of time but are not part of the regular work force), freelance workers / independent contractors and other people with jobs that are temporary for one of the following four reasons: they are temporarily replacing another worker, their job is seasonal, they are working only on a specific project, or they are working on a fixed-term contract (see Osterman 1999, p. 85; see also Bronstein 1991 for definitions of temporary work).

From a theoretical point of view the quantitative flexibilization of labour, e.g. in form of part-time and fixed-term contract work, aims at reducing labour costs, smoothing the burden of regular work or providing the firm with specialized services (see e.g. Abraham and Taylor 1996); so we would expect a positive correlation of proxies of numerical flexibility to performance. Nevertheless, we should have to bear in mind that the evidence in the empirical literature, e.g. for part-time work and fixed-term contract work, is mixed and depends on the overall conditions of the labour market as well as its institutional framework (see e.g. Hutchinson and Brewster 1994 for detailed firm case studies in several European countries dealing with the advantages and disadvantages of several flexibility measures).

We are going to investigate the relationship between numerical flexibility and economic performance not only directly but also indirectly. Technology, human capital and workplace organisation are important factors determining productivity growth. If these factors are (positively) negatively related to numerical flexibility, we expect that this type of flexibility also has a positive (negative) impact on performance.

Some further insights into the role of numerical flexibility are gained through the differences between numerical and functional flexibility embodied in the structure of Atkinson’s “core-periphery” model (Atkinson 1984). He argued that a firm partitions the workforce into “core” and “peripheral” workers. At the core the emphasis is on functional flexibility; shifting to the periphery numerical flexibility becomes more and more important. The “core workers” are the full-time, permanent employees who enjoy training, high earnings and job security. The “peripheral workers” are those who have skills which are not specific to the particular firm

and therefore can be relatively easily recruited from the external labour market and be employed on non-standard types of contract (e.g. fixed-term or temporary work contracts). Firms can vary their numbers according to levels of activity. The numerically flexible, non-standard, peripheral workers are used to buffer or protect the regular core labour force from fluctuations in demand. In the view of the Atkinson model these two kinds of activities and employee groups are complementary to each other and so are also the corresponding flexibility modes. But results of empirical studies do not support the core-periphery model (see Kalleberg 2001 for a review of the empirical literature on this subject).

In accordance to the core-periphery model we expect a negative correlation between numerical flexibility and employment duration and thus a positive relation of numerical flexibility with labour turnover. Non-standard compensations systems (such as profit-sharing, bonuses, individual- or group-based pay etc.) are primarily granted for core workers, so we expect a negative correlation between numerical flexibility and non-standard compensation.

The use of numerical flexibility enable employers to match labour utilization more closely to demand requirements; thus, we expect a positive relation between this form of flexibility and market conditions such as business cycle fluctuations, seasonal fluctuations and changes of the intensity of competition in firms' environment.

Are the different forms of flexibility applied by firms complements or substitutes? This is not a priori clear. For example, the impetus to work part-time may come rather from employees desiring to reconcile the conflicting claims of work and family (see Wickham 1997) and not from managers trying to cope with demand fluctuations. On the other hand, offering fixed-term contracts corresponds better to a firm's rationale of efficient operation and is an option rather of managers than of employees. Thus, the relation between the different forms of flexibility can be ambiguous.

On the whole, there exist some empirical studies dealing e.g. with part-time or fixed-term contact work at the macroeconomic level (see e.g. Walwei 1991, ILO 1997, OECD 2002), but it is difficult to find any studies investigating numerical flexibility (as defined here) at the firm level.

Data and methodology

We dispose of detailed data for 30 firms from five small European countries: Finland, Ireland, Greece, Netherlands and Switzerland. These data were collected through personal interviews based on a common questionnaire (see annex). Each country covered at least one firm of specific characteristics according to the Pavitt classification with some modifications to account for specificities of the service sector (Pavitt 1984). *Table 1* shows the distribution of firms by country, industry (manufacturing: 18 companies; services: 12 companies) and firm

size (small firms (up to 100 employees): 2 companies; medium-sized firms (100-500 employees): 11 companies; large firms (500 or more employees): 17 companies).

In our report *numerical flexibility* covers 4 categories of work contracts: part-time, fixed-term, work on call and temporary work (personnel temporarily hired from other firms). All four types of flexible work were measured on an ordinal five-point Likert scale (1: “irrelevant”; 5: “extremely relevant”; see question 29 of the questionnaire). They were also measured quantitatively by the percentage of personnel and percentage of working hours respectively (see questions 30a, 31a, 32a and 33a of the questionnaire). These categories are analyzed either separately or as a qualitative flexibility index; this is based on the sum of the scores of the ordinal measurement for the 4 types of work contracts taken into consideration in this study.

Throughout the tables of this study we distinguish *low*, *medium* and *high* overall qualitative flexibility according to the sum of scores for the single flexibility variables: scores 5 and 6 for “low”, 7, 8 and 9 for “medium”, 10, 11, 12 and 13 for “high” (see also table 2). In table 16 and 17 we define the categories “low”, “medium” and “high” for the quantitative measures of part-time and fixed-term contract flexibility as follows: for part-time work: 0% to 0.5% for “low”, 1% to 5% for “medium”, 8% to 55% for “high”; for fixed-term contract work: 0% to 2% for “low”, 3% to 6.3% for “medium”, 7% to 50% for “high” (see also table 2).

The small number of cases does not allow a separate analysis by country or by “Pavitt type” of firm; our results are the analysis is thus based on the whole sample of 30 available observations. Since the sample is very small, we concentrate on bivariate cross-tabulations and correlations (for the cases where these are appropriate and feasible).

Table 1: Interviewed firms by country, industry and firm size

Firm Code	Industry	Country	Number of employees (1)
1	Chemical Products	Switzerland	2
2	Textiles	Switzerland	2
3	Banking	Switzerland	3
4	Machinery and equipment	Switzerland	2
5	Communication	Switzerland	4
6	Chemical Products (Health)	Finland	4
7	Office and Computing Machinery (Electronic materials)	Finland	3
8	Office and Computing Machinery (Electronics)	Finland	2
9	Furniture	Finland	4
10	Chemical Products	Finland	2
11	Plastic Products	Finland	4
12	Insurance	Finland	3
13	Healthcare	Finland	3
14	Public Water Supply	Netherlands	2
15	Textiles (Carpets)	Netherlands	2
16	Communication (Telecommunication)	Netherlands	2
17	Production of temporary buildings	Netherlands	1
18	Transport equipment (Passenger cars)	Netherlands	4
19	Office and Computing Machinery (Semiconductors)	Ireland	4
20	Chemical Products (Pharmaceutical)	Ireland	2
21	Healthcare	Ireland	3
22	Food, Beverage and Tobacco	Ireland	2
23	Food, Beverage and Tobacco	Ireland	4
24	Chemical Products	Greece	1
25	Food, Beverage and Tobacco	Greece	2
26	Retail	Greece	4
27	Business services	Greece	3
28	Banking	Greece	4
29	Communication (IT industry)	Greece	4
30	Healthcare	Greece	4

1) 1: 20-99 employees, 2: 100-499 employees, 3: 500-999 employees, 4: 1000-10000 employees.

3 Numerical flexibility

3.1 Forms and characteristics of numerical flexibility

Forms of numerical flexibility

Among the four categories of work contracts related to numerical flexibility, *part-time and fixed-term contracts are the most widespread practices* and in some firms quite important. Work on call and temporary work are not used by many companies, and if so, not to a large extent (*table 2*). The maximum of the qualitative overall index of flexibility (sum of the relevance of the individual forms of flexible work arrangements) is 13 (out of a maximum of 20 indicating that each form of flexibility is very important). About 25% of the firms show an index of 10 and higher, whereas the flexibility index of a third of the cases is 7 or lower. In sum, we find a significant degree of flexibility; however, on average, flexibility measured by the summary index is not very high, reflecting, to some extent, the substitutive relationship we find for some forms of flexibility (see below).

Over time, numerical flexibility increased, with part-time work growing faster than fixed-term contracts (*table 3*), whereas there is not much change of work on call. The increase of part-time work is, in the first place, due to firms which, in the past, did not (much) rely on this type of arrangement; these firms are thus catching-up.

Since part-time work, in many instances, is based on permanent contracts, numerical flexibility might be higher in case of fixed-term contracts, work on call, etc.; *the flexibility of part-time work rests to a significant extent on variation of hours*.

The relationship between different forms of numerical flexibility

Are the different forms of flexibility distinguished in this study complementary elements of a firm's flexibilization strategy, or are they substitutes? As the *tables 4 and 5* show, a firm, on average, chooses either to use part-time work or to rely on fixed-term contracts (negative correlation indicating substitution). This result holds even if the motives of choosing the two strategies are to some extent different (see below, *table 10*); obviously, the motives common to both strategies weigh more than the differences. Work on call, not surprisingly, is complementing fixed-term contracts (positive correlation), whereas there is no significant relationship with part-time work. Temporary work is not correlated at all with the other forms of numerical flexibility.

Table 2: Flexibility profile of firms: qualitative and quantitative measures (ranked by the qualitative flexibility index (column 5; see footnote 2))

Firm Code	Relevance of (1)				Sum (2)	Employees with.... (% of personnel)			
	Part-time jobs	Fixed-term contracts	Work on call	Temporary work		Part-time job	Fixed-term contracts	Work on call	Hours worked by temporary workers
24	1	2	1	1	5	0	2	0	0
27	1	2	1	1	5	0	2	0	0
1	3	1	1	1	6	3	5	0	6
8	1	3	1	1	6	0	15	0	10
19	2	1	1	2	6	3	0	0	<1
21	2	2	1	1	6	10	5	0	0
25	1	3	1	1	6	1.2	10	0	0
29	1	3	1	1	6	0	14	0	0
30	1	1	1	3	6	0	20	1	0
15	4	1	1	1	7	8	5	0	20
3	2	2	3	1	8	15	1	5	0
5	3	3	1	1	8	10	3	0	2
10	3	3	1	1	8	5	6	0	0
16	1	4	2	1	8	1	50	10	1
17	4	2	1	1	8	19	6	0	0
20	1	5	1	1	8	0.5	5-10	0	5-10
28	1	5	1	1	8	0	6.3	0	0
2	4	1	3	1	9	15	0	2	1-2
6	2	4	1	2	9	0.2	5	0	0.003
9	2	3	2	2	9	0.3	0.5	0.5	0
12	2	5	1	1	9	5	7	0	0
23	5	2	1	1	9	20	2-5	0	0
26	5	1	1	2	9	55	0	0	0
7	2	5	1	2	10	3	< 5	0	5
11	2	4	3	1	10	3	10	1	0.5
14	4	2	1	3	10	24	5	0	1
4	4	4	2	1	11	30	1	0	1
18	2	5	2	2	11	3-4	1	1.5	7.5
22	3	5	1	3	12	2	0.58	0	2
13	2	5	5	1	13	n.a.	18-20	n.a.	0.01

- 1) Relevance of the specific category measured on a five-point Likert scale (1: irrelevant; 5: extremely relevant).
2) Sum of scores of the 4 qualitative categories.

Table 3: Flexibility profile of firms: assessment for the last three years and the foreseeable future (1) (firm ranking as in table 2)

Firm code	Part-time jobs	Fixed-term contracts	Work on call
24	6	6	6
27	6	6	6
1	6	6	6
8	6	9	7
19	7	n.a.	n.a.
21	6	5	n.a.
25	6	7	6
29	6	6	6
30	6	4	6
15	8	6	n.a.
3	8	6	6
5	6	6	6
10	8	7	6
16	7	6	8
17	7	8	n.a.
20	8	5	n.a.
28	6	7	6
2	8	6	6
6	7	6	n.a.
9	8	7	8
12	8	6	6
23	6	5	n.a.
26	5	n.a.	6
7	7	8	n.a.
11	8	8	8
14	6	7	6
4	6	5	6
18	8	6	6
22	6	6	n.a.
13	7	6	n.a.

- 1) Sum of the questions "During the last three years the percentage of personnel has..." and "in the foreseeable future the percentage of personnel will...". Both questions were measured on a five-point Likert scale (2: substantially decrease; 10: substantially increase).

Table 4: Relation among various dimensions of numerical flexibility
(qualitative measure) (1)

	Part-time	Fixed-term	Work on call	Temporary work
Part-time	1.00	-0.32	0.06	0.13
Fixed-term		1.00	0.20	-0.02
Work on call			1.00	-0.13
Temporary work				1.00

- 1) Spearman correlations.

Table 5: Relation among various quantitative dimensions of numerical flexibility
(quantitative measure) (1)

	Part-time	Fixed-term	Work on call	Temporary work
Part-time	1.00	-0.29	-0.07	-0.14
Fixed-term		1.00	0.71	-0.03
Work on call			1.00	-0.09
Temporary work				1.00

1) Pearson correlation coefficients.

In the remaining of the paper numerical flexibility is related to various aspects of work organisation and economic performance. In tables 6 to 17 we present results where these aspects are cross-tabulated with the intensity of numerical flexibility (three levels: high, medium, low flexibility), which is measured by the qualitative overall index of flexibility presented above (high flexibility: 10 and more points on the flexibility scale; medium: 7 to 9 points; low: up to 6 points). In addition, as far as feasible (i.e. if variables are not measured on a nominal scale), we also show correlations based on the sample firms.

Numerical flexibility and flexibility of working time

The relationship between numerical flexibility and flexibility of working time is not the same for each type of flexible working time (*table 6*). We find a positive correlation for flexible working hours over the year and the adjustment of working time according to demand changes; a detailed analysis shows that this effect is mainly attributed to part-time work. The “collection” of overtime with compensation later on, however, is not related to numerical flexibility. Surprisingly, individually tailored working hours show the strongest (positive) relationship with numerical flexibility. *Flexible working time arrangements are increasing over time*, a tendency we also found for overall numerical flexibility, another piece of evidence for the relatedness of the two types of flexibility.

Numerical flexibility and labour turnover

High numerical flexibility seems to imply high labour turnover. However, this must not be the case, since some forms of flexible work (e.g. part-time) often are established as permanent contracts. Thus, it is not very surprising that, as shown in *table 7*, there is *no correlation between numerical flexibility and labour turnover (positive sign) or duration of employment (negative sign (table 7))*.

Numerical flexibility and compensation scheme

Fixed-term contracts and temporary work contracts are presumably more frequent among low-skilled (production) workers who are often paid according to volume and quality of output (positive relation to numerical flexibility) Incentive-oriented pay schemes which are linked to performance in a more general way (like profit-sharing and company- or team-based

pay) are more frequent in case of (highly) qualified personnel, which typically are full-time employees (negative relation to numerical flexibility). *Table 8*, indeed, shows the expected sign for the different types of compensation.

Table 6: Working time flexibility and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
Percentage of employees with flexible working time during the year (1)	19	16	15	35	0.24
<i>Percentage of firms with working time arrangements such as:</i>					
- individually tailored working hours	38	13	36	71	-
- working times that adjust to the demand situation	44	25	54	50	-
- collection e.g. of overtime hours into "working time files" to be used at a later point of time	54	63	39	57	-
- "working time periods" (a pre-determined number of working hours during a fixed period)	32	38	15	57	-
- overtime work (during the past 12 months)	74	88	58	86	-
<i>Percentage of firms with changes (adoption) of existing (new) working time arrangements:</i>					
- in the period 1999-2001	39	12	39	71	-

1) Less than 20 observations.

Table 7: Employment duration, labour turnover and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>Percentage of employees with employment duration of:</i>					
- more than 10 years	40.4	40.8	34.9	49.5	0.19
- 6 to 10 years	22.2	24.6	23.2	16.3	-0.20
- 2 to 5 years	26.0	21.6	29.7	27.4	0.09
<i>Change of average employment duration (1):</i>					
- in the period 1999-2001	3.0	2.9	3.1	2.9	-0.06
- in the foreseeable future	3.1	3.3	3.2	2.7	-0.30
<i>Labour turnover (percentage of employees):</i>					
- joined the firm during the last 12 months	8.9	7.8	10.5	7.4	-0.08
- left the firm during the last 12 months	8.2	7.4	8.8	8.5	-0.06
<i>Change of labour turnover (1):</i>					
- in the period 1999-2001	3.3	3.4	3.1	3.4	-0.11
- in the foreseeable future	3.0	3.1	2.9	3.1	-0.03

1) Measured on a five-point Likert scale (1: decreased substantially; 5: increased substantially).

Table 8: Compensation scheme and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>Percentage of firms with a compensation system such as:</i>					
- output-related pay	16.0	0.0	14.3	40.0	-
- quality based pay	12.0	0.0	7.1	40.0	-
- profit-sharing, bonuses, options or some similar system	76.0	83.3	78.6	60.0	-
- individual-, group-, team-, company-based pay	64.0	33.3	64.3	100.0	-
<i>Percentage of firms with an increase of wage/earnings dispersion:</i>					
- in the period 1999-2001	48.3	55.6	42.8	50.0	-

Numerical flexibility and organisation of the labour force

One would expect that workers organized in unions (paid according to collective agreements) are less flexible than unorganized employees, since the unions, for example, tend to protect their members against hire-and-fire policies, or are mostly adversaries of some specific forms of flexibility such as, for example, work on call. *Table 9*, however, does not show any (unambiguous) relationship between numerical flexibility, on the one hand, and, on the other, pay according to collective wage agreements, the share of unionized workers or the percentage of firms where “Workers Councils” are established.

Table 9: Institutional factors and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>Percentage of personnel paid:</i>					
- according to collective wage agreements	40	47	10	55	0.06
- above the norm of collective wage agreements	30	10	23	35	0.00
- according to individually negotiated salaries	20	1	28	11	0.14
<i>Percentage of firms with a Workers' Council</i>	53	44	43	86	-
<i>Percentage of firms with a share of unionized employees:</i>					
- less than 10%	30	17	42	14	-
- 10-50%	19	0	29	14	-
- more than 50%	51	83	29	72	-

3.2 Motives for numerical flexibility

Assessment of motives

Table 10 shows the relevance of various motives for using part-time as well a fixed-term contracts and their relationship with the overall degree of numerical flexibility. It turns out that demand fluctuations (business cycle, seasonality) are much less important as a motive for using part-time work than for relying on fixed-term contracts. Part-time work is primarily the result of voluntary decisions of employees, i.e. it is *supply-driven*. In case of fixed-term contracts, *demand factors are the dominant force*: in addition to general fluctuations of demand for the firm's product, some more specific demand factors play a role (compensation for some kind of leave, temporary demand for some specialists, probation); moreover, fixed-term contracts serve as a means to avoid the risk of ending-up with too much personnel in case of a negative demand shock.

Table 10: Motives for using numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>Percentage of firms reporting following reasons for part-time work:</i>					
- fluctuations in demand	26	33	23	29	-
- business cycle fluctuations	17	0	15	29	-
- seasonal fluctuations	17	0	23	14	-
- saving wage costs	17	0	15	14	-
- voluntary decision of employees	65	100	46	71	-
<i>Percentage of firms reporting following reasons for fixed-term contracts:</i>					
- fluctuations in demand	40	50	27	50	-
- business cycle fluctuations	36	38	18	67	-
- seasonal fluctuations	24	38	18	17	-
- saving wage costs	4	0	0	17	-
- voluntary decision of employees	4	0	0	17	-
- replacement for some kind of leave (sickness, motherhood, etc.)	56	75	36	67	-
- temporary or exceptional work (e.g. special skills required)	40	38	27	67	-
- probation	32	25	36	33	-
- general practice to avoid increase of permanent personnel	24	13	18	50	-

The role of market conditions

One would expect that numerical flexibility is an important means to reduce the exposure to demand fluctuations and to changes of the degree of market competition. However, as *table 11* shows, we do not find any evidence for such a relationship. One reason for this result may be the fact that, as shown in *table 10*, supply factors are the dominant motives for using part-time work, which is the most important form of numerical flexibility.

Table 11: Market conditions and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>Sensitivity of firms' activities/sales with respect to:</i>					
- business cycle fluctuations (1)	2.2	2.2	2.1	2.2	-0.16
- seasonal fluctuations (1)	1.6	1.7	1.5	1.8	0.04
<i>Change of the intensity of competition in firms' market field:</i>					
- in the period 1999-2001 (2)	2.3	2.6	2.1	2.5	-0.07

1) Measured on a three-point Likert scale (1: hardly sensitive; 3: highly sensitive)

2) Measured on a five-point Likert scale (1: decreased substantially; 5: increased substantially).

Numerical flexibility and outsourcing

Finally, we look at the relationship between numerical flexibility and other responses to a (rapidly) changing economic environment (*table 12*). We find that outsourcing (and unspecified adjustments of a firm's structure) are *most frequent in firms with medium and high numerical flexibility*. Outsourcing, i.e. "external" flexibility is thus *complementary* to "internal" numerical flexibility. In addition, we find that outsourcing is growing in importance, in the first place, in firms which did not much use this element of flexibility in the past, indicating some catching-up.

Table 12: Organisational change and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>Percentage of firms with important structural changes:</i>					
- in the period 1999-2001	82.7	66.7	92.9	83.3	-
<i>Percentage of firms with outsourcing of services, etc.:</i>					
- in the period 1999-2001	76.7	55.6	92.9	71.4	-
<i>Change tendency of outsourcing activities (if outsourcing activities) (1):</i>					
- in the period 1999-2001	2.0	2.2	2.0	1.6	-0.43

1) Measured on a five-point Likert scale (1: decreased substantially; 5: increased substantially).

4 Flexibility and performance

4.1 Introductory remarks

It is difficult to establish a direct relationship between numerical flexibility and performance, since the latter depends on a whole set of variables. Hence, to identify the impact of flexibility on performance one must control for all other factors determining performance. In this chapter we analyze this relationship not only directly but also indirectly. Technology, human capital and workplace organisation are important factors determining productivity growth. If these factors are (positively) negatively related to numerical flexibility, we expect that this type of flexibility also has a positive (negative) impact on performance.

4.2 Numerical flexibility and some key determinants of economic performance

Technology use

There are several dimensions of technology use to be looked at, some of them clearly related to product innovations (sales share of innovative products), others indicating process innovations (use of advanced manufacturing technology). R&D intensity refers to both types of innovations; however, it is more often oriented towards the generation of new products. Similarly, ICT is related to both types of innovations, although the use of new processes may be more relevant; in addition, ICT is also related to reorganisation (which we also examine below).

Basically, one would expect that innovative and/or technology-intensive firms are characterized by less numerical flexibility than low-tech firms, since high-tech firms strongly depend on tacit knowledge which is embodied in the permanent workforce. High labour turnover (or a hire-and-fire policy) is thus detrimental to the firm, in particular in case of R&D which is the most “knowledge dependent” element of technology. Since we did not find a positive correlation between numerical flexibility and labour turnover (see above, table 7), the results referring to the basic hypothesis might be blurred.

Information on the relationship between numerical flexibility and the various aspects of technology use and innovation is presented in *table 13*. It turns out that, *in general there is no significant relationship between technology use and numerical flexibility*, neither positive nor negative. This is obvious in case of the indicators related to ICT, advanced manufacturing technologies and the proportion of innovative products. The results are *mixed as far as R&D is concerned* (where tacit knowledge might be more important than in case of the other aspects of new technology). R&D intensity (R&D expenditures/personnel as a share of sales/employment) is at highest in low-flexibility firms (which is in line with the basic hypothesis), whereas the opposite is true for the share of firms that are active in R&D. Since we believe that the intensity measure is the more appropriate one, the main conclusion is innovative firms tend to use less numerical flexibility than less innovative ones.

Table 13: Technology and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>R&D activities:</i>					
<i>Percentage of firms with:</i>					
- any R&D activities	79	78	71	86	-
- permanent R&D activities	73	67	71	86	-
R&D expenditures as a percentage of sales 2001 (1)	5	10	3	3	-0.14
R&D personnel as a percentage of total personnel (1)	3	7	3	4.5	0.00
<i>New technology:</i>					
Percentage of firms introducing an important new technology:					
- in the period 1999-2001	68	75	64	67	-
Assessment of the state of process technologies (e.g. CAD, CAP, CNC, etc.) compared to the average of firms' sector (2)	4.0	3.9	3.9	4.2	0.03
<i>ICT:</i>					
- use of e-mail (1: 0%; 6: 81-100%)	4.3	4.2	4.1	4.7	0.01
- use of internet (1: 0%; 6: 81-100%)	3.1	3.1	3.1	3.0	0.04
- use of intranet (1: 0%; 6: 81-100%)	3.7	3.6	3.8	3.8	0.05
Homepage since.....(year)	1998	1997	1999	2000	-
<i>Sales of radically changed or new products as a percentage of total sales</i>	15.6	17.9	13.6	15.4	-0.02

1) Less than 20 observations.

2) Measured on a five-point Likert scale (1: technologies far behind others; 5: use the most up-to-date technologies).

Human capital

For the same reasons as put forward for technology use, we expect that human capital (basic qualification as well as training) and numerical flexibility is *negatively correlated* (transaction costs, firm-specificity of part of training, tacit knowledge). The results (*table 14*) support this hypothesis in case of education as well as of training whether it takes place on-the job or off-the job (see also Arulampalam and Booth 1998 for further evidence on this matter).

Workplace organisation

Various aspects of (new) workplace organisation such as team work, job rotation, decentralised decision-making or internal job mobility can be interpreted as indicators of functional flexibility. The *relationship between these organisational variables and numerical flexibility may show whether the two types of flexibility are substitutes or complements.*

Table 14: Human capital and numerical flexibility (overall qualitative measure)

	Average/ median	Numerical flexibility			Corre- lation
		Low	Medium	High	
Percentage of employees with education at the tertiary level	25.7	38.9	24.4	12.8	-0.38
<i>Change of the percentage of personnel with education at the tertiary level:</i>					
- in the period 1999-2001 (1)	3.8	3.7	3.9	3.9	-0.09
- in the foreseeable future (1)	3.7	3.7	3.8	3.6	0.01
<i>Time spent for:</i>					
- training on-the job (2)	2.7	2.9	2.6	2.7	-0.24
- training off-the job (2)	2.6	2.9	2.6	2.0	-0.39
<i>Change of learning activities of new skills on the job:</i>					
- in the period 1999-2001 (1)	4.2	4.1	4.3	4.3	0.18

1) Measured on a five-point Likert scale (1: decreased substantially; 5: increased substantially).

2) Measured on a four-range scale (1: One day or less; 2: 1-5 days; 3: 5-20 days; 4: more than 20 days).

Table 15: Workplace organisation and numerical flexibility (overall qualitative measure)

	Average/ Median	Numerical flexibility			Corre- lation
		Low	Medium	High	
<i>Workplace organisation</i>					
Percentage of firms with "work in groups"	77	67	85	86	-
Intensity of use of "Work in groups"	3.3	3.3	3.1	3.5	-0.05
<i>Change of the intensity of the use "work in groups":</i>					
- in the period 1999-2001	3.6	3.1	3.8	3.8	0.37
<i>Percentage of firms with "job rotation"</i>					
Percentage of firms with "job rotation"	48	44	57	33	-
Intensity of use of "job rotation"	2.5	2.4	2.8	2.4	0.13
<i>Change of the intensity of use of "job rotation":</i>					
- in the period 1999-2001	3.5	3.2	3.6	3.6	0.23
<i>Autonomy and decentralised decision-making of employees</i>					
<i>Relevance of individual autonomy and decision making:</i>					
- in the period 1999-2001	3.4	3.2	3.6	3.3	0.15
<i>Change of importance of group autonomy and decision making:</i>					
- in the period 1999-2001	3.5	3.2	3.6	3.7	0.27
<i>Occupational flexibility (internal personnel moves)</i>					
Percentage of personnel that moved to a new function 2001	4.9	6.4	4.7	2.5	0.04
Percentage of personnel that moved to a different department 2001	5.3	6.9	5.8	1.7	-0.14
<i>Change of relevance of internal personnel moves:</i>					
- in the period 1999-2001	3.4	3.1	3.6	3.3	0.20
- in the foreseeable future	3.5	3.3	3.5	3.7	0.17

Note: Intensity of use of „work in groups“ / „job rotation“ was measured on a five-point Likert scale (1: very weak; 5: very strong); change of the intensity of use of “work in groups“ / “job rotation“, relevance of individual / group autonomy, change of importance of individual / group autonomy, change of relevance of internal personnel moves were also measured on a five-point Likert scale (1: decreased substantially; 5: increased substantially).

Table 15 shows some results pertaining to organisational matters. The findings with respect to the characteristics of workplaces at the time the cases studies were conducted (2002) are mixed. Occupational mobility and numerical flexibility are substitutes, what seems to be plausible, and what is compatible with the findings with respect to human capital presented above. Other dimensions of workplace organisation such as team work, job rotation and job autonomy are not correlated with numerical flexibility. With respect to the *change of organisational practices over time*, we find that firms with high numerical flexibility increasingly introduce elements of new workplace organisation. This result could be interpreted that over time numerical (see table 3) and functional flexibility increase in parallel. *The ongoing process of flexibilisation of work is thus based on both types of flexibility and also pertains to “outside flexibility”* (positive correlation between numerical flexibility and outsourcing; see above, table 12).

4.3 Numerical flexibility and economic performance

Table 16 shows the findings with respect to the relationship between numerical flexibility (overall flexibility and specific forms) and a set of performance measures (change of sales, profits) and change of employment; these performance measures referred a) to the effective figures in the period 1999-2001 and b) to the expectation for the “foreseeable future” (two or three years ahead of 2001).

The results in the first part of the table refer to the *qualitative overall flexibility indicator*. In this case, the *hypothesis of numerical flexibility fostering economic performance is not confirmed*. On the contrary, the firms whose workforce is highly flexible in numeric terms perform worse than “low flexibility” companies (performance change: negative correlation with the development of sales, profits, and employment over time).

The second part of table 16 shows the relationship between the *quantitative* measures of the extent of *part-time work* (percentage of personnel) and economic performance and employment respectively. The findings do not differ much from those for the qualitative overall flexibility measure.

The third part of table 16 refers to the relationship between the *quantitative* measures of the extent of *fixed-term contact work* (percentage of personnel) and economic performance or employment. In this case, the flexibility and performance (employment) measures are positively correlated.

Table 17 documents the relationship between the quantitative measures of the two most important forms of flexibility (part-time and fixed-term contact work) and firms’ assessments of the impact of a series of performance measures (innovativeness, efficiency/productivity, competitive position, level of employment and skill requirements for employees). In case of *part-time work* we get throughout negative correlations for all performance and employment measures, quite in accordance with the results in table 16. In contrast, firms with many *fixed-*

term work contracts are more innovative, efficient/productive and competitive as well as employment creating than firms who do not much rely on this form of numerical flexibility; these findings are also in accordance with the results for fixed-term contract work in table 16.

On the whole the findings based on the “objective” measures in table 16 are quite compatible with the results gained from the “subjective” impact measures in table 17.

Table 16: Numerical flexibility, economic performance and employment

	<i>Average</i>	<i>Numerical flexibility</i>			<i>Correlation</i>
		<i>Low</i>	<i>Medium</i>	<i>High</i>	
<i>Overall numerical flexibility and performance (1):</i>					
Personnel has increased	3.6	3.8	3.8	3.1	-0.23
Personnel will increase	3.3	3.4	3.4	2.9	-0.14
Sales has increased	3.6	3.9	3.7	2.8	-0.38
Sales will increase	3.8	4.0	3.9	3.5	-0.23
Profit has increased	3.2	3.5	3.6	2.3	-0.34
Profit will increase	3.4	3.9	3.3	2.8	-0.48
	<i>Average</i>	<i>Part-time flexibility</i>			<i>Correlation</i>
		<i>Low</i>	<i>Medium</i>	<i>High</i>	
<i>Part-time flexibility and performance (1):</i>					
Personnel has increased	3.6	4.3	3.1	3.5	-0.13
Personnel will increase	3.3	3.6	3.3	2.8	-0.07
Sales has increased	3.6	4.6	3.1	3.5	-0.15
Sales will increase	3.8	4.0	3.9	3.7	-0.24
Profit has increased	3.2	4.2	2.6	3.1	-0.00
Profit will increase	3.4	4.0	3.3	3.1	-0.24
	<i>Average</i>	<i>Fixed-term flexibility</i>			<i>Correlation</i>
		<i>Low</i>	<i>Medium</i>	<i>High</i>	
<i>Fixed-term flexibility and performance (1):</i>					
Personnel has increased	3.6	3.7	3.3	4.0	0.22
Personnel will increase	3.3	3.0	3.1	3.8	0.32
Sales has increased	3.6	3.1	3.5	4.3	0.39
Sales will increase	3.8	3.8	4.1	3.5	0.26
Profit has increased	3.2	3.1	2.8	4.2	0.28
Profit will increase	3.4	3.4	3.5	3.2	0.21

1) Measured on a five-point Likert scale (1: decreased substantially; 5: increased substantially).

Table 17: Impact of part-time and fixed-term work on economic performance (firms' assessments)

	Average	Part-time flexibility			Correlation
		Low	Medium	High	
<i>Impact of part-time work on performance (1):</i>					
- Level of employment	3.3	4.5	3.0	3.0	-0.26
- Skill requirements for employees	2.8	3.5	2.8	2.7	-0.52
- Efficiency / productivity	3.1	3.5	2.3	3.3	-0.05
- Innovative activities	2.9	3.0	3.0	2.8	-0.43
- Competitive position	3.4	4.0	3.0	3.3	-0.06
	Average	Fixed-term flexibility			Correlation
Low	Medium	High			
<i>Impact of fixed-term work on performance (1):</i>					
- Level of employment	3.7	3.7	3.7	3.8	0.37
- Skill requirements for employees	3.5	3.7	3.7	3.2	-0.01
- Efficiency / productivity	4.0	3.7	4.2	4.0	0.45
- Innovative activities	3.3	3.0	3.5	3.2	0.28
- Competitive position	4.0	3.7	4.2	4.0	0.40

1) Observations less than 20. All impact assessments were measured on a five-point Likert scale (1: very negative; 5: very positive)

Is there an explanation for this pattern of results? First, we discuss the fact that the *impact on performance of numerical flexibility in terms of part-time differs from the influence of fixed-term work for both type of performance measures*. It has been shown (see “motives of numerical flexibility”) that part-time work is primarily driven by the preferences of employees (which often may not suit those of employers), whereas fixed-term contracts reflect (primarily) the interests of employers (using such contracts as a means to cope with demand fluctuations and specific labour shortages). Therefore, it seems quite natural that only the second form of numerical flexibility positively influences performance, whereas part-time work (unwillingly) is accepted as a restriction of labour supply (and may be cost-increasing rather than productivity-enhancing).

Second, as far as the *overall relationship between numerical flexibility and performance (change)* is concerned, which is negative, our argument goes as follows: Human capital and R&D investments, as shown in the literature, are core drivers of performance and economic growth (at firm as well as at aggregate level). Since human capital is significantly negatively correlated with numerical flexibility, and the relationship between R&D and numerical flexibility is at least not positive, it is not surprising that numerical flexibility (as a whole) and performance is negatively correlated. If we also assume, again in accordance with the literature, that new workplace organisation is fostering productivity, we can argue in the same way as with respect to human capital and R&D. Some elements of (new) workplace organisation (e.g. labour mobility) are negatively correlated with numerical flexibility,

whereas other aspects (workers' autonomy, job rotation, team work) are at least uncorrelated with this form of flexibility. To sum up, the results imply that numerical flexibility is negatively (or, at least, not) related to performance.

5 Summary and Conclusions

The main results of the study are as follows:

Forms and characteristics of numerical flexibility

- (1) Numerical flexibility is an important practice for an increasing number of firms. Part-time and fixed-term work contracts are much more prevalent than other forms of numerically flexible work arrangements such as work on call or temporary work. Firms consider part-time and fixed-term contracts (as well as work on call) as substitutive elements of their strategy of numerical flexibilisation.
- (2) Since part-time work, in many instances, is based on permanent contracts, numerical flexibility might be higher in case of fixed-term contracts, work on call, etc.; the flexibility of part-time work rests to a significant extent on variation of hours.
- (3) We find a systematic positive relationship between numerical flexibility and flexible working hours over the year but no relation to other forms of flexible working time. Numerical flexibility and compensation schemes are systematically related, with differences by form of numerical flexibility. Compensation according to volume/quality of output is positively related to fixed-term and temporary work, whereas some of the more general forms of incentive-oriented compensation (profit sharing, bonuses, etc.) are concentrated on firms with low numerical flexibility. We do not find evidence for a correlation between numerical flexibility, on the one hand, and labour turnover and the degree of organisation of labour on the other.
- (4) The motives for using part-time and fixed-term work are different. Whereas the former are supply-driven (mostly voluntary decisions of employees), the use of the latter depends primarily on demand factors (demand fluctuations, labour shortages, etc.).
- (5) Outsourcing and some unspecified structural adjustments to the rapidly changing economic environment are positively related to numerical flexibility. “External flexibility” seems to complement flexible work arrangements (“internal flexibility”).

Numerical flexibility and firm-level performance

- (6) Human capital: We find a strong negative relationship between human capital (education as well as training) and numerical flexibility. The reason for this result might be the firm-specificity of (part of the) training and the importance of tacit knowledge embodied in the permanent work force. In these circumstances, high numerical flexibility involves high transaction costs.
- (7) Technology: The results are somewhat mixed. The use of ICT and computer-based manufacturing technologies is not systematically related to numerical flexibility. This finding is not very surprising: on the one hand, ICT knowledge, to a certain extent, is

tacit, whereas, on the other hand, hardware and much software can easily be bought on the market; in addition, temporary use of specific skills (fixed-term contracts) is an instrument to overcome a firm's knowledge deficiencies. The results for innovative activity are ambiguous. The intensity of R&D input (in terms of expenditures or personnel), which is the most convincing R&D indicator, is negatively correlated with numerical flexibility; this result can be explained in the same way as in case of human capital (firm-specific tacit knowledge implying high transaction costs of numerical flexibility). However, other measures of innovative activity (e.g. introduction of new products onto the market) do not correlate with this type of flexibility.

- (8) Workplace organisation: The results again are mixed. Internal job mobility is most prevalent in firms with low numerical flexibility. However, other dimensions of workplace organisation (team-working, job rotation, decentralised decision-making), do not show a clear relationship with numerical flexibility. Information on the change of the importance of new work practices over time shows that firms with high numerical flexibility tend to increase the use of new work practices more intensively than low-flexibility firms.
- (9) The results with respect to the relationship between human capital, technology and workplace organisation, on the one hand, and numerical flexibility on the other (negative or, at least, no correlation) can be interpreted as (indirect) evidence for a negative (or no significant) impact of numerical flexibility on firm performance.
- (10) More direct evidence is found by correlating numerical flexibility (and its most important components) with a number of performance measures. Overall, numerical flexibility is negatively related to (the change of) a firm's performance. We get the same result for part-time work (although for some performance indicators the negative correlation is rather weak). In contrast, the relationship between the use of fixed-term work and performance is positive. This difference may be explained by the fact that part-time work is primarily the result of voluntary decisions of employees (which do not seem to be in line with the interests of employers), whereas fixed-term contracts clearly reflect the demand of employers.

Numerical and functional flexibility

- (11) Overall, the results seem to imply that numerical and functional flexibility (represented, in the first place, by characteristics of workplace organisation, in second instance by the use of human capital and tacit knowledge) are substitutes rather than complements.
- (12) This conclusion has to be qualified for two reasons. Firstly, if numerical flexibility is represented only by fixed-term work contracts (since part-time work quite often has a permanent character), functional and numerical flexibility are complementary ways to increase performance; the same holds if we take account of "outside" flexibility

(outsourcing) which is positively related to “internal” numerical flexibility. Secondly, the fact that firms characterised by high numerical flexibility tend to increase the use of new work practices more intensively than firms with low numerical flexibility may indicate that the substitutive relationship between numerical and functional flexibility is becoming weaker in the course of time.

At this stage, we again point to the restrictive character of the procedure underlying this case-study analysis since it is based on a low number of observations. There are many other variables than flexibility influencing a firm’s performance. Therefore, simple bivariate cross-tabulations and correlations cannot yield more than a first indication of the underlying pattern of explanation. Nevertheless, by taking account of the role human capital, R&D and work organisation play for productivity growth, the empirical results presented here may be interpreted as preliminary evidence for a negative (or, at least, neutral) relationship between numerical flexibility and economic performance. In addition, numerical and functional flexibility seem to be substitutes rather than complements; however, over time there is some indication of a weakening of the substitutive relationship.

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ANNEX: QUESTIONNAIRE FOR FIRM CASE STUDIES

A General Information About the Firm

Sector of Principal Activity

1a. What is your **sector** of principal activity?

1b. What are the most important **activities / products** of your firm?

- your most important activity / product:

- your second most important activity / product:

Firm Organization

2. Are you an **independent** firm or do you belong to a larger conglomerate?

- independent firm
- part of a conglomerate, the mother company being:
 - a foreign company
 - a domestic company

3a. Have there been important **structural changes** in your organization during the last 3 years? (e.g. merger or take-over, privatisation, plant closures, 'back to core business', flattening of management structure, etc.)?

- no
- yes, please specify:

3b. Major motives behind these changes (more extensive qualitative information)

.....
.....
.....

4a. Do you expect there to be important structural changes in the foreseeable future?

- no
- yes, please specify:

4b. Major motives behind these changes (more extensive qualitative information)

.....
.....
.....

5. In which year has your firm (in its *present* form) been founded?

Founding year:

Outsourcing, Sub-Contracting

6a. During the past 12 months, has your firm bought services or work from other firms or collaborators (outsourcing):

yes

no

⇒ if yes, during the past three years (1999 – 2001), have these outsourcing activities:

substantially increased?

somewhat increased?

remained fairly unchanged?

somewhat decreased

substantially decreased?

6b. Do these outsourced activities mainly represent working tasks that were previously performed by the firm's own personnel:

yes

no

6c. How important were the following reasons for your firm's decision(s) to outsource (you can tick more than one possibility):

cost savings?

speeding up of production and quality and speed improvements in customer services?

concentration on core competencies?

improved risk management?

6d. Which was the most important reason for your firm's decision(s) to outsource?

.....

7a. Does your company work as a sub-contractor to other firms?

yes

no

7b. Does your firm use sub-contractors?

yes

no

Personnel, Compensation System

8a. How much personnel is presently employed in your firm?

- 20-99 employees
- 100-499 employees
- 500-999 employees
- 1000-10'000 employees

8b. During the last three years (1999-2001), the personnel of your firm has:

- substantially increased
- somewhat increased
- remained fairly constant
- somewhat decreased
- substantially decreased

8c. In the foreseeable future, do you expect the personnel of your firm to:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

9. Does your firm have a Workers' Council?

- yes
- no

10. What is the approximate share of employees that belong to a trade union?

- < 10%
- 10-50%
- more than 50%

11. What share of your personnel is paid:

- | | |
|---|----------------|
| - according to collective wage agreements | % |
| - above the norm of collective wage agreements | % |
| - according to individually negotiated salaries | % |
| - according to minimum wage schemes | <u>..... %</u> |
| Total personnel | 100 % |

12. Does your firm use any of the following compensation systems:

- out-put related pay?
- quality-based pay?
- profit-sharing, bonuses, options or some other similar system?
- individual, group, team or company result based pay?

13. During the past three years (1999 – 2001), has wage or earnings dispersion increased in your firm:

- yes
- no

Sales, Exports, Profits

14a. Your **total sales** in 2001 in Euro: (excluding Value Added Tax)

14b. During the last three years (1999-2001), the sales of your firm have:

- substantially increased
- somewhat increased
- remained fairly constant
- somewhat decreased
- substantially decreased

14c. In the foreseeable future, do you expect the sales of your firm to:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

14d. Your **export sales** in 2001 in Euro: (excluding Value Added Tax)

15a. **Gross profits** (before taxes) in 2001 in Euro:

15b. During the last three years (1999-2001), the gross profits of your firm have:

- substantially increased
- somewhat increased
- remained fairly constant
- somewhat decreased
- substantially decreased

15c. In the foreseeable future, do you expect the gross profits of your firm to:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

16. In the foreseeable future, how do you expect your firm to perform:

- better than now?
- as good as now?
- worse than now?

Market Environment, Demand Fluctuations

17. How sensitive are the activities of your firm to **business cycle** fluctuations?

- highly sensitive to the business cycle
- somewhat sensitive to the business cycle
- hardly sensitive to the business cycle

18. Are your sales sensitive to **seasonal fluctuations** over the year?

- highly sensitive to seasonal fluctuations
- somewhat sensitive to seasonal fluctuations
- hardly sensitive to seasonal fluctuations

19. In what **kind of markets** does your firm mainly operate:

- local markets?
- domestic markets?
- global markets?

20. During the last three years (1999 – 2001), has **competition** in your market field:

- substantially increased?
- somewhat increased?
- remained fairly unchanged?
- somewhat decreased
- substantially decreased?

21. How can the **present market situation** of your company be best described:
- increasing markets (despite occasional fluctuations)?
 - “mature” markets, i.e. stable demand?
 - contracting markets?
 - unstable markets?
 - no open competition (e.g. because of public subsidies, regulated activity)?

B. Innovation, R&D Activities, Use of New Technologies

- 22a. Did your firm have any **Research & Development (R&D) activities** over the last three years (1999-2001)?
- no
 - yes
 - ⇒ if yes, is the character of these **R&D activities** occasional or permanent?
 - occasional
 - permanent

- 22b. Can you give an indication of the **volume** of your R&D?
- Our R&D expenditures as a percentage of total sales: %
 - What percentage of your personnel is (mainly) occupied with R&D?: %

23. Did your firm file any **patent applications** (wherever in the World) during the last three years (1999-2001)?
- no
 - yes
 - ⇒ if yes, patent applications occur:
 - quite seldom
 - occasionally
 - quite frequently

24. Did your firm introduce an important **new technology** during the past three years?
- no
 - yes
 - ⇒ if yes, can you give a brief description of that technology?

.....

28. In the following, please subdivide the products or services that are presently sold by your firm into three categories:

- (1) products/services that have remained more or less **unchanged** during the last three years
- (2) products/services that underwent **incremental changes** during the last three years
- (3) products/services that were **radically changed** or introduced **entirely new** during the last three year

Please indicate what share of your last year's (2001) sales was due to products/services that were:

- unchanged during 1999-2001%
 - incrementally changed during 1999-2001%
 - radically changed or introduced entirely new during 1999-2001%
- your total product range 100%

C Flexibility of Labour

Employment Status

In the following we distinguish tenured personnel from personnel that is in one or the other way 'flexible'.

29. Please indicate in how far one or the other category of flexible personnel is relevant to your firm.

	irrelevant			extremely relevant	
	1	2	3	4	5
personnel on fixed-term contracts	0	0	0	0	0
personnel on probation	0	0	0	0	0
personnel hired from a man power agency	0	0	0	0	0
personnel working on a 'free lance' basis	0	0	0	0	0
consultants	0	0	0	0	0
personnel temporarily hired from other firms	0	0	0	0	0
personnel working on call	0	0	0	0	0
part-time personnel (tenured and non-tenured)	0	0	0	0	0
other categories of non-tenured workers in your firm (please specify):.....	0	0	0	0	0

Part-time Work

30a. How many of your employees have part-time jobs?% of personnel

30b. What percentage of the employees with part-time jobs is:

- tenured%
 - flexible (according to one or the other categories named above)%
- 100%

30c. During the last 3 years (1999-2001), the percentage of personnel with part-time jobs has:

- substantially increased
- somewhat increased
- remained fairly constant
- somewhat decreased
- substantially decreased

30d. In the foreseeable future, do you expect the percentage of personnel with part-time jobs to:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

30e. What are the main reasons that your firm offers part-time jobs (you can tick more than one possibility)?

- fluctuations in demand
- business cycle fluctuations
- seasonal fluctuations
- voluntary decision of employee
- saving wage costs
- other reasons:

30f. What is the most important reason?

.....

30g. What are the main reasons for changes of the share of part-time jobs (in the last years or in the near future; only if applicable)?

.....

30h. Is part-time work typically concentrated in certain *parts* (divisions, segments, affiliated companies in other countries, etc.) of your firm?

- no yes
- o o

⇒ if yes:

Which parts typically have high shares of part-time workers?

.....

Which parts typically have low shares of part-time workers?

.....

30i. Is part-time typically concentrated in certain *functions* (e.g. sales department, accounting, etc.) within your firm?

- no yes

⇒ if yes:

Which types of functions typically have high shares of part-time workers?

.....

Which types of functions typically have low shares of part-time?

.....

30j. Is part-time work typically done by:

- employees with below-average levels of education?
 employees with above-average levels of education?
 there is hardly any difference in education levels between employees with part-time and full-time jobs

Fixed-term Contract Work

31a. How many of your employees are working on fixed-term contracts?% of personnel

31b. During the last 3 years (1999-2001), the percentage of personnel on fixed-term contracts has:

- substantially increased
 somewhat increased
 remained fairly constant
 somewhat decreased
 substantially decreased

31c. In the foreseeable future, do you expect the percentage of personnel on fixed-term contracts to:

- increase substantially?
 increase somewhat?
 remain fairly constant?
 decrease somewhat?
 decrease substantially?

31d. What are the main reasons that your firm offers fixed-term contracts (you can tick more than one possibility)?

- fluctuations in demand
- business cycle fluctuations
- seasonal fluctuations
- voluntary decision of employee
- saving wage costs
- replacement for some kind of leave (sickness, motherhood, studies, etc.)
- probation
- temporary or exceptional work (e.g. special skills required)
- general wish to avoid increase of permanent personnel
- other reasons:

31e. What is the most important reason?

.....

31f. What are the main reasons for changes of the volume of fixed-term contracts offered by your firm (in the last years or in the near future; only if applicable)?

.....

31g. Is work on fixed-term contracts typically concentrated in certain *parts* (divisions, segments, affiliated companies in other countries, etc.) of your firm?

- no yes

⇒ if yes:

Which parts typically have high shares of workers with fixed-term contracts?

.....

Which parts typically have low shares of workers with fixed-term contracts?

.....

31h. Is work on fixed-term contracts typically concentrated in certain *functions* (e.g. sales department, accounting, etc.) within your firm?

no yes

• o

⇒ if yes:

Which types of functions typically have high shares of workers with fixed-term contracts?

Which types of functions typically have low shares of workers with fixed-term contracts?

31i. Is work on fixed-term contracts typically done by:

- employees with below-average levels of education?
- employees with above-average levels of education?
- there is hardly any difference in education levels between employees with fixed-term contracts and those with 'normal' contracts

31j. How often are fixed-term contracts turned into permanent contracts?

- always or mostly
- quite often
- seldom
- very seldom or never

Work on call

32a. How many of your employees are **working on call**?

(This means that they are only called to work when there is high demand) % of personnel

32b. During the last 3 years (1999-2001), the relative share of work on call has:

- increased substantially
- increased somewhat
- remained fairly constant
- decreased somewhat
- decreased substantially

32c. In the foreseeable future, the relative share of work on call is likely to:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

32d. What are the main reasons for having substantial numbers (or changes in the share in the last years or in the near future) of employees that work on call (only if applicable)?

.....
.....
.....
.....
.....

Workers Hired from Manpower Organizations

33a. What percentage of the working hours in your firm is done by employees hired from manpower organizations? % of working hours

33b. During the last 3 years (1999-2001), the relative contribution by workers hired from manpower organizations has:

- increased substantially
- increased somewhat
- remained fairly constant
- has somewhat decreased
- decreased substantially

33c. In the foreseeable future, the relative contribution by workers hired from manpower organizations is likely to:

- increase substantially
- increase somewhat
- remain fairly constant
- decrease somewhat
- decrease substantially

33d. What are the main reasons for having a high share (or changes in the share in the last years or in the near future) of work done by personnel hired from manpower organizations (only if applicable)?

.....
.....
.....
.....
.....

Personnel-sharing

34a. Do you occasionally occupy (have on your payroll) personnel that you share with other firms?

- no
- yes

⇒ If yes:

- How often?
- What type of firms (collaborators on a project basis, same holding company, clients, suppliers)?
- For what type of activities (development and applications of computer software, R&D, sales, training, other)?

34b. Is there occasionally personnel working in your firm but paid by another company?

- no
- yes

⇒ If yes:

- How often?
- What type of firms (collaborators on a project basis, same holding company, clients, suppliers)?
- For what type of activities (development and applications of computer software, R&D, sales, training, other)?

34c. If the answer is 'no' to both the above questions can you please comment:

- Personnel-sharing would be necessary but is legally difficult
- Personnel sharing is not a necessity
- Personnel-sharing may be a necessity in the future

Employment Duration, Labour Turnover

35. Please give an indication of the **average duration** of employment relations in your firm; i.e. give the (approximate) percentage of total personnel (including flexible workers) that falls into one of the following categories:

- % of personnel has been employed in our firm for more than 10 years
- % of personnel has been employed for 6-10 years
- % of personnel has been employed for 2-5 years
- % of personnel has been employed for less than 2 years
- 100%

36. During the last three years (1999-2001), the average length of time that a person works for your firm has:

- substantially increased
- somewhat increased
- hardly changed
- somewhat decreased
- substantially decreased

37. In the foreseeable future, the average length of time that a person works for your firm will:

- increase substantially
- increase somewhat
- remain fairly constant
- decrease somewhat
- decrease substantially

38. (if applicable): In what functions of your firm are employees with short work durations (less than two years) typically concentrated? (more extensive qualitative information)

.....
.....
.....

In what functions of your firm are employees with long work durations (six years and more) typically concentrated? (more extensive qualitative information)

.....
.....
.....

39. (if applicable): Are employees with long job duration typically:

- employees with below-average levels of education?
- employees with above-average levels of education?
- there is hardly any difference in education levels between those that have a long or short job duration

40. (if applicable): What are the main reasons why some employees work for a long time in your firm? (more extensive qualitative information)

.....
.....
.....

41. (if applicable): What are the main reasons why some employees work for a short time in your firm? (more extensive qualitative information)

.....
.....
.....

42. (if applicable): What are the main reasons for changes in the average length that employees work for your firm? (more extensive qualitative information)

.....
.....
.....

43. (if applicable): What percentage of your personnel (average number of employees in 2001) has been **newly hired** for your firm during the last 12 months?

..... % has newly joined our firm during the last 12 months

44. (if applicable): What percentage of your personnel (average number of employees in 2001) **has left** your firm during the last 12 months?

..... % has left our firm during the last 12 months

45. Has the percentage of employees that left or joined your firm ('labour turnover') during the last three years:

- increased substantially?
- somewhat increased?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

46. Do you expect in the foreseeable future that the labour turnover will:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

47. (if applicable): Can you give reasons for changes in labour turnover? (more extensive qualitative information)

.....
.....
.....

Working Time Flexibility

48. How many of your employees have flexible working hours during the year (i.e. the employer and the employee jointly determine in which periods employees work more or less hours)?

..... % of personnel having flexible working hours

49. (if applicable): What are the main reasons for having flexible working hours? (more extensive qualitative information)

.....

50. How many of your employees work regularly or quite regularly longer (than normal) weeks (i.e. additional hours and / or overtime)?

..... % of personnel working longer (than normal) weeks

51. During the past three years (1999–2001), has the percentage of the personnel working longer (than normal) weeks

- substantially increased?
- somewhat increased?
- remained fairly unchanged?
- somewhat decreased
- substantially decreased?

52. Does your company implement the following types of working time arrangements (here the alternatives might vary according to the country in question):

	yes	no
- individually tailored working hours?	<input type="radio"/>	<input type="radio"/>
- sabbatical leave, part-time bonuses or part-time pensions?	<input type="radio"/>	<input type="radio"/>
- working times that adjust to the demand situation?	<input type="radio"/>	<input type="radio"/>
- collection of e.g. overtime hours into “working time files” to be used at a later point in time?	<input type="radio"/>	<input type="radio"/>
- “working time periods” (a pre-determined number of working hours during a fixed period)?	<input type="radio"/>	<input type="radio"/>
- overtime work during the past 12 months?	<input type="radio"/>	<input type="radio"/>

53. During the past three years (1999–2001), has your company changed existing working time arrangements or adopted new ones?

- yes
- no

⇒ if yes, how important were the following reasons (you can tick more than one possibility):

- better adjustment to demand and changes in demand?
- better control of working time?
- lowering of costs?
- avoid recruitment of new personnel?
- avoid lay-offs?
- accounting for initiatives and desires of the personnel?

54. Do you expect in the foreseeable future that the current working time arrangements of your company will be changed or complemented with new ones?

- yes
- no

D. Management of Human Resources

Vocational Education

55. What percentage of your employees has higher education degrees (at **tertiary** level)?

..... % of total personnel having higher education degrees

56. Has the percentage of personnel with higher education (at **tertiary** level) over the last three years (1999-2001):

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

57. Is the percentage of personnel with higher education (at **tertiary** level) in the foreseeable future likely to:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

58. (if applicable): If personnel with higher education has increased or is likely to increase, what are the main reasons? (more extensive qualitative information)

.....

Training

59. Approximately how much time was spent during the last three years on on-the-job or off-the-job training per individual employee?

	on-the-job	off-the-job
a) tenured employees:		
- One day or less	o	o
- between 1 and 5 days	o	o
- 5 to 20 days	o	o
- more than 20 days	o	o
b) flexible employees:		
- One day or less	o	o
- between 1 and 5 days	o	o
- 5 to 20 days	o	o
- more than 20 days	o	o
c) employees with higher education degrees:		
- One day or less	o	o
- between 1 and 5 days	o	o
- 5 to 20 days	o	o
- more than 20 days	o	o

60. Do you expect in the foreseeable future that the training of your personnel will:

- increase
- remain more or less unchanged
- decrease

61. How important are the following reasons for the provision of training for your personnel (you can tick more than one possibility):

- new technology?
- organizational change?
- new products or activities?
- to avoid new hires?
- some other reason?

Occupational Flexibility

62. What percentage of your personnel in 2001 **moved to a new function** or to a **different department** within your firm?

..... % of personnel that moved to a different function

..... % of personnel that moved to a different department

63. Have such internal moves over the last three years (1999-2001):

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

64. Are such internal moves in the foreseeable future likely to:

- increase substantially?
- increase somewhat?
- remain fairly constant?
- decrease somewhat?
- decrease substantially?

65. The employees mainly involved in such internal moves are mostly:

- employees with below-average levels of education?
- employees with above-average levels of education?
- there is hardly any difference in education levels between those who are selected to move internally and those who are not selected

66. (if applicable): What are the main reasons for these internal moves? (more extensive qualitative information)

.....
.....
.....

67. (if applicable): What are the main reasons for the changes in these internal moves? (more extensive qualitative information)

.....
.....
.....

Workplace organization

68a. During the past years, has your firm undertaken or planned changes with respect to workplace organization?

- have been undertaken.
- are undertaken at the moment.
- are planned to be undertaken.
- have not even been planned.

68b. Do the most recent changes of workplace organization undertaken or in progress affect:

- the whole organization?
- a considerable part of the organization?
- only a small part of the organization?

69. How important were the following targets when undertaking changes of workplace organization in your firm (you can tick more than one possibility):

- improved competitiveness?
- improved productivity?
- improved products and activities?
- concentration on core competencies?
- control of labour force costs?
- improvement of the competencies of the personnel?
- improved conditions for team and / or other group work?
- better response to customers' demands?

70a. **Work in groups:** Does your firm use permanent work teams in which employees jointly perform some tasks or discuss problems (self-organised group work, project groups, quality circles, etc.)?

- no
- yes

⇒ if yes, when did your firm introduce this type of workplace organization (i.e. install team-based work organization)?

..... (year)

70b. Is **work in groups** (as defined above) wide-spread in your firm (if relevant)? (Please answer on a 1-5 scale):

very weak					very strong
1	2	3	4	5	
0	0	0	0	0	

70c. Has the use of **work in groups** (as defined above) over the last three years (1999-2001):

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

70d. (if applicable): What are the main reasons for changes in the use of work in groups? (more extensive qualitative information)

.....

.....

.....

71a. **Job rotation**: Does your firm uses programmes of rotation of jobs and tasks (i.e. sequential work in different functions)?

- no
- yes

⇒ if yes, when did your firm introduce job rotation?(year)

71b. Is **job rotation** (as defined above) wide-spread in your firm (if relevant)? (Please answer on a 1-5 scale):

very weak					very strong
1	2	3	4	5	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

71c. Has the use of **job rotation** (as defined above) over the last three years (1999-2001):

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

71d. (if applicable): What are the main reasons for changes in the use of job rotation? (more extensive qualitative information)

.....

.....

.....

72a. Has the individual autonomy and decision-making of employees over the last three years (1999-2001):

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

72b. Has group autonomy and decision-making of employees over the last three years:

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

72c. (if applicable): What are the main reasons for changes in individual or group autonomy? (more extensive qualitative information)

.....
.....
.....

Job Characteristics

73a. Has the **learning of new skills on the job** over the last three years:

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

73b. Does the learning of new skills on the job concern:

- all jobs?
- a considerable part of the jobs?
- only a small part of the jobs?

73c. (if applicable): What are the main reasons for changes in learning of new skills on the job? (more extensive qualitative information)

.....
.....
.....

74. During the past three years (1999-2001), has your firm experienced difficulties in trying to recruit persons into high-skilled occupations:

- no
- yes

⇒ if yes, which type(s) of high-skilled occupation?

.....

75. Please list the **most important occupational groups** in your firm:

.....

76. What percentage of employees in these groups have a **tenured** position?

..... % tenured employees within the most important occupational groups

77a. Considering the work of the tenured part of above-listed groups, please rate on a 1-5 scale what is the more realistic answer (1 = means that you totally agree with the statement on the left hand side; 5 = means that you totally agree with the statement on the right hand side):						
	1	2	3	4	5	
“work involves a broad range of different tasks (‘multi-tasking’)”	<input type="radio"/>	<input type="radio"/>	↔	<input type="radio"/>	<input type="radio"/>	“work involves repetition of quite a limited number of single tasks”
“work is essentially a team activity”	<input type="radio"/>	<input type="radio"/>	↔	<input type="radio"/>	<input type="radio"/>	“the work is essentially an individual activity”
“a high level of qualification is required”	<input type="radio"/>	<input type="radio"/>	↔	<input type="radio"/>	<input type="radio"/>	“little or no qualification is required”
“recruits for work have to be trained to do the job”	<input type="radio"/>	<input type="radio"/>	↔	<input type="radio"/>	<input type="radio"/>	“recruits for work are already trained to do the job”
“the pace of work is in dependent of technology (e.g. machine time requirements)”	<input type="radio"/>	<input type="radio"/>	↔	<input type="radio"/>	<input type="radio"/>	“the pace of work is dependent on technology (e.g. machine time requirements)”
“contracts for employees typically allow for shifts between different tasks and functions”	<input type="radio"/>	<input type="radio"/>	↔	<input type="radio"/>	<input type="radio"/>	“employees are typically hired for clearly specified tasks”

[Note to the interviewer: This question is to be asked only if above (in Q60) a substantial percentage of non-tenured workers was reported]

77b. Considering the work of the **flexible** part of above-listed groups, please rate on a 1-5 scale what is the more realistic answer (1 = means that you totally agree with the statement on the left hand side; 5 = means that you totally agree with the statement on the right hand side):

	1	2	3	4	5	
“work involves a broad range of different tasks”			↔			“work involves repetition of quite a limited number of single tasks”
“work is essentially a team activity”			↔			“the work is essentially an individual activity”
“a high level of qualification is required”			↔			“little or no qualification is required”
“recruits for work have to be trained to do the job”			↔			“recruits for work are already trained to do the job”
“the pace of work is <u>in</u> dependent of technology (e.g. machine time requirements)”			↔			“the pace of work is dependent on technology (e.g. machine time requirements)”
“contracts for employees typically allow for shifts between different tasks and functions”			↔			“employees are typically hired for clearly specified tasks”
“contracts for employees typically allow for shifts between different tasks and functions”			↔			“employees are typically hired for clearly specified tasks”

Absenteeism

78a. What percentage of your total working hours is lost annually due to **sick leave**?

..... % of working hours lost by sick leave annually

78b. Has sick leave over the last three years:

- increased substantially?
- increased somewhat?
- remained fairly constant?
- decreased somewhat?
- decreased substantially?

73c. (if applicable): If sick leave has been substantial, what are the main reasons for this?? (more extensive qualitative information)

.....

.....

.....

E Impact of Labour Flexibility on Working Conditions, Industrial Relations and Firm Performance

(Applicable only if some of the considered working modes (part-time work, fixed-term work, work on call) or organizational forms (work in groups, job rotation, decentralisation of decision making) are of considerable relevance for a firm; depending on the particular case the relevant level of reference for the impact may be the entire firm, a division or a department)

Working Conditions, Industrial Relations

79a. Please make an assessment of the **impact of part-time work** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Motivation of employees	0	0	0	0	0
- Satisfaction of employees / work climate	0	0	0	0	0
- Quality of life (family life, health, etc.)	0	0	0	0	0
- Industrial relations	0	0	0	0	0

79b. Please make an assessment of the **impact of fixed-term contract work** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Motivation of employees	0	0	0	0	0
- Satisfaction of employees / work climate	0	0	0	0	0
- Quality of life (family life, health, etc.)	0	0	0	0	0
- Industrial relations	0	0	0	0	0

79c. Please make an assessment of the **impact of work on call** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Motivation of employees	0	0	0	0	0
- Satisfaction of employees / work climate	0	0	0	0	0
- Quality of life (family life, health, etc.)	0	0	0	0	0
- Industrial relations	0	0	0	0	0

79d. Please make an assessment of the **impact of work in groups** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
	1	2	3	4	5
- Motivation of employees	0	0	0	0	0
- Satisfaction of employees / work climate	0	0	0	0	0
- Quality of life (family life, health, etc.)	0	0	0	0	0
- Industrial relations	0	0	0	0	0

79e. Please make an assessment of the **impact of job rotation** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
	1	2	3	4	5
- Motivation of employees	0	0	0	0	0
- Satisfaction of employees / work climate	0	0	0	0	0
- Quality of life (family life, health, etc.)	0	0	0	0	0
- Industrial relations	0	0	0	0	0

79f. Please make an assessment of the **impact of increased decentralisation of decision-making** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
	1	2	3	4	5
- Motivation of employees	0	0	0	0	0
- Satisfaction of employees / work climate	0	0	0	0	0
- Quality of life (family life, health, etc.)	0	0	0	0	0
- Industrial relations	0	0	0	0	0

Firm Performance

80a. Please make an assessment of the **impact of part-time work** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
	1	2	3	4	5
- Level of employment	0	0	0	0	0
- Skill requirements for employees	0	0	0	0	0
- Efficiency / productivity	0	0	0	0	0
- Innovative activities	0	0	0	0	0
- Competitive position	0	0	0	0	0

80b. Please make an assessment of the **impact of fixed-term contract work** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Level of employment	0	0	0	0	0
- Skill requirements for employees	0	0	0	0	0
- Efficiency / productivity	0	0	0	0	0
- Innovative activities	0	0	0	0	0
- Competitive position	0	0	0	0	0

80c. Please make an assessment of the **impact of work on call** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Level of employment	0	0	0	0	0
- Skill requirements for employees	0	0	0	0	0
- Efficiency / productivity	0	0	0	0	0
- Innovative activities	0	0	0	0	0
- Competitive position	0	0	0	0	0

80d. Please make an assessment of the **impact of work in groups** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Level of employment	0	0	0	0	0
- Skill requirements for employees	0	0	0	0	0
- Efficiency / productivity	0	0	0	0	0
- Innovative activities	0	0	0	0	0
- Competitive position	0	0	0	0	0

80e. Please make an assessment of the **impact of job rotation** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Level of employment	0	0	0	0	0
- Skill requirements for employees	0	0	0	0	0
- Efficiency / productivity	0	0	0	0	0
- Innovative activities	0	0	0	0	0
- Competitive position	0	0	0	0	0

80f. Please make an assessment of the **impact of increased decentralisation of decision-making** (if relevant for your firm) on a 1-5 scale (1 = very negative; 5 = very positive) on:

	1	2	3	4	5
- Level of employment	0	0	0	0	0
- Skill requirements for employees	0	0	0	0	0
- Efficiency / productivity	0	0	0	0	0
- Innovative activities	0	0	0	0	0
- Competitive position	0	0	0	0	0