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**High Performance Work Systems, Technological Innovations Firm Performance in SME.  
Evidences From The Case of The Milan Area**

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*Track 08: Human Capital, Organizational Behavior and Performance*

HIGH PERFORMANCE WORK SYSTEMS,  
TECHNOLOGICAL INNOVATIONS AND FIRM  
PERFORMANCE IN SME.  
EVIDENCES FROM THE CASE OF THE MILAN AREA\*

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## 1 Introduction

Study of the effects exerted by new work practices on the productive, economic and financial performance of firms is probably the main strand of inquiry into High Performance Work Practices (HPWPs).

Since the mid-1990s, the international economic literature has reported increasingly robust results in support of the idea that the new ‘high commitment’ or ‘high involvement’ organizational models stand in a positive relationship with firms’ economic results. In particular, a recent body of theoretical and empirical studies shows that firms obtain the best results when the innovations are introduced according to a logic of complementarity: that is, not concentrating on certain single measures but privileging a systemic vision of change (organizational, technological, etc.) (Milgrom and Roberts 1990, 1995, McDuffie 1995, Becker et al. 1997, Ichniowski et al. 1997, Black and Lynch 2001, 2004).

Nevertheless, although there is a large amount of evidence in regard to large firms, we know very little about the practices and the effectiveness of HPWS in small organizations (Huselid 2003), and the lack of knowledge is particularly relevant in the case of Italy, where SME represents a very rele-

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*\* This paper is based on the results of a research project conducted by the Research Department of Lombardy Industrial Association (Assolombarda) jointly with the Work Training and Welfare research centre of the University of Milan. We are particularly grateful to Silvia Salini for her useful methodological suggestions. Responsibility for any errors is obviously ours alone.*

vant part of the economic system. But this is not limited to the Italian and European firms; in USA such knowledge is also lacking (Way 2002).

By using data from a survey carried out by the Research Department of Lombardy Industrial Association (Assolombarda) on more than 100 SME in the Milan area, this paper seeks to answer the following questions. The positive relationships between the adoptions of HPWS and firm performance reported by the literature on large firms holds also for SME? if so, what are the particular strategies that yield superior performance? to what extent is it important for planning to be consistent with other corporate strategies (as in the case of large firms)?

The analysis was conducted using the multivariate technique of classification trees and enabled identification of the business strategies associated with the best results in terms of labour productivity and overall economic performance.

The empirical part of the paper also considers the diffusion of organizational innovations, and is preceded by a description of the definition of HPWP used in this survey and by a brief review of the current literature.

## **2 HPWS: a world of shifting boundaries**

We said at the outset that the majority of current studies report results which support the existence of a positive relation between the adoption of HPWS and better business performance. It is well known, however, that various methodological obstacles considerably hamper the extendibility of the results obtained, and therefore the possibility of reaching general conclusions.

A specific problem of studies analysing the relations between HPWS and firm performance is the variety of the indicators used to measure the latter. The two indicators most frequently used are productivity, usually of labour, measured as the number of units produced in a particular interval of time or as value added per employee, and the quality of products or services, which in the manufacturing sector is mainly measured as the percentage of defective products in total output, and in the tertiary sector as the disservices furnished. In many cases, the two indicators – labour productivity and the quality of output – are considered jointly (McDuffie 1995, Banker et al. 1996, Ichniowski et al. 1997, EF 1997, Appelbaum et al.

2000, Ramsay et al. 2000, Godard 2001, Gittel et al. 2004). Other indicators used to measure organizational performance are financial results (Brown et al. 1992, Pini 2005, Antonioli and Pini 2004, Addison et al. 2000), improvements in the behaviour of workers, which mainly refers to reduced absenteeism (EF 1997, Ramsay et al. 2000, Godard 2001), and variation in the number of employees in the firm (EF 1997 and Addison et al. 2000).

The main problem encountered in the study of new work practices is the lack of an unambiguous definition of what falls under that heading. The terminology used to denote the set of new work practices also varies greatly: 'high performance work organization', 'new forms of work organization', 'employee involvement practices', are just some of the expressions currently employed.

It should be said, however, that because every firm adopts its own particular practices, or ones tailor-made for its organization, it is largely pointless, as well as difficult, to draw up a systematic list of what practices can be considered to belong to the category of HPWS. Instead, it is much more sensible to identify a set of features shared by such practices. In this regard, the changes brought by the new forms of work organization can be arranged along three main dimensions: the ways in which work is organized; the ways in which work is coordinated within the organization; and personnel management policies (EC 2002).

Therefore, in order to be considered such, new work practices must at least partly change the way in which work is organized, coordinated or managed. Adopting and integrating the scheme used by the European Commission's study (2002), Box 1 shows the dimensions and the components of 'a high performance work system' as understood here.

### **Box 1. Dimensions and components of a 'high performance' work system**

1. Ways in which **operational activities are organized**:
  - Work groups: groups are responsible for achieving targets and they decide how the work is to be carried out. They may be *autonomous* (the leader is selected by the group) or *semi-autonomous* (the leader is selected from outside and/or there is a certain amount of external influence/control over the group)
  - Multi-skilling: the workers are able to perform more than one task within the organization and the boundaries among tasks are less clearly marked out.
  - Job rotation: the workers regularly rotate among different tasks.
2. Ways in which **work within the organization is coordinated**
  - Greater autonomy in the carrying out of tasks: decision-making is decentralized and pushed down to the lowest possible level.
  - Information sharing: workers (at all levels) are given detailed information about the organization's performance (financial, productive etc.).
  - Workforce involvement: besides the meetings foreseen by the collective agreement, there are other occasions for the consultation of workers or their representatives by management on various issues (organization, quality, production process, etc.).
  - Performance evaluation systems: the performance of employees is systematically evaluated according to a method known to the workers
3. **Personnel management policies**
  - Investments in technical/specific training: (internal or external) training schemes to improve the skills and knowledge of workers concerning their tasks/activities in the firm.
  - Investments in relational/behavioural training: (internal or external) training schemes to enhance the cross-skills (e.g. problem-solving or team-working) involved in the approach to work and the management of interpersonal relations.
  - Internal labour markets: opportunities for workers to pursue careers within the organization.
  - Incentivising reward systems: a significant portion of the wage (more than 5%) depends on individual or group performance.

*Source: adapted from EC (2002).*

## **3 HPWS and firm performance**

The organizational literature has convincingly shown that the diffusion, sustainability and success of the new practices in large firms are conditioned by the satisfaction of workers (senior and middle managers included) with their work; and that this satisfaction is mediated in its turn by workers' perceptions of the security (and discretion) of their jobs (Batt

2004). On this view, moreover, the new work practices are important because they are the forms of control best suited to the new way of working, with a shift from the direct control of superiors to indirect control (Godard 2001). If a worker's wage depends to a substantial extent on performance (by him/herself, by his/her group, or by the firm), direct control by management (supervision and monitoring) is less necessary. This allows workers to carry out their tasks in ways more consistent with the new organization of work, with the variability of the wage acting as a guarantee of their commitment.

The economic literature has also shown that the performance of workers (productivity) is substantially improved with reward systems supported by innovative work practices such as flexible tasks, participation in problem solving, multiskilling, workplace safety, rigorous selections and communication processes (Ichniowski et al. 1997). Since the works of Milgrom and Roberts (1990, 1995), moreover, a growing body of studies maintain that if the new practices are to have positive effects, they must be introduced at system level, because the different 'clusters' of practices (as identified on the above three definitional dimensions) are interconnected by complementarities in relation to the effects on the firm's economic and productive results. This holds in terms of both internal coherence among the various 'bundles' of working practices and external coherence, i.e. with the other strategies pursued by the firm.

As regards internal coherence, the existing evidence suggests that the best results are obtained if the practices introduced are coherent with each other (Becker et al. 1997; Ichniowski et al. 1997), supported by suitable personnel management practices (Brown et al. 1992; Ichniowski et al. 1997; Becker et al. 1997), and designed consistently with managerial capabilities (Becker et al. 1997; Thompson and Heron 2005).

In one of the first studies to adopt this approach, Brown and colleagues (1992) used the expression 'SET System' for a workplace where the three elements of security, employee involvement and training are present. According to these authors, these three elements reinforce each other in a virtuous circle with positive effects on the firm's economic performance, whilst the absence of one of them complicates the operation of the other two, thereby also weakening the effects on performance.

Some research results also suggest that the relationship between the extent to which reforms are adopted and their effectiveness is not linear, but

instead exponential. Becker et al. (1997), for instance, on studying more than 1500 American firms, have found that the returns on investment in HPWS grow greatly at an initial stage, when the firm takes its first steps towards adoption of a HPWS, diminish for levels of medium adoption, in which the marginal results are limited, and substantially increase at higher levels of adoption.

Adopting a more critical approach, Godard (2001) analyses a longitudinal sample of 78 Canadian firms and argues instead that the economic results grow at moderate levels of introduction, stabilize at intermediate levels, and decline at high levels. Godard's results are therefore very similar to those obtained by Becker and colleagues (1997) up to the sixtieth percentile, but then assume the reverse pattern at the highest levels of sophistication.

Complementarity with other strategies instead requires that organizational innovations be coherent with the technologies employed and with the competitive strategies and the characteristics of the market in which firms operate (Milgrom and Roberts, 1990, 1995; McDuffie, 1995; Black and Lynch, 2001, 2004; Gittell et al. 2004; Godard 2004). This applies both to the effects that these variables (jointly) exert on the firm's economic and productive performance (Milgrom and Roberts 1990, 1995; Black and Lynch 2001, 2004; for the Italian case see Pini 2006; Antonioli et al. 2007; Cristini et al. 2008), and to the effects that they exert on each other, i.e. in terms of the firm's overall innovative performance (Osterman 1994; Laursen and Foss, 2003; Mohnen and Röller, 2005; for the Italian case see Pini 2006; Antonioli et al. 2007; Giannetti and Madia, 2008).

According to Adams (2002), moreover, attention should also be paid to the characteristics of the market in which the firm operates, and especially to the volatility of orders. Adams's theoretical model, which is confirmed by the econometric analysis, establishes that the use of autonomous work groups of job depends on the intention to remove at least some decision-making power from the management ('off-line decision maker') and give it to the workers on the production line ('on-line decision makers'). Thus established is a trade-off between the rapidity of the decisions taken on-line and the greater slowness – though accompanied by the greater preparedness (in the sense of education, and therefore quality) – of the decisions taken off-line. The results show that, provided that training programmes are organized, firms employ work groups more if they have a very volatile pro-

duction. Further corroborating the thesis of internal coherence is the finding that work groups and training programmes are integrated and reinforce each other. Also Becker et al. (1997) argue that there must be a close linkage between HPWPs and the firm's strategic and business initiatives if the workers' behaviour is to focus on the firm's key priorities and ultimately generate profits, growth and market value.

## **4 The case of SME in the Milan area**

A previous survey on a sample of 234 manufacturing firms in Milan has shown that innovative firms combine high investments in organizational innovation with the adoption of advanced productive and organizational technologies (Della Torre 2009), thereby supporting the thesis of complementarity between the adoption of new work practices and investment in technological innovation. In the sections that follow, through analysis of a sample of 114 medium-sized industrial and service firms, we shall seek to augment the evidence on the firms of the Milan area by verifying whether and how in SME these corporate strategies have effects on firms' economic performance, particularly in terms of labour productivity.

### *4.1 Sample and representativeness*

The analysis was conducted on 984 firms affiliated to Assolombarda, operating in the manufacturing and services sectors, and with between 50 and 250 employees. Given the predominance of studies which concentrate on the manufacturing sector, the fact that the present study also considers service firms indubitably gives it value added.

Some 114 firms agreed to cooperate, with a reply rate of around 12% and the survey was conducted in the period April-June 2007 on the basis of a written questionnaire. Some parts of the questionnaire were constructed on the basis of surveys carried out by other research groups in other local contexts<sup>1</sup>. And this, given the methodological heterogeneity that character-

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<sup>1</sup> We refer in particular to the research groups at the University of Ferrara and the University of Bergamo, which have conducted repeated surveys on innovative dynamics in the local

izes the existing literature on these topics, is certainly one of the strengths of the inquiry.

The final sample had an overall good representativeness if compared with the Istat Census of 2001. The results of the Marbach's test (1992), reported in table 1, showed that overall the sample had a probability of more than 90% and was therefore acceptable. Of the two sectors, manufacturing (89% probability) was best represented, whilst in regard to size, representativeness was greater for the firms in the lower classes.

*Tab. 1 – Results of the Marbach's test*

	<b>size of the sample</b>	<b>size of the population</b>	<b>margin of error <math>\theta</math></b>	<b>sample probability</b>
Manufacturing firms	74	1204	0.1127	89%
Service firms	40	1582	0.1561	84%
Total	114	2786	0.0917	91%
50—99	54	1735	0.1340	87%
100—199	40	866	0.1545	85%
200—249	20	185	0.2117	79%

#### *4.2 Adoption of new work practices*

Table 2 shows the frequencies of the use of the thirteen practices investigated by grouping them into 'bundles' as identified above. To be noted is the rather high frequency of personnel management policies, i.e. those practices intended to enhance the quality of employees' work. In particular, training to improve technical skills is the most widespread practice overall, being present in 82% of the firms in the sample. The second practice in order of frequency is career advancement through internal labour markets (80%).

Practices intended to decentralize decision-making power to lower levels in the organization are less widespread (they concern less than one firm in every three). Even less common are autonomous work groups (14.5%), which together with decision-making decentralization, probably represent the most marked forms of organizational 'flattening'. In both cases, therefore, these seem to be practices which require particular conditions if they

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economic systems of Reggio Emilia, Ferrara and Bergamo. See Antonioli et al. (2007, 2008), Cristini et al. (2003, 2008), Leoni et al. (2004), Pini (2004, 2006).

are to be introduced, probably because of the greater connected risks with their use.

As for the degree of penetration by innovations, the practices adopted most intensely (i.e. involving at least 50% of workers) are information sharing, performance evaluation, and employee involvement. The practices related to work coordination are therefore those in which firms involve the greatest proportion of workers, whilst the degree of intensity is decidedly lower (without great differences between the two bundles), for work management and organization policies, showing that interventions in these two areas much more closely targeted.

*Tab. 2 – Frequency and intensity of the use of practices*

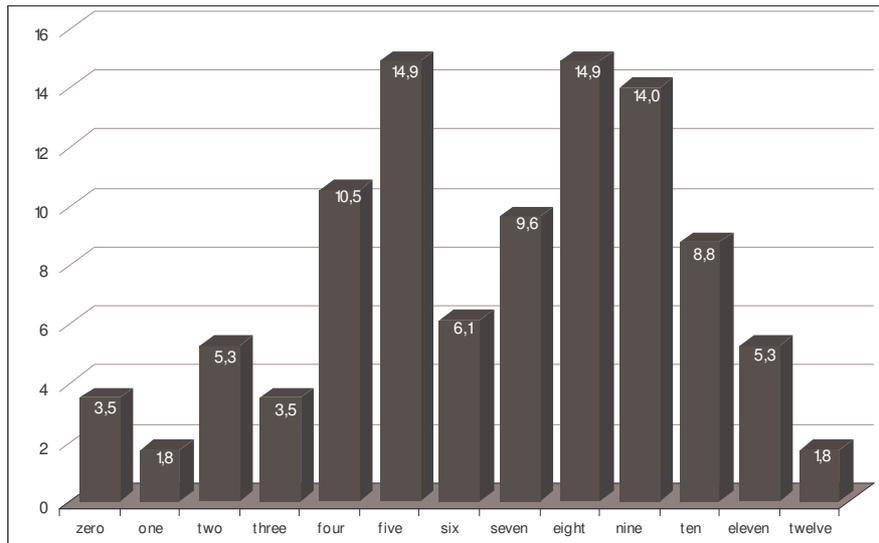
	% of user firms	<i>of which involving more than 50% of employees (%)</i>
<i>Organization of work</i>		
autonomous work groups	14.5	28.6
semi-autonomous work groups	38.9	27.9
job rotation	32.7	27.3
multi-skilling	60.2	16.4
<i>Coordination of work within the organization</i>		
decentralization of decision-making	37.5	24.3
sharing of information	61.4	64.6
employee involvement	50.4	55.6
evaluation of employee performance	50.4	63.0
<i>Personal management policies</i>		
specific technical training	82.3	42.2
relational/behavioural training	50.9	25.0
internal labour markets	80.7	14.8
collective performance-related pay > 5%	57.1	13.3
individual performance-related pay > 5%	61.5	26.6

We now consider what happens within individual firms. Figure 2 and Table 3 show that almost 30% can be considered to have innovative work systems in that they adopt nine or more of the thirteen practices surveyed. However, only 2% of firms adopt twelve of these practices, and in no case are all thirteen practices used.

Figure 1 apparently shows two critical junctures in change processes: the first occurs in transition from moderate levels of use (up to five practices) to intermediate ones; the second from medium-to-high levels to the

completion phase (more than nine practices). Finally, only 3.5% of firms do not use any of the new work practices.

Fig. 1 – Percentage distribution of firms by number of practices used



The overall degree of organizational innovation by firms<sup>2</sup> shows some relation to firm's size (Table 3). Overall, almost 50% of the sample are in an intermediate phase definable as 'transitional', to use the European Commission's term.

Tab. 3 – Degree of organizational innovation by size class. Percentage values

	<b>moderate</b>	<b>average</b>	<b>high</b>	<b>total</b>
50-99 empl.	33.3	38.9	27.8	100.0
100-199 empl.	15.0	57.5	27.5	100.0
200-250 empl.	20.0	40.0	40.0	100.0
<i>Total</i>	<i>24.6</i>	<i>45.6</i>	<i>29.8</i>	<i>100.0</i>

<sup>2</sup> The firms were grouped into classes according to the number of practices used: from 0 to 4 = 'moderate', from 5 to 8 = 'average', from 9 to 13 = 'high'.

### 4.3 *The relations between new work practices and firm performance*

This section aims to identify the characteristics of firms achieving the best results in terms of labour productivity and overall economic performance, i.e. the two indicators of firm performance indicated by the literature as the most closely connected with the firm's level of organizational and technological innovation. As suggested by the literature, the analysis also considered other factors which may have complementarity effects with technical-organizational innovations. Specifically, in small and medium-sized enterprises, an important role in determining the degree of innovativeness is played by the firm's embeddedness in stable relational networks with other firms<sup>3</sup>.

#### 4.3.1 Methodology

The classification trees approach is a technique of hierarchical segmentation used to identify the membership of statistical units (in our case firms) in the classes of a dependent variable (labour productivity, overall economic performance) when knowing the values or the modalities of one or more explanatory variables (technologies employed, relationships of collaboration with others firms, bundles of practices used).

The results of the segmentation are visualized by means of hierarchical structures called 'trees'. The literature proposes various techniques for the creation of the final segments. We used the CART (Classification and Regression Trees) methodology (Breiman et al. 1984) which was best suited to the characteristics of our data.

The basic idea behind the creation of classification trees is to select every subdivision of a set in such a way that each of the subgroups produced by the division is 'purer' than the initial set. The notion of 'impurity' refers to the heterogeneity of the statistical units in relation to the modalities of the dependent variable. In this technique impurity is measured by the Gini index.

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<sup>3</sup> On Italy see Antonioli et al. (2007), Mancinelli and Mazzanti (2007).

The two dependent variables considered were therefore the indicator for labour productivity and the summary indicator for overall economic performance<sup>4</sup>. Each indicator was related to the following explanatory variables:

- the main type of technology used (process, product, for work coordination);
- the technological level compared with the average for the sector (less advanced, the same, more advanced);
- the presence of collaborative relationships with Italian firms (no, yes with firms in the same group, yes with other firms);
- the presence of collaborative relationships with foreign firms (no, yes with firms in the same group, yes with other firms);
- the number of practices used for personnel management (from 0 to 5);
- the number of practices used for work organization (from 0 to 4);
- the number of practices used to coordinate work (from 0 to 4);
- the overall number of practices used (from 0 to 13).

#### 4.3.2 Firms achieving the best productivity performances

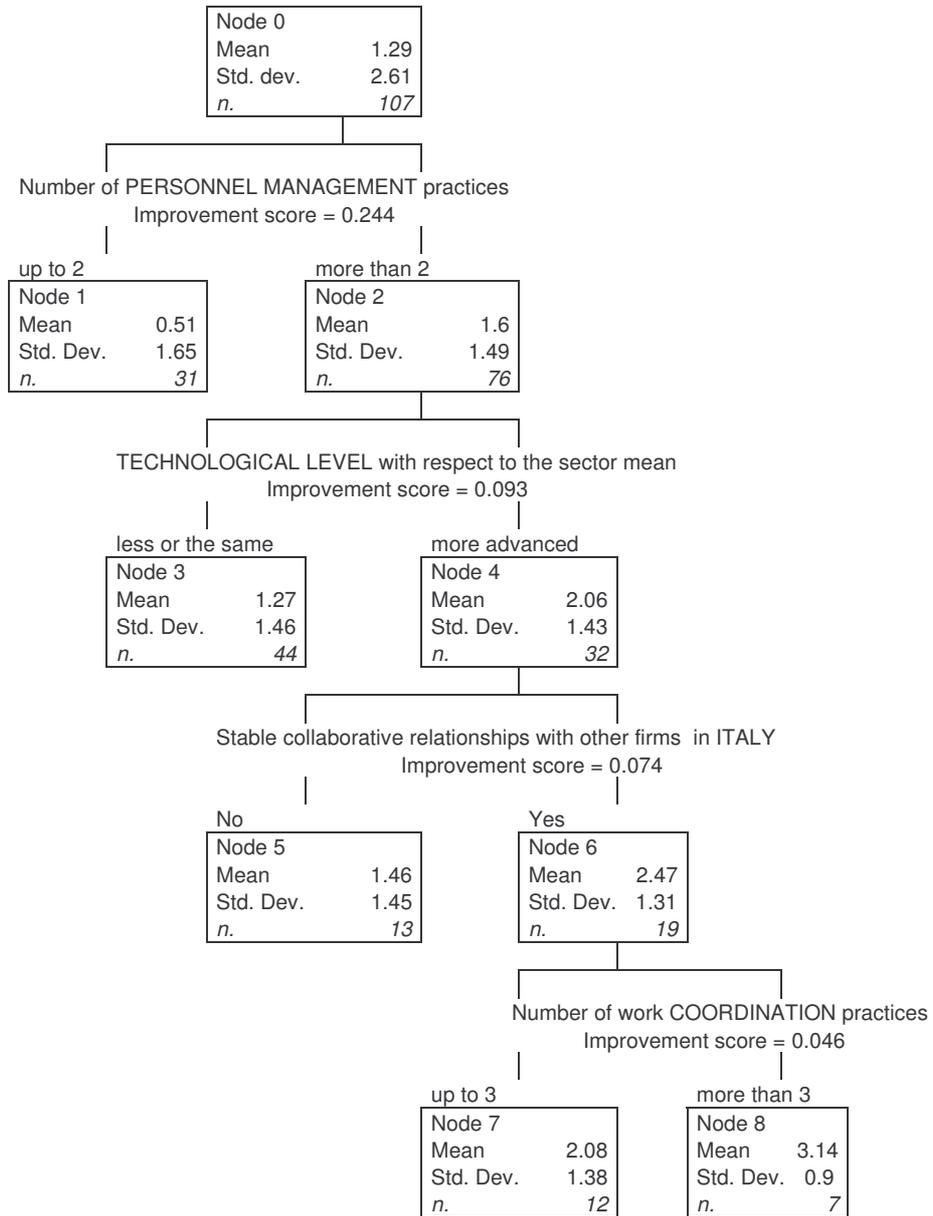
Considering labour productivity first, Figure 2 shows that it is possible to identify a group of firms which, by combining high levels of organizational innovation with high technological levels and close relationships with other firms, have achieved trend in productivity substantially better than those of other firms.

In particular, the tree's hierarchical structure shows that the variable which most discriminates among the productivity results is the number of personnel management practices adopted. Among firms using up to two practices, the mean in productivity trends is 0.5, whilst among those using three or more practices it is 1.6.

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<sup>4</sup> The survey has analyzed six indicators of the economic performance of the firms: market share, sales volume, assets, labour productivity, profits, fixed investments. Each indicator related to the trend over the last five years; the firms could be rated on a scale from -5 (very negative) to +5 (very positive). Trends in each indicators were defined in terms of declarations by management, which were not necessarily based on objective indicators drawn from the balance sheet. The indicator 'overall economic performance' was a summary indicator constructed as the sum of the values recorded by all the indicators considered, and therefore assumed values between -30 and +30.

Fig. 2 - Subdivision of firms according to labour productivity performance  
Trends in labour productivity



Performances further improves if firms, besides investing greatly in the quality of work, also do so in technological innovation and develop stable collaborative relations with other Italian firms – that is, they network with other organizations sharing information, knowledge and experiences. In fact, among the firms that have adopted a large number of organizational practices for personnel management, the high technological level pushes the productivity index up to an mean value of 2.1, as opposed to the 1.2 recorded among firms which do not accompany organizational investments with investments in technologies.

The presence of collaborative relationships with other firms improves performance up to 2.4, and a further increase in productivity is obtained by adding to these characteristics large-scale investment in innovations concerning practices to coordinate work: that is, investment in the adoption of practices of decision-making decentralization, employee involvement, the sharing of information with workers, and a structured system of performance assessment. When all these characteristics are simultaneously present, the productivity index reaches levels equal in mean to 3.4 (almost three times higher than the mean recorded for the entire sample).

It should also be noted that, in the presence of low adoption of personnel management practices, none of the variables considered in the analysis has explanatory value for increases in the index of labour productivity trend. These results confirm complementarity both among the different bundles of practices, and among these, technological innovations, and collaboration networks. In particular, if technological innovations are not accompanied by organizational innovations, the effects on labour productivity are not significant. Likewise, the intense adoption of several bundles of innovative practices is not significant if these strategies are not accompanied by large investments in advanced technologies.

However, these results also show that productivity is not simply tied to the overall degree of organizational innovation in the firm, an indicator which does not take account of the various dimensions of labour relations on which the practices intervene. Conversely, investments should be targeted on specific practices intended to enhance the quality of work and those designed to improve the coordination of activities and employee involvement.

#### 4.3.3 Firms achieving the best overall economic performances

Turning now to the firm's overall economic performance (Figure 3), the results appear more differentiated but generally in line with the findings for labour productivity.

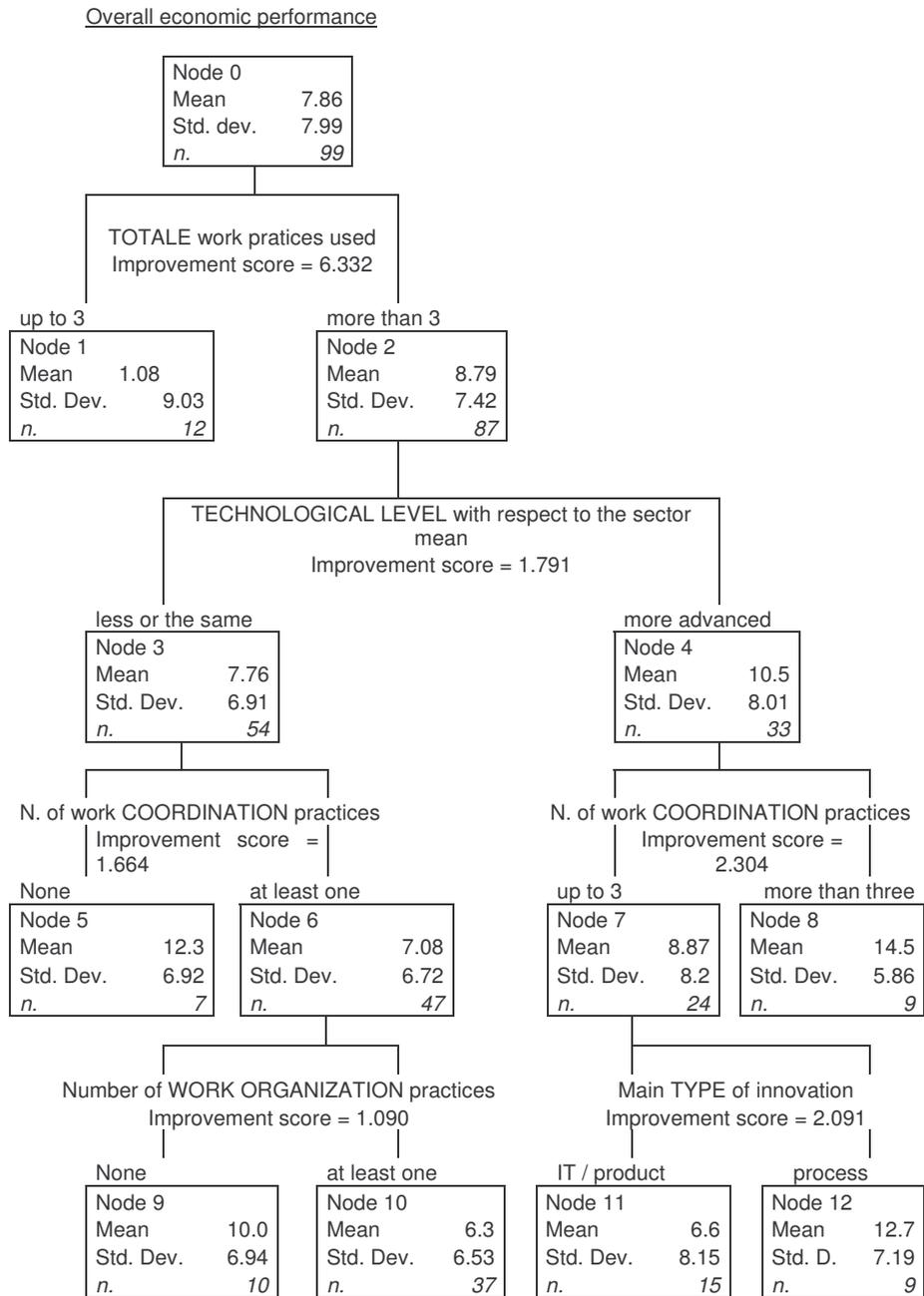
In this case, the variable that most discriminates among the performances of firms is the overall number of innovative practices used. Whilst in the case of productivity it is personnel management practices that record the most significant relations, the relations with overall economic performance are stronger if the various bundles are considered jointly, once again showing the importance of a systemic approach to organizational change.

However, the discriminating threshold is not particularly high. It is the firms adopting at least four practices (out of thirteen) that achieve the best results, with the economic indicator assuming values on mean equal to 8.8, whilst among those adopting fewer than four practices the mean for the indicator is 1.1. If the use of at least four innovative practices is combined with a technological level above the sector average, performances improve further, reaching an mean value of 10.5.

In confirmation of the finding for productivity, even better performances are achieved by adding to these two characteristics the intense use of innovative work coordination practices: the performance indicator now assumes an mean value of 14.8. In cases where a high technological level is not supported by innovations in work coordination practices, the best performances are achieved when technologies concern the product transformation process, not the coordination of activities (ICT) and the final product.

Another finding to emerge from Figure 3 is that, where technological levels are low, the adoption of organizational innovations related to work coordination and organization may have harmful effects on the firm's overall performance. In other words, if the technologies adopted are of traditional type, the best performances are obtained by maintaining organizational arrangements that are also of traditional type. Overall, in order to achieve good business performance, the levels of technological and organizational innovation must be coherent, and the more both of them are advanced, the better the results obtained.

Figure 3 - Classification of firms according to overall economic performance and some business variables



In conclusion, therefore, the findings suggest the existence, also in the case of SME, of a quite solid relationship between the adoption of new work practices and better business results, especially as far as labour productivity is concerned. However, the data have also confirmed the view put forward in the literature on large firms that the new work practices must be introduced at system level, i.e. on a large scale and coherently, and be accompanied with equally large-scale investments in technological innovation so as to exploit complementarities.

## **5 Final remarks**

This study has examined organizational innovations in SME in the Milan area. The analysis has enabled us to separate two groups of results concerning (i) the current situation of organizational innovation and (ii) the relationship between organizational innovation practices and firms' performances.

SME exhibits a good diffusion of organizational innovation practices, but there is a difference between personnel management practices, which are very widespread, and those to coordinate and organize work, which are less so. Overall, around half the firms in the sample are in a situation which can be called of 'transition' (EC 2002) towards a different organization model.

Moreover, SME prefer to invest in the quality of work and skills and greater rigidity in decision-making process. The most radical forms of organizational flattening (i.e. decision-making decentralization and autonomous work groups) seem to need particular conditions to be introduced, probably because of the greater risks connected with their use which could be incompatible with SME. Nevertheless, when SME decide to invest in these organizational processes they do so with conviction, involving a larger share of the workforce compared with the case of the other innovative practices.

Analysis of the relationship between practices and economic results has identified a positive and significant relationship between the adoption of personnel management practices (technical and relational/ behavioural training, internal labour markets, incentivising reward systems) and performance in terms of labour productivity.

Confirming the results reported by a large body of studies on large firms, the analysis of interactions between organizational and technological innovations in SME has shown that in firms with a high level of technologies adopted, the effects of organizational innovations on the firm's performance are greater. Conversely, with lower technological levels, a high degree of organizational innovation may have counter-productive effects by worsening the business results. Overall, SME exhibit a certain awareness of the benefits derivable from the interaction between technologies and organizational innovation by accompanying investments in new practices with investments in advanced technologies.

Finally, also embeddedness in stable relational networks with other firms seems to be a factor which, if coherently combined with the other business strategies, yields superior performances. This finding is strictly connected with the type of firm analysed, but precisely for this reason is of paramount importance for the strategies of SME and suggests also to policy makers to pay more attention on the role of relational networks as opportunity for SME to growth.

## References

- Adams C.P. (2002), *Selection of High Performance Work Systems in US Manufacturing*, Federal Trade Commission, 29 march.
- Addison J.T., Stanley Siebert W., Wagner J., Wei X. (2000), "Worker Participation and Firm Performance: Evidence from Germany and Britain", *British Journal of Industrial Relation*, vol. 38, n. 1, pp.7-48.
- Antonioli D., Mazzanti M., Pini P. (2008), "Productivity, Innovation Strategies and Industrial Relations in SME. Empirical Evidence for a Local Manufacturing System in Northern Italy", paper presentato alla Conferenza ISAE Monitoring Italy 2007, Roma, 18 ottobre 2007, in corso di pubblicazione sulla *Rivista di Politica Economica*.
- Antonioli D., Delsoldato L., Mazzanti, Pini P. (2007), *Dinamiche innovative, relazioni industriali, performance nelle imprese manifatturiere. Seconda indagine sul sistema locale di Reggio Emilia*, Franco Angeli, Milano.
- Antonioli D., Pini P. (2004), "Dinamiche innovative e performance d'impresa: analisi cluster per un sistema industriale locale", *Istituzioni e sviluppo economico*, 2 (1), pp. 65-104.
- Appelbaum E., Bailey T., Berg P., Kalleberg A.L. (2000), *Manufacturing Advantage. Why High Performance Work Systems Pay Off*, Cornell University Press, New York.

- Banker R.D., Field J.M., Schroeder R.G., Sinha K.K. (1996), "Impact of Work Teams on Manufacturing Performance: A Longitudinal Field Study", *Academy of Management Journal*, vol. 39, n. 4, pp.867-890.
- Batt R. (2004), "Who Benefits from Teams? Comparing Workers, Supervisors and Managers", *Industrial Relations*, vol. 43, n. 1, pp. 183-212.
- Becker B.E., Huselid M.A., Pickus P.S., Spratt M.F. (1997), "HR as a Source of Shareholder Value: Research and Recommendations", *Human Resource Management Journal*, vol. 31, n. 1, pp. 25-41.
- Black S.E., Lynch L.M. (2001), "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity", *Review of Economics and Statistics*, vol. 83, n.3, pp. 434-445.
- Black S.E., Lynch L.M. (2004), "What's Driving the New Economy? The Benefits of Workplace Innovation", *Economic Journal*, vol. 114, n.2, pp. 97-116.
- Breiman L., Friedman J.H., Olshen R., Stone C.J. (1984), *Classification and Regression Trees*, Belmont, Wadsworth.
- Brodner P., Latniak E. (2002), "Source of Innovation and Competitiveness: National Programmes Supporting the Development of Work Organization", Final Report to DG Employment and Social Affairs, Institute for Work and Technology, Gelsenkirchen, *mimeo*.
- Brown C. – Reich S., Stern D. (1992), "Becoming a High Performance Work Organization: The Role of Security, Employee Involvement, an Training", University of California, paper iirwps04592, *mimeo*.
- Butler P., Felstead A., Ashton D., Fuller A., Lee T., Unwin L., Walters S. (2004), "High Performance Management: A Literature Review", Learning as Work Research Paper, n. 1, june.
- Cristini A., Labory S., Leoni R. (2008), "Direct and Indirect Complementarity Between Workplace Reorganization And New Technology", paper presentato alla *Conferenza ISAE Monitoring Italy 2007*, Roma, 18 ottobre 2007, in corso di pubblicazione su *Rivista di Politica Economica*.
- Cristini A., Gaj A., Labory S., Leoni R. (2003), "Flat Hierarchical Structure, Bundles of New Work Practices and Firm Performance", *Rivista Italiana degli Economisti*, vol. VIII, n. 2, agosto, pp. 313-341.
- Della Torre E. (2009), "Pratiche di lavoro ad elevata performance e caratteristiche delle imprese innovative", *Economia Politica*, in corso di pubblicazione.
- European Commission (2002), *New Form of Work Organization: The Obstacles to a Wider Diffusion*, Final Report, Business Decision Limited, October.
- European Foundation for The Improving of Living and Working Conditions (1997), *New forms of Work Organization: Can Europe Realize Its Potential?*, Office for Official Publications of the European Communities, Luxembourg.
- Giannetti C., Madia M. (2008), "Is There Any Relationship Between The Degree of Labour Market Regulation And Firm Innovativeness?", paper presentato alla Conferenza ISAE Monitoring Italy 2007, Roma, 18 ottobre 2007, in corso di pubblicazione su *Rivista di Politica Economica*.
- Gittel J.H., von Nordenflycht A., Kochan T.A. (2004), "Mutual Gain or Zero Sum? Labor Relations and Firm Performance in the Airline Industry", *Industrial and Labor Relations Review*, vol. 57 (2), pp. 163-180.
- Godard J. (2001), "Beyond the High Performance Paradigm? An Analysis of Variation in Canadian Managerial Perceptions of Reform Programme Effectiveness", *British Journal of Industrial Relations*, Blackwell, 39:1, March, pp. 25-52.
- Godard J. (2004), "A Critical Assessment of the High Performance Paradigm", *British Journal of Industrial Relations*, Blackwell, 42:2, June, pp. 349-378.
- Huselid M.A. (2003), "Editor's Note: Special Issue On Small and Medium-sized Enterprises: a Call for More Research", *Human Research Management*, 42:4.

- Ichniowski C., Shaw K., Prennushi G. (1997), "The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines", *American Economic Review*, vol 87, n.3, pp.291-313.
- Laursen K., Foss J.F. (2003), "New Human Resource Management Practices, Complementarities and The Impact on Innovation Performance", *Cambridge Journal of Economics*, vol.27, n. 2, pp. 243-263.
- Leoni R., Cristini A., Mazzoni N., Bazzana E., Gaj A. (2004), "Disegni organizzativi, stili di management e performance d'impresa", Rapporto di ricerca, Dipartimento di Scienze economiche, Università di Bergamo, *mimeo*.
- Mancinelli S., Mazzanti M. (2007), "SME Performance, Innovation and Networking. Evidence on Complementarities for a Local Economic System", Nota di Lavoro n. 50, Fondazione Eni Enrico Mattei, *mimeo*.
- Marbach G. (1992), *Le ricerche di mercato*, Torino, Utet.
- McDuffie J.P. (1995), "Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in The World Auto Industry", *Industrial and Labor Relations Review*, vol. 48, n. 2, pp. 197-221.
- Milgrom P., Roberts J. (1990), "The Economics of Modern Manufacturing: Technology, Strategy and Organization", *American Economic Review*, vol. 80, n. 3, pp. 511-528.
- Milgrom P., Roberts J. (1995), "Complementarities and Fit Strategies, Structure, and Organizational Change in Manufacturing", *Journal of Accounting Economics*, vol. 19, n. 2-3, pp. 179-208.
- Mohnen P., Röller L.H. (2005), "Complementarities in innovation policy", *European Economic Review*, vol. 49, n. 6, pp. 1431-1450.
- Osterman P. (1994), "How Common Is Workplace Transformation and Who Adopts It?", *Industrial and Labor Relations Review*, vol. 47, n. 2, pp. 173-188.
- Osterman P. (2000), "Work Reorganization in a Era of Restructuring: Trends in Diffusion and Effects on Employee Welfare", *Industrial and Labor Relations Review*, vol. 53, n. 2., pp. 179-196.
- Pini P. (2005), "Dinamiche innovative, partecipazione e risultati d'impresa in un sistema locale di produzione", *Economia Politica*, n.1, aprile, pp. 3-23.
- Pini P., (a cura di) (2006), *Dinamiche innovative, conoscenza, performance. Un'indagine sulle imprese della provincia di Ferrara*, Franco Angeli, Milano.
- Ramsay H., Scholarios D., Harley B. (2000), "Employees and High-Performance Work Systems: Testing inside the Black Box", *British Journal of Industrial Relations*, 38:4, December, pp. 501-531.
- Thompson M., Heron P. (2005), "Management Capability and High Performance Work Organization", *International Journal of Human Resource Management*, vol. 16, n. 6, pp. 1029-1048.
- Way S.A. (2002), "High Performance Work Systems and Intermediate Indicators of Firm Performance Within the US Small Business Sector", *Journal of Management*, vol. 28, n.6, pp. 765-785.
- Wood (1999), "Getting the Measure of the Transformed High Performance Organization", *British Journal of Industrial Relations*, Blackwell, 37:3, September, pp. 391-417.

**Summary.** *The empirical evidence of the past fifteen years has shown the existence of a positive relationship between the adoption of organizational innovations and a firm's economic results. However, only few studies focus on the actual adoption and the effectiveness of High Performance Work Systems in small and medium-sized enterprises, and especially so in the case of Italy. Through analysis of an original sample of SME in the Milan area, this paper shows that organizational innovations have been introduced in a large part of SME, but in many cases the process of organizational change is not yet complete. Moreover, confirming a large part of the existing evidences, analysis of the relationships with business performance shows that SME which have achieved the largest productivity increases are those which have combined investments in the new organization of work with advanced technologies and with the embeddedness in stable relational networks with other firms.*