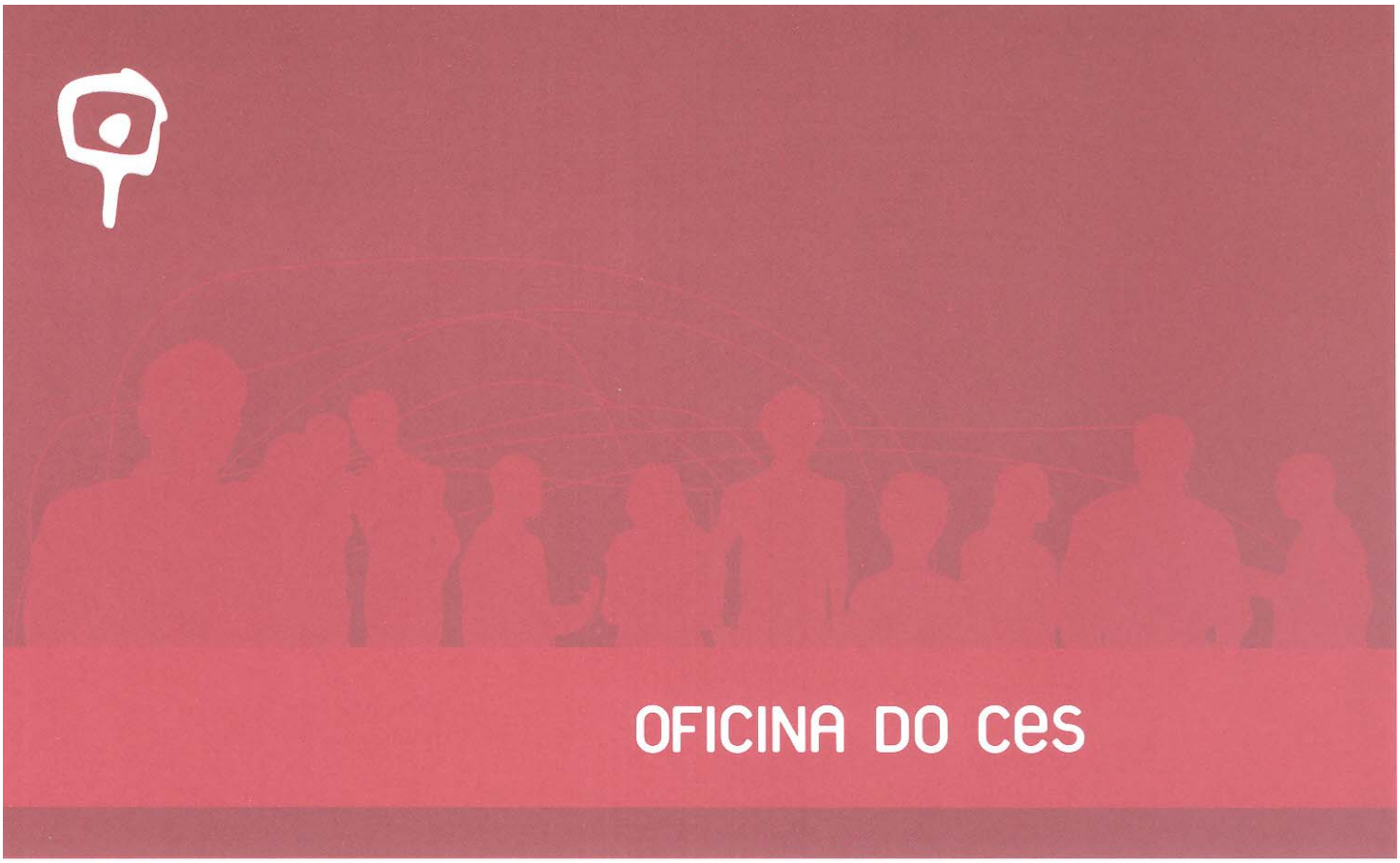

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Setembro de 2008
Oficina nº 313

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Setembro de 2008

OFICINA DO CES
Publicação seriada do
Centro de Estudos Sociais
Praça D. Dinis
Colégio de S. Jerónimo, Coimbra

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Organisational Enablers of Process Innovation in the Portuguese Footwear Industry: Do Subunits' Differences Matter?

Abstract: With the aim of investigating the link between the implementation of new forms of work organisation and innovation, this paper explores the importance of intra-organisational differences in explaining innovation adoption. By means of a survey complemented by case study field notes, this study takes two organisational units – production and conception & development – and analyses the subject in the Portuguese footwear industry. Findings suggest that there are not only differences in what concerns the extent to which certain management practices – such as autonomy and consultancy – are implemented, but also in the impact of these potential drivers on innovation adoption. This fact has important research and policy implications. If innovation is to be encouraged, intra-organisational differences regarding purposes, resources and competencies cannot be ignored.

Introduction

It is widely accepted that the successful implementation of process innovation is largely dependent upon the adoption of certain management practices, regarded as key organisational enablers. However, previous research (e.g. Prajogo and Sohal, 2006; Wilson *et al.*, 1999; Wolfe , 1994) has not found a consistent pattern of influence and, contrary to what would be expected, many hypothesised relationships have been found not to be statistically significant. This might be explained by the fact that most studies consider different types of innovation and ill-defined constructs. Moreover, when multiple industries are considered, the heterogeneity of the samples might overshadow the meaning of the hypothesised relationships.

The authors have recently conducted research (Abrunhosa and Moura e Sá, 2008) in a single industry and at the shopfloor level on the role of some management principles commonly associated with the "soft" elements of Total Quality Management [TQM] in enhancing the adoption of process innovation and got mixed results (Abrunhosa and Moura e

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Sá, 2008; Sá and Abrunhosa, 2007). In fact, they found that, in the Portuguese footwear industry, teamwork, supportive people management practices and communication significantly contribute to process innovation adoption, whereas other aspects, such as autonomy and consultation, have no clear association with it.

Contingency theories and ambidextrous approaches tend to suggest that organizations are not homogeneous – different subunits may have different cultures, aims, and structures – which means that the various organisational practices are implemented on a different scale and in different ways across the firm. Therefore, organisational enablers should not be regarded as universal: their influence may depend on the organisational area where they are to be implemented. This probably explains why, in many studies, some relationships are so ambiguous in what concerns their strength and even their sign (positive or negative impact).

To overcome this shortcoming, in this research study, rather than considering the organization as a "black box", we have taken two subunits – conception & development and production – as the unit of analysis. These two areas were chosen due to the differences in their internal processes and in the way they interact with the environment, putting them at the extremes of the organizational spectrum. The aim of this study is thus to analyse the importance of intra-organisational differences in the implementation level of some organisational practices commonly regarded as innovation enablers.

Given the relevance of understanding the drivers of innovation in mature industries that have been going through a process of change in their competitive bases, our research focus is on the Portuguese footwear industry. In fact, in developed countries, if the industry is to survive and prosper it has to find a way to beat the competition of the emerging economies that are able to produce large batches at lower costs. In the absence of cost advantages, the Portuguese footwear industry must pursue a differentiation strategy supported by innovation. Thus, the new competitive basis relies more and more on intangible factors, such as time-to-market, customisation and the provision of additional services, only possible to achieve through the use of management practices that change the way the work is organised and performed.

In order to investigate the relationships between the management practices chosen and the adoption of process innovation, quantitative and qualitative data were collected from a set of footwear firms. Based on data collected from industry experts and case studies conducted in a variety of firms, we developed a survey instrument that was administered to the top managers.

Overall, our findings suggest that the new forms of work organisation, mainly related with job design and work coordination, have an impact on process innovation adoption. Moreover, since the level of implementation of these aspects differs across the organisation, the effectiveness of certain management practices in driving innovation may vary.

Thus, some practical and policy implications can be drawn. First, if innovation adoption is to be promoted, the adoption of new forms of work organisation should be encouraged. Therefore, attention must be given to such organisational innovation enablers. Moreover, the implementation of these work management practices must take into account the specificities of the different subunits where they are to be applied.

In a field where organisational level studies dominate, adopting a subunit level of analysis and concentrating on a single industry constitutes an original approach, and we hope our research can make a significant contribution to the understanding of intra-organisational differences in innovation adoption.

The Portuguese footwear industry and the role of the conception and production subunits

Over the last decade, the production of footwear worldwide has registered an important growth. Asia has greatly contributed to this growth and, in 2005, was responsible for 80% of the world's production. China, with a share of 56%, is the greatest manufacturer worldwide. The European Continent, similarly to the American, concentrates 9% of world production. In terms of international trade, Asia is responsible for 79% of total world exports, and China appears with a share of 57%.

In this context, even by world standards, Portugal is a major player in the footwear industry. In 2005, Portugal occupied the 7th position in the world export ranking, with a share of 2.7% (compared to 3.4% in 2000) (UN Statistics Division). China (including Hong Kong and Macau) led the ranking, representing 41.8% of the market, followed by Italy (15.1%), Germany (4.2%), Belgium (4.2%), Spain (3.6%) and Brazil (3.3%).

In the leather market, in which Portugal specializes, the country occupies the 6th position (it was 3rd in 2000), with a share of 3.7%. China, with a share of 34.6%, Italy (18.8%), Germany (5.0%), Spain (4.6%) and Brazil (4.4%) are the world leaders (UN Statistics Division).

The Portuguese footwear industry exports around 85% of its production (against 88% in 2005, the highest percentage ever) (APICCAPS, 2007: 16)). The EU is responsible for

absorbing 90% of the Portuguese exports, with France (25.1%), Germany (21.7%), the United Kingdom (14.3%), the Netherlands (10.1%), Spain (7.5%) and Denmark (4.4%), as the major markets. In 2006, Portugal was in the 8th place as supplier of the EU, ahead of competing countries such as Spain and France, with a share of 4.4% (which corresponded to 1225 million Euros). Portuguese exports are mainly leather products, which represent 75.6% of the exports to the EU market (GEE, 2007a).

In addition, from a national point of view, in 2005, the sector represented around 4% (10% in 1986-1988) of the Portuguese exports of goods (GEE, 2007b) and 0.8% of the Portuguese imports of goods (GEE, 2007a). According to the National Institute of Statistics, in the period from 2000 to 2006, the trade balance showed a surplu*s*, in spite of a progressive decrease of exports between 2001 and 2005 and a small inflection in 2006, while the imports have slowly but steadily increased (GEE, 2007a).

The characteristics of the firms have been changing in favor of a more capital-intensive nature. As a sign of this change, there was a cut of 30% in the number of workers (APICCAPS, 2007).

In Portugal, micro and small firms represent 85% of the industry (PROINOV, 2001: 31) and most of them are family firms with a structure which is highly centralised in the person who is at the top (most of the times the founder), and where the large majority of the workers – around 65%, according to the Portuguese Footwear Technological Centre (CTC, 2004: 29) – has a low level of education and qualification.

The sources of competitive advantages have changed over the last forty-years. If, in the 1970s and 80s, the industry grew based on the low cost of the work and on economies of scale, in the 1990s this was no longer possible. Producers from emergent economies could produce the same with lower costs. Pressures from the demand side added to these changes in supply. In fact, in developed countries, shoes have increasingly became a life-style purchase, with an increase in orders for urgent and small-sized batches of fashionable products (with higher variety in models and colours) and a decrease of orders for large batches of standardised shoes with long lead times. Taken together, these pressures mean that, for firms in developed countries, productivity, quality, fast adaptation to change, and reduction of delivery times became the key competitive factors.

If, until the 1990s, the majority of the firms concentrated their activities on the shopfloor level, from then on conception/design and commercialisation have also been under the spotlight.

The role of the different organisational areas is largely explained by what we could call the "life cycle of shoes". This cycle can be shortly described as follows. A new collection of shoes starts with a brand concept that is the basis for the creative design of the shoe. Then, there is the need to transform that design into a technical model that can be mass-produced, a process that is usually based on a CAD-CAM software system and requires an extensive cooperation between conception and development and the other areas of the firm. The main stages of shoe production are the cutting of the leather, the stitching of the cut leather to form the uppers, and the assembly of the uppers to the sole to complete the shoe. This is normally a sequential (step by step) process carried out in an assembly line. Then, the shoes need to be delivered to retail stores, supported by marketing activities, followed by the final sales (online retail of shoes is still a marginal activity).

In this regard, conception&development (C&D) is mainly oriented towards the rapid reaction to market changes. Therefore, it is closer to the market and more permeable to its changes and pressures. Generally, C&D activities require a broad knowledge of the firm, since it needs to interact with other areas, especially production and sales. Furthermore, to enhance creativity, risk is more tolerated and mistakes are not so punitively taken. To accomplish these demands workers are typically more qualified and have wider competencies and skills. Work is organised in a way that allows autonomy, communication, teamwork and polyvalence. Accordingly, a strong investment on education and training is required.

On the other hand, given the kind of activities performed, in production the jobs are more standardized and formalization is clearly higher. The focus is mainly on efficiency/productivity, which puts a stronger pressure on time control and waste fight. Usually, mistakes are severely regarded. Workers tend to be less qualified and skills much more homogeneous. All in all, this implies that managers and workers are less willing to adopt more organic forms of work organisation.

Conceptual framework

The theoretical background of our research derives from organizational studies (especially those related to the organic and systemic paradigm [Mazzanti *et al.*, 2006; Altman, 2002, Black and Lynch, 2001; Capelli and Neumark, 1999; Newton, 1996]) and from innovation theories, in particular evolutionary theories (Hamel and Prahalad, 1994; Bartlett and Ghoshal, 1995; Ghoshal and Bartlett, 1995).

According to this background, organisations are regarded as open systems permeable to the pressures of the environment in which they operate. In addition, the adoption of new forms of work organisation (NFWO) becomes more and more important if firms are to survive in the new competitive landscape.

In fact, organisational theory emphasises that more organic structures, normally associated with NFWO, are more innovative (Damanpour, 1987; Aiken *et al*., 1980; Daft, 1978; Prajogo and Sohal, 2006; Burns and Stalker, 1961, Abrunhosa and Moura e Sá, 2008). For the purposes of our study, innovation embraces the creation or application of new knowledge, or the recombination of existing knowledge, to generate value through the introduction of products, processes, markets or organisational forms which are new or substantially improved for the adopting firm (Marques and Abrunhosa, 2005).

Such NFWO call for flatter organisations, delegation of power and responsibility, more autonomy, increasing communication, a closer relationship between workers and managers and the establishment of consultation processes. These changes demand supportive people management practices (EC, 2002, 1998). Therefore, NFWO have consequences mainly on the structure and internal processes of a firm.

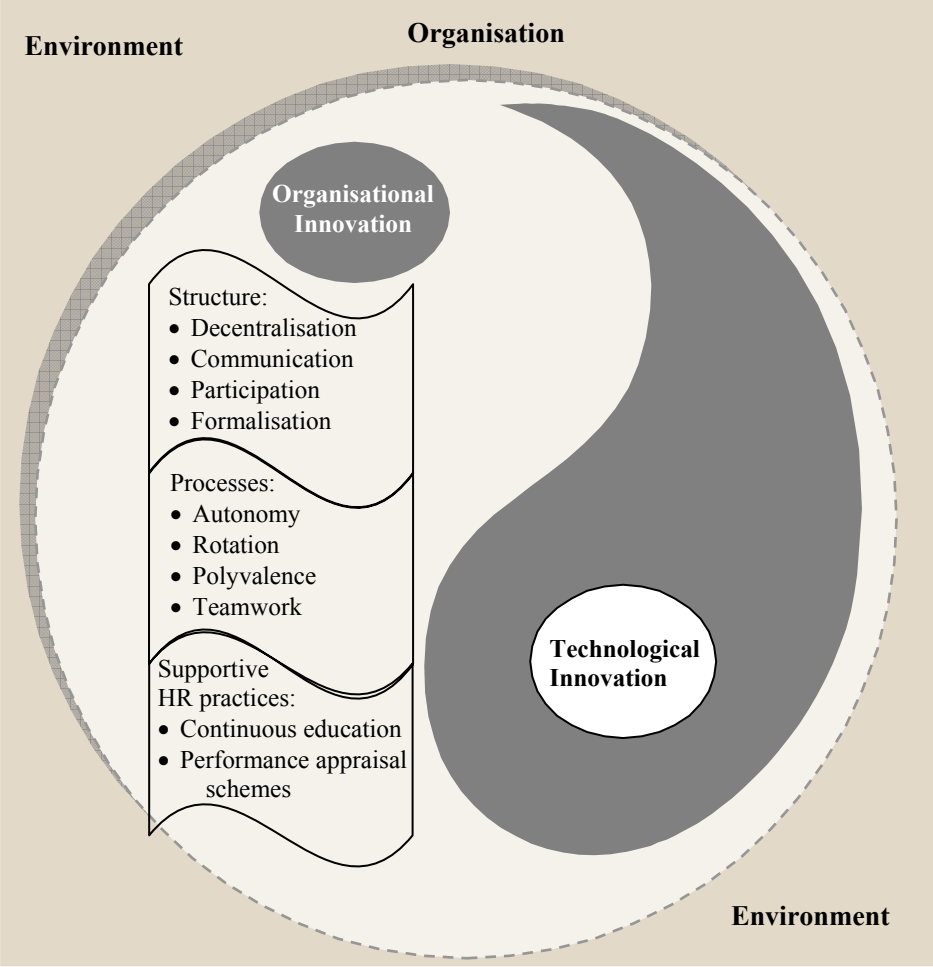
As extensively discussed in the literature, the structure of a firm is concerned with the arrangement of people, departments and other subsystems and can be described in terms of key dimensions, namely formalisation, centralisation, differentiation, and information flow (Pugh *et al.*, 1968, Pierce and Delbecq, 1977; Pettigrew *et. al*, 2000). The internal processes refer to the way in which the work is organised within operational activities (Pettigrew *et. al*, 2000; EC, 2002).

Figure 1 summarizes these arguments and represents our conceptual framework.

Traditionally, organisational level studies have assumed implicitly that work and structural forms across participants and subunits are homogeneous (Fry, 1982). Yet, according to the different nature of the tasks, the heterogeneity of the resources and the degree of closeness to external (environmental) influences, different organisational forms may apply.

Organisational scholars have long suggested the adoption of a contingencial view (Lawrence and Lorsch, 1967) when choosing between alternative organisational forms, but have seldom taken that argument forward to the subunit level of analysis.

Figure 1. Theoretical framework



A review of the literature on drivers of innovation shows an almost complete lack of attention to differences in the way the various subunits of a firm organise their work and, consequently, to their diverse contribution to the innovation process. In this research, we address this gap.

Research goals and methodology

The current research aims to analyse the importance of new forms of work organisation, commonly regarded as innovation enablers, both at the organisational and intra-organisational (subunits) level. In this regard, three major research questions emerge:

- R1: Is the implementation of new forms of work organisation supporting the adoption of process innovation?
- R2: Are different organisational subunits implementing those new forms of work organisation to the same extent?

- R3: Are the innovation drivers the same across the organisational subunits? Is their strength similar?

Based on the conceptual framework described above, and in line with the arguments that suggest that organic models facilitate innovation, the following hypotheses were proposed:

HA: High levels of NFWO (autonomy, formalization, rotation, contact, consultation) are associated with high levels of process innovation adoption

HA1: High levels of autonomy are associated with high levels of process innovation adoption

HA2: High levels of formalization are associated with low levels of process innovation adoption

HA3: High levels of rotation are associated with high levels of process innovation adoption

HA4: High levels of contact opportunities are associated with high levels of process innovation adoption

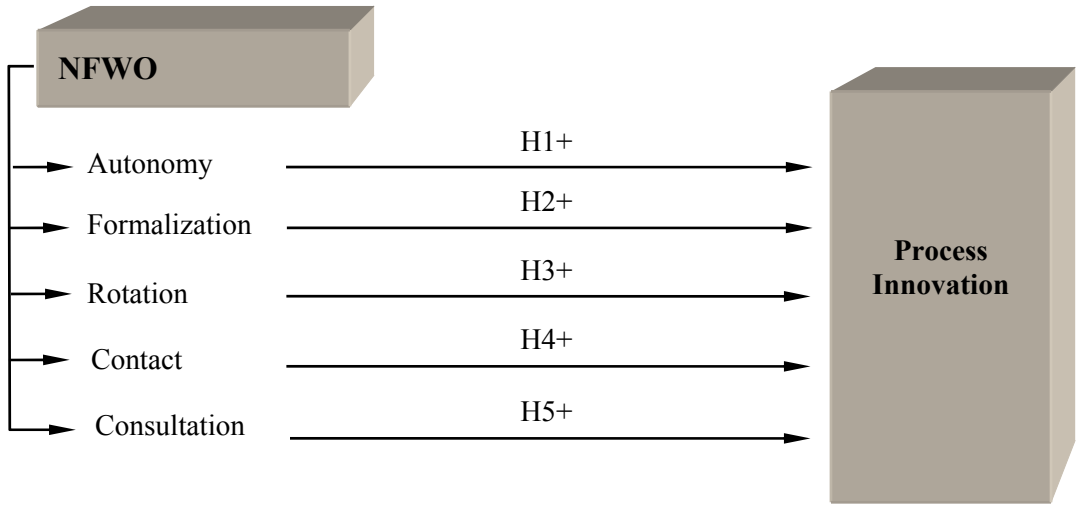
HA5: High levels of consultation are associated with high levels of process innovation adoption

HB: The same for production

HC: The same for conception&development (C&D)

This first set of hypotheses is depicted in Figure 2.

Figure 2. NFWO and process innovation (proposed relationships)



Additionally, taking into consideration the relevance of intra-organisational differences in explaining the role of the innovation drivers, the following hypotheses were put forward:

HD: The degree of implementation of NFWO is not the same for production and conception areas.

HE: The strength of NFWO in driving process innovation adoption is higher in conception than it is in production.

Given that new forms of work organization (NFWO) correspond to constructs that cannot be directly observed, they were measured using scales widely supported by previous studies (see Table 1).

Table 1. Proposed NFWO enablers of innovation

Tentative Constructs	Selected Measurement Items	Literature
Autonomy It relates to the degree to which employees have some discretion and control over job-related decisions	• Authority to take immediate corrective actions once problems arise • Support from the supervisors to the decisions made • Active role in task planning and scheduling • Control over the quality of the work	Damanpour (1991) Thompson (1965) Daft (1978) Daft (1982) Subramanian and Nilakanta (1996) Nahm *et al*. (2003)
Formalization The presence of written and enforced rules, procedures and other guides to action	• Written documents with job descriptions • Written rules and procedures that guide workers when they perform their tasks • Written rules and procedures that guide workers in dealing with problems at work	Burns and Stalber (1961) Thompson (1965) Damanpour (1991) Miner (1982) Subramanian and Nilakanta (1996)
Job Rotation It concerns the firm's ability to adjust and deploy the skills of its employees to match the tasks required by its changing workload, production methods and/or technology.	• Use of job rotation schemes • Development of competencies for workers to perform a wide variety of tasks	Subramanian and Nilakanta (1996) Damanpour (1991) Saleh and Wang (1993)
Contact opportunities It reflects the extent to which workers meet with each other and have access to their top managers	• Degree of intradepartmental communication (among co-workers that belong to the same area) • Degree of transversal (interdepartmental) communication • Accessibility of upper manager to workers • Regular meetings between workers and their direct supervisors	Damanpour (1991) Nahm *et al*., (2003)
Consultation It relates to the degree to which the organisation listens to its employees	• Employees' feedback collection through the use of questionnaires • Existence of a system to collect employees' suggestions • Disclosure of the results of the questionnaires • Workers' involvement in strategy decision making	Roebuck (1996) EPOC (1997)

Given their relative importance to the footwear industry, some process innovation items were considered and managers were asked to report those that they have introduced. The 1997-2004 period was considered appropriate to this analysis.

Table 2. Proposed process innovation items

• Automatic systems cutting samples
• Automatic conveyers with dynamic distribution and dynamic warehouses
• Digitalizing table for leather and other materials
• Automatic nesting system for leather and other materials
• Automatic leather cutting systems (WaterJet/Laser/knife)
• Engraving system by laser
• Automatic stitching machine
• Automatic toe lasting machine
• CAD System

When measuring process innovation adoption, we have used the mean number of innovations adopted over time (MNI), as suggested by Subramanian and Nilakanta (1996) and Damanpour and Gopalakrishnan (1998). Thus, MNI represents the mean number of the innovation items described in Table 2 adopted over the time period considered.

With the aim of testing the hypotheses previously presented, a face-to-face questionnaire was administered to the top managers of 20 Portuguese footwear firms, in which additional qualitative data was collected within the empirical work carried out (case-studies). That contributed also to validate the questionnaire designed.

One response per firm was thus obtained regarding the perceptions of managers concerning the degree to which each area – production and conception – is implementing the practices above-mentioned.

In accordance with the scales proposed in Table 1, each NFWO was represented by a set of questions (measurement items). Establishing the reliability and validity of those scales is essential to ensure that they actually measure the concepts they are supposed to represent (Sureshchandar *et al*., 2001).

Using the common validation procedures (i.e. by computing the corresponding Cronbach alphas and analysing the inter- and intra-item correlations), it is possible to affirm that all the scales meet the reliability and validity criteria, since the Cronbach alphas are all above 0.7 (Table 3). Moreover, a principal component analysis was performed that revealed that the scales are unidimensional (a single factor was extracted) and that the items indeed load in the appropriate constructs.

Table 3. Scale validation results

Constructs	Cronbach Alpha		
	Organization	**Production**	**C&D**
Autonomy	0.834	0.752	0.711
Formalization	0.879	0.771	0.758
Rotation	0.851	0.931	0.920
Contact	0.950	0.947	0.791
Consultation	0.953	0.896	0.896

Results and discussion

Once established the quality of the measurement scales, it was then possible to go forward and use multiple regression analysis to estimate the coefficients linking the various NFWO to process innovation adoption.

For each case analysed (organisation, production and C&D) the following model was estimated:

$$MNI = \alpha + \beta_1\ AUTON + \beta_2 FORM + \beta_3\ ROTATION + \beta_4\ CONTACT + \beta_5\ CONSULT$$

The results obtained are summarised in Tables 4, 5 and 6.

Table 4. Multiple Regression Analysis Results for the Organization

	Beta	***t***	***Sig.***	**Hypothesis**
Autonomy	0.366	1.018	0.331	H1: supported (not significant)
Formalization	-0.870	-3.030	0.011	H2: supported at 0.1 significant level
Rotation	0.343	1.296	0.221	H3: supported (not significant)
Contact	-1.021	-2.599	0.025	H4: not supported
Consultation	0.913	2.779	0.018	H5: supported at 0.1 significant level

$R^2 = 0.5486$
Adjusted R^2=0.342

Table 5. Multiple Regression Analysis Results for Production

	Beta	***t***	***Sig.***	**Hypothesis**
Autonomy	0.865	1.906	0.083	H1: supported at 0.1 significant level
Formalization	-1.924	-4.348	0.001	H2: supported at 0.1 significant level
Rotation	1.277	3.724	0.003	H3: supported at 0.1 significant level
Contact	-1.922	-3.336	0.007	H4: not supported
Consultation	1.323	4.207	0.001	H5: supported at 0.1 significant level

$R^2 = 0.671$
Adjusted R^2=0.522

Table 6. Multiple Regression Analysis Results for Conception&Development

	Beta	***t***	***Sig.***	**Hypothesis**
Autonomy	0.172	0.614	0.552	H1: supported (not significant)
Formalization	-0.509	-1.369	0.198	H2: supported (not significant)
Rotation	0.370	1.089	0.299	H3: supported (not significant)
Contact	-0.654	-1.864	0.089	H4: not supported
Consultation	0.648	1.914	0.082	H5: supported at 0.1 significant level

$R^2 = 0.426$
Adjusted R^2=0.166

As can be observed, not only the model has a good fit in all situations, but also the majority of the hypotheses are supported. Thus, it is possible to establish that ~~the~~ NFWO consistently drive process innovation adoption. Overall, the sign of the relationships goes in line with what we would expect. For production, all the betas are even statistically significant, with the exception of contact opportunities. The results at the organisational level are similar, even if autonomy and rotation, though positive, do not show a significant association with MNI. For C&D, it was not possible to find many statistically significant relationships, even if, once again, the sign remains consistent with theory.

Therefore, the NFWO proposed seem to be interesting instruments to encourage process innovation adoption. *Consultation*, in particular, emerged as a very important enabler, exhibiting a statistically significant coefficient for the organization and across the two subunits taken into consideration. Less *formalization* seems also to contribute to the willingness to innovate.

As stated before, only *contact opportunities* apparently contradict most theory, consistently showing negative regression coefficients which, in many cases, are even statistically significant. This somewhat confusing fact may find an explanation in the items considered to measure it and in the characteristics of the footwear firms. In fact, *contact opportunities* refers essentially to the degree of inter- and intra-organisational communication, as well as to accessibility to top managers. Since the large majority of the firms are small and family units, contact opportunities are easy to establish (3.76 out of 5). Yet, most of the time the aim of these contacts is not to address or discuss particular issues related to process improvement or innovation. They come as a natural consequence of "gathering together". By themselves, contact opportunities do not have an impact on innovation behaviours, especially if they are not supported by more structured mechanisms.

In order to analyse intra-organisational differences in the implementation of NFWO, the correspondent mean values for each construct were computed and a t-test performed. The results are shown in Table 7.

Table 7. Degree of implementation of ~~the~~ NFWO for production and C&D

Constructs	Production		Conception&Development		Subunits Comparison	
	Mean (out of 5)	**S. D.**	**Mean (out of 5)**	**S. D.**	**t**	***Sig.***
Autonomy	2.78	0.892	3.94	0.534	-7.827	0.000
Formalization	2.47	1.12	2.53	1.20	-0.614	0.548
Rotation	2.79	1.01	2.18	1.27	1.728	0.103
Contact	3.65	1.23	3.88	0.93	-2.954	0.009
Consultation	2.18	1.09	2.76	1.08	-3.736	0.002

As expected, autonomy, contact and consultation are more extensively practiced in C&D, having already became part of daily routines. This does not come as a surprise, given the job characteristics in this area. For production the implementation levels of NFWO range from 2.18 (consultation) to 3.65 (contact). As for C&D, rotation has the lowest score (2.18), while autonomy has the highest (3.94). Although work standardization is lower for C&D, in fact formalization is not perceived as being lower in this area.

Looking at the t-test, it is possible to affirm that autonomy, contact and consultation levels are in fact statistically different for the two areas analyzed. HD is, thus, partially supported.

Finally, and trying to roughly evaluate whether the impact of the innovation drivers differs across the two subunits under study, the corresponding regression coefficients, as well as the p-values, are shown side by side in Table 8.

Table 8. Betas for Production versus C&D

Constructs	Betas for Production	Betas for C&D
Autonomy	0.865 (p=0.083)	0.172 (p=0.552)
Formalization	-1.924 (p=0.001)	-0.509 (p=0.198)
Rotation	1.277 (p=0.003)	0.370 (p=0.299)
Contact	-1.922 (p=0.007)	-0.654 (p=0.089)
Consultation	1.323 (p=0.001)	0.684 (p=0.082)

All in all, and contrarily to what we first anticipated, the beta coefficients for production are higher and statistically more significant. This seems to indicate that, at the shopfloor level, the marginal contribution of an increase in any of the practices associated with NFWO to process innovation adoption is higher. An explanation for this fact may be found in the lower current level of implementation of these practices in production (Table 7), whereas in C&D the NFWO might have already achieved a level of implementation that makes their additional contribution somehow weaker. In fact, as an example, autonomy, being much less implemented in production (2.7 versus 3.9), shows a superior and statistically significant beta-coefficient (0.865 versus 0.172), indicating that increasing the autonomy of shopfloor workers will have indeed a strong positive impact on innovation adoption.

Conclusion

In a context of increasing turbulence, firms in mature industries face the challenge of changing their competitive basis, which makes innovation adoption critical to their survival. Recent studies tend to emphasise the importance of organisational processes and structures to stimulate innovation and capitalize its effects.

In line with this trend, a conceptual model was developed and tested to investigate whether certain work management practices are innovation drivers in the Portuguese footwear

firms. In doing that, we took into account two main levels of analysis: the organisation as a whole and two subunits.

In fact, one of the main arguments underlying the current study is that the effectiveness of the various NFWO in process innovation adoption is not universal, but rather depends on the organisational area in which they are applied. Therefore, in studying the role of key organisational enablers in driving process innovation, we took into consideration two main areas: production and conception. The reasoning behind this choice is essentially linked to the differences in job design, responsibilities and professional cultures between these two areas.

The model proposed shows a good fit in all situations, confirming that, in general, the practices proposed are innovation drivers. HA, HB and HC were, thus, overall supported. With the exception of *contact opportunities*, the sign of the relationships linking each practice to innovation is consistent with theory and remains the same across the organisation. In particular, *consultation*, being statistically significant in all cases, emerges as a key innovation enabler.

As we anticipated, there are some important differences between organisational areas regarding the level of implementation of NFWO. While production subunits still exhibit a set of characteristics that are close to a mechanistic model, conception has features that are much more typical of an organic model (i.e. increased flexibility, additional integration, and enhanced stimulus to creativity). In fact, results of the statistical tests indicate that the level of implementation of the majority of NFWO differs between production and conception. That is particularly the case of *autonomy* and *consultation*. Thus, HD was partially supported.

Additionally, the contribution of each NFWO to innovation adoption varies for the different areas, showing that the effectiveness of management practices is not the same across the organisation. Indications are that sub-implemented practices, as it happens with autonomy at the shopfloor level, have a stronger additional effect on innovation.

All in all, our findings suggest that indeed at the organisational level different structures and processes do coexist. Due to those differences, the organisational enablers of innovation do not have the same impact organisational-wide. This confirms the idea that innovation is path dependent (context-specific). There is not a unique set of practices that organisations should adopt to be more innovative. Even if the new forms of work organisation are in general innovation drivers, different combinations apply to different situations. If a firm is to be more innovative, it has to adjust its work management practices to the particular conditions of its internal subunits.

References

Abrunhosa, Ana, Moura e Sá, Patrícia (2008), "Are TQM Principles Supporting Innovation in the Portuguese Footwear Industry?", *Technovation*, 28(4), 208-221.

Aiken, Michael *et al.* (1980), "Organisational Structure, Work Process, and Proposal Making in Administrative Bureaucracies", *Academy of Management Journal*, 23, 631-652.

Altman, Morris (2002), "Economic Theory and the Challenges of Innovative Work Practices", *Economic and Industrial Democracy. An International Journal*, 23(2), 271-290.

APICCAPS, Associação Portuguesa dos Industriais de Calçado, Componentes, Artigos de Pele e seus Sucedâneos (2007), *Indústria do Calçado, Plano Estratégico 2007-2013*. Porto: APICCAPS. Disponível em http://www.apiccaps.pt/.

Bartlett, Christopher; Ghoshal, Sumantra (1995), "Changing the Role of Top Management: Beyond Systems to People", *Harvard Business Review*, 73(3), 132-142.

Black, Sandra; Lynch, Lisa (2001), "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity", *Review of Economics and Statistics*, 83(3), 434-445.

Burns, Tom; Stalker, G. M. (1961), *The Management of Innovation*. London: Tavistock.

Cappellli, Peter; Neumark, David (1999), "Do High Performance Work Practices Improve Establishment-Level Outcomes?", *NBER Working Paper*, 7374.

CTC, Centro Tecnológico do Calçado (2004), *Utilização da formação como factor de competitividade pelas empresas da fileira do calçado: Estudos e Investigação*. São João da Madeira: Centro Tecnológico do Calçado.

Daft, Richard. L. (1978), "A Dual-core Model of Organizational Innovation", *Academy of Management Journal*, 21(2), 193-210.

Daft, Richard. L. (1982), "Bureaucratic versus Nonbureaucratic Structure and the Process of Innovation and Change", *in* S. B. Bacharach (ed.), *Research in the Sociology of Organizations*. Greenwich, CT: JAI Press: 129-166.

Damanpour, Fariborz (1987), "The Adoption of Technological, Administrative and Ancillary Innovations: Impact of Organisational Factors", *Journal of Management*, 13(4), 675-688.

Damanpour, Fariborz (1991), "Organisational Innovation: A Meta-analysis of Effects of Determinants and Moderators", *Academy of Journal Management*, 34(3), 555-590.

Damanpour, Fariborz; Gopalakrishnan, Shanthi (1998), "Theories of Organizational Structure and Innovation Adoption: The Role of Environmental Change", *Journal of Engineering and Technology Management*, 15, 1-24.

EPOC (1997), *New Forms of Work Organisation: Can Europe Realise its potential? Results of a Survey of Direct Employee Participation in Europe*. Dublin: European Foundation for the Improvement of Living Conditions.

European Commission (1998), *New Forms of Work Organisation: Case Studies*. Bruxels: DG Employment, Industrial Relations and Social Affairs.

European Commission (2002), *New Forms of Work Organisation: the Obstacles to Wider Diffusion*. Bruxels: DG Employment and Social Affairs.

Fry, Louis W. (1982), "Technology-structure Research: Three Critical Issues", *Academy of Management Journal,* 25(3), 532-552.

GEE – Gabinete de Estratégia e Estudos, Ministério da Economia e da Inovação (2007a), *Comércio Internacional Português de Calçado. Boletim Mensal do Comércio Internacional – Novembro de 2007*. GEE, disponível em http://www.gee.min-economia.pt/.

GEE – Gabinete de Estratégia e Estudos, Ministério da Economia e da Inovação (2007b), *Sector do Calçado – Comércio Internacional*. GEE, disponível em http://www.gee.min-economia.pt/.

Ghoshal, Sumantra; Bartlett, Christopher (1995), "Changing the Role of Top Management: Beyond Structure to Processes", *Harvard Business Review*, 73(1), 86-96.

Hamel, Gary; Prahalad, C. K. (1994), *Competing for the Future.* Boston, MA: Harvard Business School Press.

Lawrence, Paul R.; Lorsch, Jay W. (1967), *Organization and Environment*. Boston, MA: Harvard Business School Press.

Marques, Alfredo; Abrunhosa, Ana (2005), "Do modelo linear de inovação à abordagem sistémica - aspectos teóricos e de política económica", *CEUNEUROP Discussion Papers*, *33,* disponível em http://www4.fe.uc.pt/ceue/working papers/Abrun33.pdf.

Mazzanti, Massimiliano *et al*. (2006), "Organizational Innovations, Human Resources and Firm Performance. The Emilia-Romagna Food Sector", *The Journal of Socio-Economics*, 35, 123-141.

Newton, Keith (1996), "The Human Factor in Firms' Performance: Management Strategies for Productivity and Competitiveness in the Knowledge-based Economy", *Occasional Paper*, 14, Industry Canada, Ontario.

Nahm, Abraham Y. *et al.* (2003), "The Impact of Organizational Structure on Time-based Manufacturing and Plant Performance", *Journal of Operations Management*, 21, 281-306.

Pettigrew, Andrew; Massini, Silvia; Numagami, Tsuyoshi (2000), "Innovative Forms of Organising in Europe and Japan", *European Management Journal*, 18(3), 259-273.

Pierce, Jon L.; Delbecq, Andre L. (1977), "Organizational Structure, Individual Attitudes, and Innovation", *Academy of Management Review*, 2, 26–37.

Prajogo, Daniel; Sohal, Amerik (2006), "The Relationship between Organization Strategy, Total Quality Management (TQM), and Organization Performance: The Mediating Role of TQM", *European Journal of Operational Research,* 168, 35-50.

PROINOV (2001), *O Cluster do Calçado em Portugal*. Lisboa: PROINOV

Pugh, Derek S. *et al.* (1968), "Dimensions of Organization Structure", *Administrative Science Quarterly,* 13, 65-91.

Roebuck, Chris (1996), "Constructive Feedback: Key to Higher Performance and Commitment", *Long Range Planning*, 29(3), 328–336.

Sá, Patrícia; Abrunhosa, Ana (2007), "The Role of TQM Practices in Technological Innovation: The Portuguese Footwear Industry Case", *Total Quality Management & Business Excellence,* 18(1-2), 57-66.

Saleh, Shoukry D.; Wang, Clement K. (1993), "The Management of Innovation: Strategy, Structure, and Organizational Climate", *IEEE Transactions on Engineering Management*, 40(1), 14–21

Subramanian, Ashok; Nilakanta, Sree (1996), "Organisational Innovativeness: Exploring the Relationship between Organizational Determinants of Innovation, Types of Innovations, and Measures of Organisational Performance", *Omega, The International Journal of Management Science*, 24(6), 631-647.

Sureshchandar, G. S. *et al.* (2001), "A Holistic Model for Total Quality Service", *International Journal of Service Industry Management,* 12(4), 378-412.

Thompson, Victor A. (1965), "Bureaucracy and Innovation", *Administrative Science Quarterly*, 10, 1-20.

UN Statistics Division: http://comtrade.un.org/.

Wilson, Alla *et al.* (1999), "A Multi-attribute Measure for Innovation Adoption: The Context of Imaging Technology", *IEEE Transactions on Engineering Management,* 46(3), 311-321.

Wolfe, Richard (1994), "Organizational Innovation: Review, Critique and Suggested Research Directions", *Journal of Management Studies,* 31(3), 405-431.