WORKPLACE INNOVATION – SOCIAL INNOVATION: SHAPING WORK ORGANISATION AND WORKING LIFE

Guest Editors

Professor Jürgen Howaldt

Sozialforschungsstelle (sfs),
TU-Dortmund,
Evinger Platz 17, 44339 Dortmund, Germany
Email: howaldt@sfs-dortmund.de

Peter R.A. Oeij

TNO, Netherlands Organisation for Applied Scientific Research,
P.O. Box 3005, 2301 DA Leiden, The Netherlands
Email: peter.oeij@tno.nl

Published by
Inderscience Enterprises Ltd.

Contents

SPECIAL ISSUE: WORKPLACE INNOVATION – SOCIAL INNOVATION: SHAPING WORK ORGANISATION AND WORKING LIFE

Guest Editors: Professor Jürgen Howaldt and Peter R.A. Oeij

Workplace innovation and social innovation: an introduction

Jürgen Howaldt

Sozialforschungsstelle (sfs),
TU-Dortmund,
Evinger Platz 17, 44339 Dortmund, Germany
Email: howaldt@sfs-dortmund.de

Peter R.A. Oeij

TNO, Netherlands Organisation for Applied Scientific Research,
P.O. Box 3005, 2301 DA Leiden, The Netherlands
Email: peter.oeij@tno.nl
*Corresponding author

Steven Dhondt

TNO, Netherlands Organisation for Applied Scientific Research,
P.O. Box 3005, 2301 DA Leiden, The Netherlands
and
Catholic University Leuven,
Parkstraat 45 – Box 3601, 3000 Leuven, Belgium
Email: steven.dhondt@tno.nl

Ben Fruytier

Deceased; formerly of: Utrecht University of Applied Sciences,
The Netherlands

Abstract: This is the introduction to this special issue of *World Review of Entrepreneurship, Management and Sustainable Development* (*WREMSD*) dedicated to workplace innovation and social innovation related to work and organisation. As technological and business model innovations alone are not sufficient to enhance opportunities for businesses and employment, awareness is rising that better use should be made of human talents and new ways of organising and managing. In order to make working environments more receptive for innovation, and to enable people in organisations to take up an entrepreneurial role as intrapreneurs, a shift towards workplace innovation can be observed. Workplace innovation is complementary to technological and business model innovation, and a necessary ingredient for successful renewal, in that it addresses a type of management that seeks collaboration with employees through dialogue and employee engagement. Consequently, not only improvements of the quality of work for employees become beckoning perspectives, improving the business is at hand as well through successful innovations in the organisation's functioning, its culture of cooperation and leadership and the implementation of changes in the domain of HR-practices.

Keywords: workplace innovation; WPI; social innovation; innovation.

Reference to this paper should be made as follows: Howaldt, J., Oeij, P.R.A., Dhondt, S. and Fruytier, B. (2016) 'Workplace innovation and social innovation: an introduction', *World Review of Entrepreneurship, Management and Sustainable Development*, Vol. 12, No. 1, pp.1–12.

Biographical notes: Jürgen Howaldt is the Director of Sozialforschungsstelle Dortmund (sfs), Central Scientific Unit of the Technical University of Dortmund (TUDO) and Professor at the Faculty of Economics and Social Sciences and University Professor. He is a member of the Editorial Board of *Vision – The Journal of Business Perspective*; affiliate of SIERC (Social Innovation and Entrepreneurship Research Centre, Massey University, New Zealand); and member of the board of the European School of Social Innovation. He is an expert in innovation studies and social innovation, organisation development and management concepts, cooperation management and regional development.

Peter R.A. Oeij is a Senior Research Scientist at TNO and PhD candidate at Open University of the Netherlands, Faculty of Management, Science and Technology. Formerly, he was appointed as a Senior Researcher at IVA, Institute for Social Research of Tilburg University. His work covers the themes social innovation, workplace innovation and innovation management. He is preparing a dissertation on 'Innovation projects and team behaviour'.

Steven Dhondt is a Visiting Professor of Social Innovation at the University of Leuven and Senior Research Scientist at TNO. He is active in building a sound theoretical foundation for workplace innovation and why companies do invest in such practices. His work encompasses theoretical accounts, major surveys and building of methods for Dutch, Belgian and EU-customers. Over the past years, as a coordinator of the European learning network for workplace innovation, he has built an extensive European network of practitioners, social partners and knowledge partners for the European Commission.

Ben Fruytier was an Endowed Professor in Organisation Configurations and Employment Relations at the Utrecht University of Applied Sciences. Formerly, he was appointed as an Associate Professor at Radboud University Nijmegen and Senior Researcher at IVA, Institute for Social Research of Tilburg University. He holds a PhD from Radboud University Nijmegen.

1 Introduction

Workplace innovation (WPI) is conceptualised as a developed and implemented practice or combination of practices that structurally (division of labour) and/or culturally (empowerment) enable employees to participate in organisational change and renewal to improve quality of working life and organisational performance (Oeij et al., 2015). This conceptualisation of WPI implies that one needs to look at the organisation as a whole and consider the reciprocal effects of strategy, structure and culture, if they are to reap the benefits associated with WPI. For instance, hierarchical organisational structures may lead to more directive leadership styles and human resource management (HRM) practices that focus on a clear division of labour and control, whereas less hierarchical

structures may lead to leadership styles and HRM practices that are geared at promoting employee involvement, engagement and commitment (MacDuffie, 1997; Pot, 2011). Therefore, to fully understand WPI, it might be fruitful to not only focus on certain types of HRM practices and their consequences, but to also take into consideration the organisational structure and the management philosophy underlying strategic choices. Too often WPI is narrowed down as an 'HR-toy'. As a consequence, decision makers on technological innovation, business model innovation and marketing innovation underestimate and underuse the potential of WPI, as they are largely unaware of the role of organisation and people to make non-technical innovations a success. Within organisations, HR-managers and line- and operational managers too strongly function within separate silos.

This debate on WPI about the organisational level has a counterpart at societal level, called social innovation. The most relevant point of view in this debate is that technological and economic innovation alone are insufficient to solve today's social issues, like poverty, environmental pollution, climate control, and geopolitical tensions (Howaldt and Schwarz, 2010). A necessary condition is to include making better use of human resources, which need to be fully unleashed if we want to make a head start tackling these issues.

WPI (or social innovation in the workplace) is not only content, it is at the same time a process. Namely, it is a social, participatory process which shapes work organisation and working life, combining their human, organisational and technological dimensions. This participatory process simultaneously results in improved organisational performance and enhanced quality of working life. WPI is an important element of strategies for smart, sustainable and inclusive growth of the economies (EU2020 Strategy) through higher productivity, a better quality of working life and more innovation capability. WPI facilitates the impact of technological and economic innovations, delivering a productivity and innovation leap for private and public enterprises. A lack of investment in WPI results in idle capacities and a lagging development of the knowledge economy, a gap intensified by the emergence of new working patterns and new types of organisation. At the same time, data of the European Working Conditions Survey, EWCS, demonstrate that WPI results in active work situations: workplaces and jobs in which workers have greater autonomy in controlling their work demands, coupled with higher discretionary capacity for learning and problem-solving (Eurofound, 2012).

2 Innovation, growth and democratic workplaces

Since 2013, the European Commission is promoting the development of WPI in Europe (Dhondt, 2014). The belief is that by stimulating cooperation between managers and first-line workers, the innovation performance of companies will improve greatly. Dhondt discusses that strive for innovation as a European strategy should be supported by a huge rise in research, development and innovation (R&D&I) budgets. The EU-R&D&I strategy, however, is very inefficient, and companies experience a problem with the transformation of the research-euros into the valorisation of market products, because companies get stuck in a 'double valley of death of innovation'. WPI can help to overcome these valleys of death.

Europe wants manufacturing output to grow (European Commission, 2014), which can only be achieved if companies start re-investing into their manufacturing capabilities. Such a rise in investment has however not been seen over the past couple of years, while R&D&I-investments in service sectors have risen considerably. With dwindling public funding for R&D&I, this can only mean that in EU- and national research budgets, there will be a likely shift of investments from social sciences research into technical and IT sciences, e.g., in cyber physical systems, robotics, laser-technologies. This strategy can only work if the return of such hard tech investments is sufficiently high, but a concern is whether such innovation investments run the risk of getting stuck in two valleys of death.

A recent report shows that the key enabling technology (KET)-strategy has created a lot of 'stray-KETs' (Butter, 2015). The report says that companies experience major hurdles in getting a return from their investment. Their 'innovation transformation' gets stuck in the phase of generating more market return from pilots and demonstration projects. The report states that the amount of investment spent has already risen quite considerably, which is more that just a pity, as a clear strategy to overcome this first innovation valley of death does not seem to exist. Moreover, next to the pilot and demonstration phase, there is also a second innovation valley of death. That is in the market expansion phase itself. Companies do not seem to achieve the growth they are hoping for.

These two valleys of death are quite costly for companies, and for public finances since at least half of these R&D&I-budgets are composed of public funding. Dhondt (2015) suggest, therefore, that more new R&D&I-euros should not remain in the invention phase, but could probably be better directed at achieving a better transformation in the production organisation, in WPI. These investments should be connected to an improved deployment of human capital. Better education and improved management are helpful, but not a sufficient condition to 'make innovation pay'. Dhondt argues that, based on the shifting dominance of investments from tangible capital to intangible capital, there is also a major shift in management requirements. The amount of investments connected to intangible capital – i.e., organisation, management, HR – flipped in the nineties and is already double the size of investments in tangible capital (Corrado and Hulten, 2010). Managers need to understand how other capital sources need to be controlled to deliver value to the company. They need to be able to motivate personnel, manage design capabilities of the company, steer R&D, integrate ICTs in their production setting, and know how to keep their organisations adapting themselves to ever changing environments. It is clear that one person in management will probably not be able to oversee and fully understand all these investment areas. Management has become more of a cooperative endeavour than it has ever been. Management and leadership within such a setting will more and more rely on democratic procedures to manage these multitudes of sources that help grow value of the company (Gallie, 2013). Overcoming the two valleys of death is a challenge that requires new organisational strategies that reflect WPI. Recent results from the European Company Survey, ECS, inform on what kind of types of organisations are more affective than other types, in terms of workplace well-being, an index of 'work climate', and organisational performance, an index constructed of the financial situation, labour productivity and goods and services produced. Out of five organisational types, the more democratic types to manage the company are associated to significantly higher performance, and better workplace well

being (Eurofound, 2015). Dhondt (2015) suggests that these types help to cross the valleys of death of innovation more easily. Such democratic management approaches seem more suited to the management complexity that companies face nowadays.

Another Eurofound study (Oeij et al., 2015) found firm indications that democratic management and bottom-up management delivers positive consequences for companies and employees. In this study, more than 50 case studies were conducted among companies that perform relatively high WPI practices. This sample gives insight into the motivations and reasons to opt for WPI, but also on the different measures used to implement such more democratic practices. In-depth interviews with company managers, employee representatives and employees, point to three different set of factors that support such more democratic procedures, namely the structure of the company, cultural elements of workplace practices, and the process to motivate employees during the implementation (Table 1). The structure elements are linked to decision latitude, the organisational model, participation to co-decide in the organisational model, and autonomy and participation, while the cultural elements are connected to innovative behaviour, bottom-up and people driven initiative, and participatory implementation.

Table 1 Factors influencing strategies to choose for WPI

Structure:
• *Decision latitude of the organisation*: the company has a certain degree of freedom to introduce self-chosen WPI-practices. (DECLAT)
• *Organisation model*: this mirrors a preference for limited or significant division of labour. (ORGMOD)
Culture:
• *Innovative behaviour of employees*: employees perform in such ways that initiatives are taken, knowledge is shared, processes are improved, and new information is sought, or are supported to do so. (INNOBEH)
• *Autonomy and participation*: employees can decide in their jobs and share tasks (in teams); while at the same time there is much open communication and participation. (AUTPAR)
Adoption and implementation:
• *Participation in organisational model*: participation in decision about the organisational model. It reflects the participatory role in organisational design of middle management and first line workers. (PARTMOD)
• *Bottom-up and people driven initiative*: whether the initiative for WPI is bottom up and people driven. The initiative can be either bottom up or top-down and it can either be people-driven by intrinsic arguments to improve the situation of employees, or organisation driven by extrinsic arguments, namely to account for business and market circumstances. (BOTUPIN)
• *Participatory implementation*: presence of a control orientation during the implementation process. It informs whether WPI is implemented participatory and supported by employees. Implementation can be participative/participatory or top down and the change process for the workplace innovation practices can be characterised by much or less support from employees. (CONOR)

Source: Oeij et al. (2015)

Table 2 Configurations explaining substantial WPI (parsimonious solution)

Path (or configurations)	*Causal conditions*							*Consistency, %*
	ORGMOD	*DECLAT*	*INNOBEH*	*AUTPAR*	*PARTMOD*	*BOTUPIN*	*CONOR*	
1 Top-guided WPI			●			○	●	84.1
2 Autonomy driven WPI	○	●		●	●			83.5
3 Integral WPI	●	●	●			●		83.7
4 Employee driven WPI		●			●	●	●	82.7
5 Innovative behavioural driven WPI	●		●		○			68.6

Notes: '●' – causal condition is present, '○' – causal condition is absent (called 'negated').
Model consistency is 0.811 (81.1%) (see Table 1 for abbreviations of eh causal conditions).

Source: Oeij et al. (2015)

From this study, five 'strategic' paths could be distilled that are used by those companies that could be assessed as successful workplace innovators. These innovators are companies where management and employees cooperate in selecting and designing WPI practices. The result of this cooperation is that, in many cases, the results are both beneficial to the company performance as well as for the employees' quality of work. The strategic paths refer to a combination of variables from the three factors that explain why these companies became successful workplace innovators. Using these different factors (Table 1) in a technique called fuzzy set qualitative comparative analysis (fsQCA), it proved possible to discern one or more paths or strategies to reach the outcome 'substantial WPI', which means a 'high maturity level of WPI' or being successful workplace innovators. The fsQCA-analysis shows five paths that altogether explain half of cases with a high level of consistency (81.1%). Consistency indicates to what degree cases are in line with the assumed theoretical conditions reflected in the factors of Tables 1 and 2. The remaining other cases have paths that are not consistent enough to achieve becoming successful workplace innovators.

Table 2 shows the results. For each of the five paths a black dot, '●', indicates the presence of a causal condition relevant for the outcome; the sign '○' indicates the absence of a condition; while a blank space (empty position) points to the irrelevance of a condition. Other than 'irrelevant' in the case of a blank position, absence stresses the relevance that a condition is NOT present for the outcome to emerge.

The results show varying configurational paths that all lead to being a workplace innovator as a company or being characterised by 'substantial WPI' as a company. These paths are not mutually exclusive for the outcome. In other words, different combinations can lead to the same results. While correlation-based approaches could never have produced such seemingly deviating results, it is, nonetheless, rather plausible that different roads indeed 'lead to Rome'. The paths mean the following:

- 'Top-guided WPI' states that 84% of the companies with the characteristics of innovative behaviour, the absence of bottom up initiatives (i.e., the presence of top down initiatives), and a participatory implementation process in conjunction, are members of the set substantial WPI.
- 'Autonomy driven WPI' states that 83% of the companies with four characteristics in conjunction are members of the set Substantial WPI, namely those where employees participated in developing the organisation's model, employees have job autonomy in combination with employee participation, where the organisation itself has decision latitude to decide about own choices, and where the organisation is not featured by a preference for limiting the division of labour.
- 'Integral WPI' states that 84% of the companies with four characteristics in conjunction are members of the set substantial WPI, namely those where employees show innovative behaviour, where the implementation process is a bottom up initiative, where the organisation itself has decision latitude to decide about own choices, and where the organisation is featured by a preference for limiting the division of labour.
- 'Employee driven WPI' states that 83% of the companies with the characteristics of employee participation in developing the organisation's model, where the implementation process is a bottom up initiative, and also a participatory

implementation process, and where the organisation itself has decision latitude to decide about own choices in conjunction, are members of the set substantial WPI.

- 'Innovative behavioural driven WPI' states that 68% of the companies with three characteristics in conjunction are members of the set substantial WPI, namely those where employees have not participated in developing the organisation's model, where employees show innovative behaviour, and where the organisation is featured by a preference for limiting the division of labour.

These WPI practices are varied and every company gives its own twist to specific measures [these specific practices can be found in Oeij et al. (2015)]. This result suggests that efficiency-reasons (alone) will not lead companies to choose for WPI approaches. The reality of organising and managing is clearly a complex and difficult one. It merely means that policy strategies to support such a choice will need to rely on a broad set of measures to get there. The European Commission is currently supporting a broad network development approach for WPI, called the European learning network for WPI, in short EUWIN. EUWIN is a limited activity to build upon existing national networks that support organisational change that relies on more democratic decision making. In Table 3, the main components of EUWIN are presented.

Table 3 Main components of EUWIN

Component	*Objective*
Social media	Communication of information and data to audiences. EUWIN is active on Twitter, LinkedIn and Facebook.
Knowledge bank	The Knowledge Bank delivers insight into the main components of workplace innovation. Two sources are available: ukwon.net and http://www.workplaceinnovation.org.
Videos	A set of 12 videos showing what workplace innovation means in practice, brings real examples to the community.
Conferences	Each year, there are two regional (60 persons per event) and one large (100+) event. The events are focused on companies. Each year, there have been at least 20 spin-off events.
Supporting tools	A guide (The Fifth Element) has been written as a support to change organisational practices.

Source: Dhondt (2014)

The European Commission hopes EUWIN will help companies to introduce or experiment with WPI. The belief is on 'contagion', meaning that seeing other companies use these models (by means of knowledge bank, films), more companies will try to experiment with change.

An innovation strategy to boost growth and jobs should not only rely on R&D&I-investments. If this would be the only strategy, major investments will be lost in the two innovation valleys of death, as is the case in manufacturing industry (Dhondt, 2015). The current approaches to develop talent and new management are necessary but not sufficient, as they are not a self-evident route to success. Companies selecting democratic decision making procedures seem to profit from win-win outcomes: better economic performance and better well-being for employees. But this is no self-evident route where companies follow markets, i.e., behave in line with the prevailing market or 'market conformity'. Yet, if they miss to see these opportunities, their

exclusive technological investments will lead to major disappointments: next to R&D&I-investment, it is equally important to deploy more democratic production systems.

3 This special issue

This special issue of *World Review of Entrepreneurship, Management and Sustainable Development* brings together research from authors from North America and Western Europe. The immediate cause for this issue was the session on 'Workplace Innovation & Social Innovation' held at the XVIII ISA World Congress of Sociology in Yokohama (Japan) in July 2014, from which three papers were selected. The additional two papers on WPI stem from an earlier ISA conference and another European event on the same topic. The underlying theme of the articles is a change and innovation of the internal structure of organisations and the way organisational members interact and constitute new organisational cultures. While new challenges for organising the business and work processes emerge, management, leaders and employees are offered opportunities to create sustainable workplaces characterised by dialogue and engagement on the one hand, and productivity and better performance on the other, if they can identify the opportunities and act on them. These opportunities go beyond the level of single organisations, as there is a role to play for national and regional policy makers, investors and politicians in supporting to create the institutional facilitation of innovative workplaces that can better accommodate and develop technological innovations. One example is to develop innovation programs that link technical and WPI, as is the case in Germany and Finland.

The first contribution by Pot, Totterdill and Dhondt introduces WPI from both a policy and theory perspective. They sketch the historical development of European policies on work organisation and WPI in the past two decades and contend that new forms of work organisation that use workers' human capital to the fullest is indispensable for Europe to remain competitive and sustain its level of wellbeing and welfare. European policymakers are slowly but surely becoming aware of this. However, WPI policies across Europe are fragmented and the applied (policy) definitions lack uniformity. Despite the evidence of positive effects on organisational performance and quality of working life, the implementation of WPI in practice by companies is also scattered and hesitant. The authors subsequently illustrate that WPI can be theoretically understood by using the example of the concept of 'The Fifth Element'. This concept is an integral approach of four elements that together constitute WPI, namely:

1 work organisation

2 structures and systems

3 learning and reflection

4 workplace partnership.

The interaction of these four elements ultimately fosters high performance, good work and sustainable organisations as 'the fifth element'.

Ramioul, Benders and Van Peteghem, in their contribution, provide a practical example of WPI, by performing two case studies of construction companies, of which

one applies a 'low road' to change and another one applies 'the high road'. The 'low-road' company knows high levels of control of employees and standardisation of tasks with a focus on an operation-based production flow, whereas the 'high-road' company is employee centred and has an organisational model based on participation, empowered teamwork and investing in worker skills, with much better effects on the job quality. Since both companies operate in a highly comparable market segment, the authors conclude that the difference between them must be lead back to organisational choices made by management. In other words, there is room to choose for WPI.

As work organisation and teamwork are vital features of WPI, the contribution by Lapointe and Cucumel is helpful for its suggestion for an alternative typology of teamwork. Criticising socio-technical teams in Sweden for stronger resembling lean teams than democratic teams over the years, the authors propose an alternative frame for teamwork. Based on Canadian data, the authors illustrate the difference between hierarchical and democratic teams, where the first are characterised by Tayloristic ways of standardisation, labour cost reduction, and incentive pay while job security, worker representation and partnership being absent, whereas democratic teams feature the opposite. Democratic teams have leaders who have been chosen by workers, not appointed by management, better job security guarantees, and are not faced by a managerial strategy of cutting costs. These findings point to the importance of democratic principles, which go beyond earlier typologies of teamwork that put a focus on autonomy for employees. The relevance of this alternative typology is its link with employee engagement as an impact of WPI. Employee engagement is based on dialogue and participation, which are clear examples of democratic principles.

That job autonomy is still a relevant characteristic of WPI can be drawn from the findings of Preenen, Oeij, Dhondt, Kraan and Jansen's contribution, in which the relationship between employees' job autonomy and company performance growth was studied. Investigating the moderating effect of company maturity (young vs. older companies) in this relationship, the results indicate that job autonomy is positively related to self-assessed growth of company revenue and profit (only) for young companies (2–5 years old). These results suggest that it is especially important for young companies to provide their employees with job autonomy. These findings indicate the relevance of 'good jobs' for company growth.

A final contribution by Oeij and Vaas provides one of the earliest empirical operationalisations of WPI. Borrowing theoretical elements from the dynamic capabilities approach and modern socio-technical systems theory they distinguish four sub constructs of WPI, namely 'strategic orientation', 'flexible work', 'smarter organising' and 'product-market improvement'. Companies, taken from a Dutch sample, that score better on the total-score of this overall construct report better organisational performance and lower sickness absence rates.

Despite growing evidence and indications that WPI is beneficial for both organisational performance and the quality of work (Oeij et al., 2015) and an augmenting interest in WPI at policy level (Dhondt, 2014), much further study is needed. WPI is initiated by people with entrepreneurial ambitions. These people are influenced by their national and organisational culture in a broad sense. WPIs are complex and multifaceted. It may therefore be useful to apply case study methods to better holistically understand WPI as an entrepreneurial process (Dana and Dana, 2005). For, little is still known about how WPI drives and adapts to recent and emerging social developments in the world of work: growing numbers of self-employed individuals, the emergence of the network

economy and multi-located working sites, the notion of the mobile and boundless 'workplace', the concept of distributed leadership and management, the changing institutional roles of unions and occupational groupings, the ageing work force, complex patterns of self-organising linkages connecting organisations and individuals, robotics, 'cobotics' (people and robots working together) and ongoing automation, the application of ICTs and the use of social media. These highly unpredictable, yet irrefutably emerging patterns demand social intelligence and innovative capacity which transcends restricted technical or economic perspectives.

Acknowledgements

We would like to thank Professor Leo-Paul Dana, editor-in-chief, for his support and constructive comments which helped significantly to realise this special issue.

Our colleague Dr. Ben Fruytier, co-organiser of our ISA2014 workshop, sadly passed away in the summer of 2014. Ben, PhD in sociology and policy sciences, was a prominent member of the Dutch scientific community on work and organisation topics in the Netherlands. His passion was to help organisations improve their performance, enhance the quality of work of employees and guide students to become worthy professionals.

References

Butter, M. (Ed.) (2015) *Assessing Support of Pilot Production in Multi-KETs Activities*, mKETS Final Report, D7 Final Report of the Multi-KETs Pilot Lines Project, including the Tentative Policy Roadmap, The Hague.

Corrado, C.A. and Hulten, C.R. (2010) 'How do you measure a 'technological revolution'?', *American Economic Review: Papers & Proceedings*, Vol. 100, No. 2, pp.99–104.

Dana, L.P. and Dana, T.E. (2005) 'Expanding the scope of methodologies used in entrepreneurial research', *International Journal of Entrepreneurship and Small Business*, Vol. 2, No. 1, pp.79–88.

Dhondt, S. (2014) *Second Year EUWIN: Interim Report to DGENTR*, TNO/WPI Ltd., Leiden.

Dhondt, S. (2015) 'Working in the digitalized world: the meaning of the link between advanced manufacturing and workplace innovation in the EU growth strategy', Paper presented at *Session 6 'Einzug der Digitalisierung am Arbeitsplatz – erfolgreiche Beispiele aus Europa', for the Conference Arbeit in der digitalisierten Welt*, 28–29 May 2015, Berlin; Forthcoming in the *Conference Proceedings Arbeit in der digitalisierten Welt (Labour in the Digital World)*, Deutsches Zentrum für Luft- und Raumfahrt, Berlin.

Eurofound (2012) *5th European Working Conditions Survey: Overview Report*, Office for Official Publications of the European Communities, Luxembourg.

Eurofound (2015) *Third European Company Survey – Overview Report: Workplace Practices – Patterns, Performance and Well-being*, Office for Official Publications of the European Communities, Luxembourg.

European Commission (2014) *Commission Staff Working Document: 'Advancing Manufacturing – Advancing Europe' – Report of the Task Force on Advanced Manufacturing for Clean Production*, 19.3 SWD(2014) 120 final, EC, Brussels.

Gallie, D. (Ed.) (2013) *Economic Crisis, Quality of Work and Social Integration. The European Experience*, Oxford UP, Oxford.

Howaldt, J. and Schwarz, M. (2010) *Social Innovation.Concepts, Research Fields and International Trends*, Sozialforschungstelle Dortmund, ZWE der TU-Dortmund, Dortmund.

MacDuffie, J.P. (1997) 'The road to 'root cause': shop-floor problem-solving at three auto assembly plants', *Management Science*, Vol. 43, No. 4, pp.479–502.

Oeij, P., Žiauberytė-Jakštienė, R., Dhondt, S., Corral, A., Totterdill, P. and Preenen, P. (2015) *Workplace Innovation in European Companies*, Office for Official Publications of the European Communities, Luxemburg.

Pot, F.D. (2011) 'Workplace innovation for better jobs and performance', *International Journal of Productivity and Performance Management*, Vol. 60, No. 4, pp.404–415.

Workplace innovation: European policy and theoretical foundation

Frank Pot*

TNO, Netherlands Organisation for Applied Scientific Research,
Radboud University Nijmegen,
Fagelstraat 46, 2334 AZ Leiden, The Netherlands
Email: frank.pot@ardan.demon.nl
*Corresponding author

Peter Totterdill

UK Work Organisation Network,
54 High Pavement, Nottingham NG1 1HW, UK
and
Kingston University,
River House, 53–57 High Street,
Kingston upon Thames,
Surrey KT1 1LQ, UK
and
University of Bath,
Claverton Down, Bath, BA2 7AY, UK
Email: peter.totterdill@ukwon.net

Steven Dhondt

TNO, Netherlands Organisation for Applied Scientific Research,
P.O. Box 3005, 2301 DA Leiden, The Netherlands
and
Catholic University of Leuven,
Parkstraat 45, Bus 3601,
3000, Leuven, Belgium
Email: steven.dhondt@tno.nl

Abstract: Workplace innovation is gaining profile as an emerging European policy, creating organisational performance and quality jobs. DG GROW and DG EMPL are leading. Policies regarding work organisation and workplace innovation in the EU over the last 20 years used to be rather fragmented, but more coherence is likely to develop in the near future. Besides social partners and government- and EU-officials a major role was played by European Networks of Applied Researchers. They provided the theories that are part of the foundation of such policies. The evidence for the positive effects of workplace innovation stimulated many entrepreneurs and managers to apply it. National programs appear to be helpful, in particular where coalitions of employers' associations, trade unions, governments and research institutes exist. However, this is still a minority. More research is needed into the obstacles and the mechanism to promote implementation.

Keywords: work organisation; organisational innovation; European policy; theoretical foundation; workplace innovation.

Reference to this paper should be made as follows: Pot, F., Totterdill, P. and Dhondt, S. (2016) 'Workplace innovation: European policy and theoretical foundation', *World Review of Entrepreneurship, Management and Sustainable Development*, Vol. 12, No. 1, pp.13–32.

Biographical notes: Frank Pot is Emeritus Professor of Social Innovation of Work and Employment, Institute for Management Research at the Radboud University Nijmegen, the Netherlands. He is the Chair of the Advisory Board of the European Workplace Innovation Network (EUWIN, 2013–2016) and a member of the Scientific Advisory Board of Social Innovation: Driver for Change (SI-DRIVE, 2014–2018). He publishes scientific and policy articles and is an invited expert for European organisations. He has been working at TNO in the Netherlands for almost 25 years and used to be the Director of the Institute TNO Work and Employment. In the '90s, he was a part-time Professor of Work and Technology at the Leiden University, the Netherlands.

Peter Totterdill is the Chief Executive of the UK Work Organisation Network (UKWON), a not-for-profit organisation collaborating with employers' organisations, trade unions, professional bodies, public agencies and universities committed to developing and disseminating new ways of working. He is also the Director of UKWONs sister company Workplace Innovation Limited. See http://www.goodworkplaces.net. A passionate advocate of organisational practices that combine high performance and high quality of working life, his career as a researcher, policy advisor and consultant has focused on building bridges between academic knowledge and practice. He maintains close academic links with universities across the UK and Europe, and especially through his role as a Visiting Professor at the Kingston University London and a Senior Research Fellow at the University of Bath.

Steven Dhondt is a Visiting Professor of Social Innovation at the University of Leuven and a Senior Research Scientist at TNO. He is active in building a sound theoretical foundation for workplace innovation and why companies do invest in such practices. His work encompasses theoretical accounts, major surveys and building of methods for Dutch, Belgian and EU-customers. Over the past years, as a coordinator of the European Learning Network for Workplace Innovation, he has built an extensive European network of practitioners, social partners and knowledge partners for the European Commission.

This paper is a revised and expanded version of a paper entitled 'Development of the concept of workplace innovation in European policy and its theoretical foundation' presented at Seminar 'Current Scientific Work on Workplace Innovation', EUWIN/Kozminski University, Warsaw, 16 June 2015.

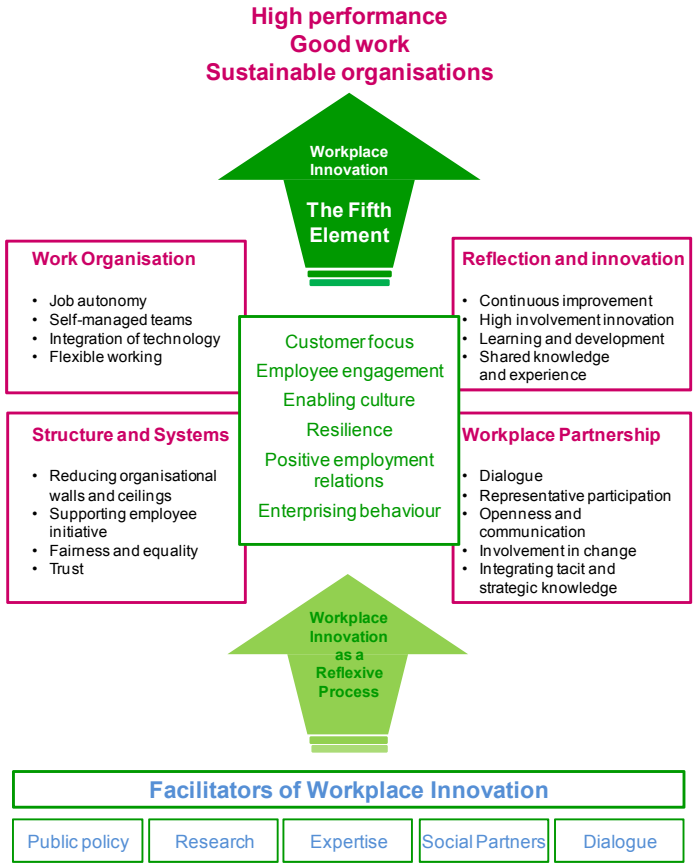
1 Introduction

Workplace innovation is gaining profile as an emerging European policy, creating organisational performance and quality jobs. Workplace innovation is first of all a policy concept. In the application for the European Workplace Innovation Network (EUWIN) that started in 2013 workplace innovation is described as follows: "Workplace

innovations designate new and combined interventions in work organisation, human resource management, labour relations and supportive technologies. It is important to recognise both process and outcomes. The term workplace innovation describes the participatory and inclusive nature of innovations that embed workplace practices grounded in continuing reflection, learning and improvements in the way in which organisations manage their employees, organise work and deploy technologies. It champions workplace cultures and processes in which productive reflection is a part of everyday working life. It builds bridges between the strategic knowledge of the leadership, the professional and tacit knowledge of frontline employees and the organisational design knowledge of experts. It seeks to engage all stakeholders in dialogue in which the force of the better argument prevails. It works towards "win-win" outcomes in which a creative convergence (rather than a trade-off) is forged between enhanced organisational performance and enhanced quality of working life". The concept refers to the organisational level (workplace as an establishment or – virtual – organisation) and not to individual workplaces.

How can this emergence of interest in workplace innovation, this new élan, be understood?

Figure 1 The fifth element (see online version for colours)



Source: Totterdill (2013)

This paper describes the development of European policies regarding work organisation and workplace innovation over the last 20 years and its societal context. Three periods are being distinguished: the nineties, the Lisbon Agenda and the EU 2020 Strategy. There is quite some evidence for the positive effects of workplace innovation. How can this be understood theoretically? A few of those economic, sociological and psychological theories are presented. In this article, we draw on The Fifth Element concept of EUWIN (Totterdill, 2013) to show the current theoretical inroads to understand the changes and to help develop new theories and methods to support companies. The fifth element refers to the chemistry of integrating four elements: 'work organisation' (first element), 'structures and systems' (second element), 'learning and reflection' (third element) and 'workplace partnership' (fourth element) (Figure 1).

2 Recent updates of productivity and industrial democracy policies

Workplace innovation, as it developed from the beginning of this century, is a member of the Sociotechnical Systems Design (STSD)-family (Mohr and Van Amelsvoort, 2015), going back to the restructuring of Europe after the Second World War, starting more or less the same policies for productivity and industrial democracy in several Western European countries.

Although consensus about the use of the concept is growing and its policy profile is getting stronger, different concepts are being used for more or less the same approach (Kesselring et al., 2014). Examples are 'innovative workplaces' (e.g., OECD, 2010a, 2010b; and sometimes EESC, 2011) and 'sustainable work systems' or 'sustainable work' which concepts are still used by the Swedish part of the STSD-family (Docherty et al., 2002). And, as can be expected, in national programs and initiatives (Totterdill et al., 2009; Pot et al., 2012b) concepts in the country's language are being used. 'Workplace innovation' is also being used in the USA, Canada and Australia besides concepts such as 'high involvement workplaces' and 'relational coordination' (Gittell et al., 2010).

2.1 Urgency

How can this emergence of interest in workplace innovation, this new élan, be understood? The broader context is that in the early 1990s a significant shift in Europe's economy and businesses could be observed fuelled by information technology. This shift reversed the historical pattern where tangible capital was considered to be the main asset in companies. Around 1990 investments in intangible capital (in percentage of adjusted GNP), such as patents, R&D, marketing, organisational competences became higher than investments in tangible capital (Corrado and Hulten, 2010). Regarding innovation the conviction grew in Europa that 'social innovation' (work organisation, competence development, employee participation, etc.) is probably more important than 'technological innovation' to explain the company's performance (Bolwijn et al., 1986). Business models changed from products (Philips: light bulbs) to services (Philips: city lighting). This context explains the need to develop and utilise the skills and competences of the present and potential workforce to increase added value as part of a competitive

and knowledge-based global economy (European Commission, 2014). One more reason for 'workplace innovation' is that private and public organisations can only fully benefit from technological innovation if it is embedded in workplace innovation (making technology work by means of proper organisation). Finally, there is a need to enhance labour productivity to maintain our level of welfare and social security in the near future with fewer people in the workforce due to the ageing population.

2.2 The '90s, the 'green paper', EWON and the European work and technology consortium

This growing awareness of the need for new forms of work organisation led to a number of activities on the European level. During the mid-1990s the employment Directorate General (DG EMPL) of the European Commission established ACTEUR, a policy advisory group which brought together representatives from national programs and initiatives as well as officials from other Member States where comparable initiatives were absent. At the same time individual lobbyists mobilised an influential coalition of researchers and policymakers, resulting in the publication in 1995 of 'Europe's next step: organisational innovation, competition and employment', a manifesto for the future of work organisation (Andreasen et al., 1995). Also in 1995, unbeknown to the officials managing ACTEUR, a different part of DG EMPL established the European Work & Technology Consortium. The Consortium brought together 16 public policy and research organisations from ten Member States to create a 'Medium Term Plan for Collaborative Action for the Modernisation of Work Organisation' (Totterdill, 2003). A seminal moment for those advocating the recognition of workplace innovation as a key dimension in EU strategy came in 1997 with the publication of the Commission's Green Paper 'Partnership for a new organisation of work': "The Green Paper invites the social partners and public authorities to seek to build a partnership for the development of a new framework for the modernisation of work. Such a partnership could make a significant contribution to achieving the objective of a productive, learning and participative organisation of work". Interest in work organisation as a driver for European competitiveness and quality of working life had been growing, partly fuelled by national initiatives such as those in Ireland, France, Germany, the Netherlands and the massive Work Environment Fund which made a significant impact in Sweden during the 1980s and early '90s. The Green Paper is a curiously hybrid document doubtless reflecting internal differences within DG EMPL. According to Ennals the Green Paper combines in essence a legalistic discussion of the regulatory conditions which might help or hinder workplace flexibility visibly stitched together with an open-ended call for measures by governments and social partners to stimulate participative working practices. Nonetheless it provided a rallying point for those who had been advocating recognition of workplace innovation, and there was high expectation that specific policy interventions would follow (Ennals, 1998; Ennals et al., 2004) Based on the responses to this consultative document '*Modernising the organisation of work – A positive approach to change*' was published by the European Commission in 1998. A substantial volume of evidence for the positive effects of new forms of work organisation was provided by the European Work & Technology Consortium (1998). By 1998, it had become clear that, despite enthusiasm from some trade unions, there was little appetite amongst European social partners for intervention in the workplace whether regulatory or otherwise. Likewise

several Member States and some senior officials within DG EMPL remained not enthusiastic, considering workplace innovation to be no more than a 'Nordic obsession' (Totterdill et al., 2012a).

ACTEUR was re-launched in 1997 as the European Work Organisation Network (EWON) to support the policy of 'a new organisation of work' and instigated a series of policy dialogues, conferences and research projects until 2002, accompanied by a news bulletin. Eurofound conducted a large scale research project into 'employee participation in organisational change' which provided again evidence for the positive relation between employee participation and organisational performance (EPOC: Eurofound, 1997). EWON summarised for DG EMPL the positive research results in different countries (Savage, 2001) and so did other researchers (Brödner and Latniak, 2002). DG Research commissioned research into successful cases. In the report the concept of workplace innovation was used (Totterdill et al., 2002) EWON was discontinued by DG EMPL itself. This was never explained to the participants. Most of the attention for organisational innovation was later assigned to EU OSHA, the European Agency for Safety and Health at Work (related to stress prevention and wellbeing at work) and to Eurofound.

2.3 The Lisbon agenda and Work-In-Net and EDI

Not much later, facilitated by the 6th Framework Program ERA-NET the 'Work-In-Net' (WIN) consortium was one of the networks continuing the work of EWON and the European Work & Technology Consortium from 2004 until 2010 (Alasoini et al., 2005; WIN, 2010), coordinating research in the field of 'Innovation of Work Organisation'. In the same period the Employee-Driven Innovation (EDI) Network was established, in particular by the Norwegian and Danish trade union confederations and researchers in the field of work organisation (Høyrup et al., 2012). This network was connected to the European program 'Lifelong Learning in Europe (LLinE)'. EDI became part of the Norwegian government policy in 2008. A handbook for EDI was made by the trade union confederation (LO) and the Confederation of Norwegian Enterprise (NHO) together.

Since the Lisbon Growth and Jobs Strategy had been launched in 2000, the European Employment Strategy's overarching objectives have encompassed not only full employment, but also the promotion of quality and productivity at work. In the Commission the "design and dissemination of innovative and sustainable forms of work organisation" (European Commission, 2003) continued to be cited as a means of enhancing productivity, responsiveness and quality, as well as improving working life and the retention of older employees. By the middle of the decade, EU policy outputs relevant to the workplace read like a checklist of fashionable ideas of good practice, for example Corporate Social Responsibility, Financial Participation, Anticipating and Managing Change and Work-Related Stress. Each of these policy interventions made a potentially significant contribution in its own right to European economic and social policy objectives, but collectively offered an insufficiently integrated vision of the sustainable workplace (Totterdill et al., 2012a). The renewed Lisbon strategy agreed in March 2005 put growth and jobs at the top of Europe's political priorities and implied fresh commitment to a comprehensive approach. In the 'Guidelines for the employment policies of the Member States' we find the following text in proposed guideline 7: "Work-life balance policies with the provision of affordable care and innovation in work

organisation should be geared to raising employment rates, particularly among youth, older workers and women, in particular to retain highly-skilled women in scientific and technical fields. Member States should also remove barriers to labour market entry for newcomers, support self-employment and job creation in areas including green employment and care and promote social innovation" [European Commission, (2010b), p.8]. The title of the EU strategy for occupational safety and health (OSH) in this period was: 'Healthy and productive jobs'.

However, according to Totterdill et al. (2012a) 'better organisation of work' remained largely undefined in this policy narrative and its status as a factor 'which should be analysed' is a characteristic Commission obfuscation. There is very little evidence to show that the Integrated Guidelines stimulated action at national level to support new forms of work organisation. Member States such as those in the Nordic Countries, Netherlands, France and Germany with a tradition of policies and programs focused on workplace innovation continued to deliver them; but countries with no such tradition continued, by and large, to ignore the issue (e.g., Greece: Ioannou, 2006).

This was also the case in the 'new member states 'of the EU, the former socialist countries. Implementing workplace innovation is even more difficult for them because they have another tradition in which concepts such as productivity, industrial democracy and social dialogue had different meanings than the same concepts in Western Europe. In the eighties the Central and Eastern European countries became familiar with the Japanese style of management and work organisation as most of these countries established productivity centres with Japanese aid funds and Japanese consultants (ex-managers in their 'second career'). These centres were connected to Western European centres through their membership of the European Association of National Productivity Centres (EANPC). The EANPC (2005) promotes not only productivity, but an integrated approach with quality of working life and sustainability. After these countries had entered the European Union the Japanese aid was discontinued. Other exchanges of views on work organisation were organised in the eighties by the European Coordination Centre for Research and Documentation in the Social Sciences ('the Vienna Centre'), a strong network of researchers from East and West (Grootings et al., 1991). The Vienna Centre had been established in the sixties by UNESCO and the International Social Science Council (ISSC).

Even in the Nordic countries implementing workplace innovation was not a matter of course; in Sweden the programs and research were partly discontinued by the new centre-right government in 2006 (Sandberg, 2013). The outcome is a European policy pattern that has remained fatally fragmented: a series of separate EU policy fields that add up to less than the sum of the parts.

In 2007, a European Social Fund (ESF)-program (DG EMPL) focused on a more flexible labour market. One of the main areas proposed for investment was the "design and dissemination of innovative and productive methods of work organisation". EWON prepared a report on this subject for the Commission (EWON, 2002). There are instances in Finland, Netherlands, Belgium, Germany and Sweden where it has been used as a foundation for national programs or initiatives. However these examples are generally found in countries with embedded structures and institutions concerned with work organisation.

2.4 EU2020 Strategy and EUWIN

Since the demise of the 1997 Green Paper, workplace innovation has fallen through the gaps between several policy platforms including competitiveness, innovation, employment and social inclusion – even though it has profound implications for each. The formulation of the EUs Europe 2020 vision and strategy during 2009–2010 (European Commission, 2010a) therefore provided an important opportunity for European policymakers to assimilate evidence of how innovation in working practices can address economic and social priorities. However, that opportunity was missed by the policy makers at that time (Dortmund-Brussels Declaration, 2012).

While the broad vision behind Europe 2020 may represent widely acceptable goals, it fell into the same traps as the previous Lisbon strategy. In particular, there was no concrete model of how convergence between quite different policy objectives such as competitiveness, innovation, employment and social inclusion will be achieved in practice.

2.4.1 A new start

In March 2011, the European Commission's DG Enterprise & Industry organised a workshop on workplace innovation within the launch of its Social Innovation Europe initiative (Dhondt et al., 2011; Pot et al., 2012a). This launch reflected a growing recognition that innovation, central to the EUs 2020 economic strategy, has a clear social dimension. Key influences on the European Commission included a 2011 Opinion of the European Economic and Social Committee on 'Innovative workplaces as a source of productivity and quality jobs' (EESC, 2011) and the 'Dortmund-Brussels position Paper' (Dortmund-Brussels Declaration, 2012) signed by more than 30 experts and practitioners across the EU, both calling for more proactive interventions by the European Commission.

In order to define concrete ways to move the policy agenda forward at EU level, the Commission subsequently organised a workshop in Brussels in May 2012 which brought together 50 thought leaders and leading companies in workplace innovation from across Europe. Following discussion at the European Council, the Commission announced funding for a EUWIN embracing all 27 Member States, candidate countries, Switzerland and Norway. The Network was to:

- focus on upscaling through awareness raising and knowledge sharing
- aim to create a critical mass, reducing the current fragmentation across Europe between practitioners, policymakers and researchers concerned with workplace innovation
- emphasise multi-channel communication, including social media, as a means of shaping management awareness.

2.4.2 DG GROW

According to DG GROW workplace innovation improves motivation and working conditions for employees, which leads to increased labour productivity, innovation capability, market resilience, and overall business competitiveness. All enterprises, no matter their size, can benefit from workplace innovation. It improves performance and

working lives, and encourages creativity of employees through positive organisational changes, combines leadership with hands-on, practical knowledge of frontline employees and engages all stakeholders in the process of change.

The main objectives of the DG GROW initiative are to foster the uptake of workplace innovation across European businesses and raise policy maker awareness, at all levels, of the benefits of these innovations (http://ec.europa.eu/growth/industry/innovation/policy/workplace/index_en.htm).

Through DG GROW, the European Commission prioritised workplace innovation with, for example, the reinforced 2020 EU Industrial Policy Communication and the innovation policy. Crucially it established the EUWIN – EUWIN in 2013 to support this priority, to exchange good practices and establish 'workplace innovation alliances' of employers, trade unions, governments and knowledge institutes.

This policy is also part of the '*Advanced Manufacturing Programme*': (ADMA). It is said that "Workplace innovation has to provide advanced solutions for manufacturing industry, based on the newest technologies. Virtual reality and side laboratories, where employees can perform extra research and experimentation, not connected with their daily tasks, are examples of combining advanced manufacturing technologies and advanced workplaces. Furthermore, workplace innovation can help companies to enhance competitiveness by using the innovativeness and creativity of all employees. (…) The Commission has included workplace innovation aspects in the R&D&I programs for advanced manufacturing. Explicitly including R&D on human-centred manufacturing could enhance the active and innovative role of people in factories and could contribute to design the workplaces of the future" (European Commission, 2014).

2.4.3 DG EMPL

Eurofound organised the first seminar on workplace innovation in 2005 and developed the concept over the years in the European Working Conditions Survey (EWCS; Eurofound, 2012) and the European Company Survey (ECS; Eurofound, 2013). In 2010, a workshop was organised by DG EMPL and some researchers to explore the concept of workplace innovation again (Totterdill, 2010). Since the launch of Social Innovation Europe in 2011 'social innovation of work and employment' became a topic in policies of DG ENTR (Enterprise and Industry, now DG GROW) as well as DG EMPL. "With the Europe 2020 Strategy it also became a priority to support workplace innovation aimed at improving staff motivation and working conditions with a view to enhancing the EUs innovation capability, labour productivity and organisational performance" [European Commission, (2015), pp.169–70].

EU-OSHA commissioned a literature review on the relation between workplace innovation and OSH (Eeckelaert et al., 2012) because the claim of workplace innovation is to improve quality of working life and organisational performance simultaneously. Consequently workplace innovation was connected to 'wellbeing at work' in the research priorities of OSH (EU-OSHA, 2013a) as well as in the policy to extend OSH to 'wellbeing at work' (EU-OSHA, 2013b). In the biannual conferences of the European Partnership for Research on OSH (PEROSH) on wellbeing at work 'workplace innovation' became a separate track (Manchester 2012; Copenhagen 2014, Amsterdam 2016).

In 2015, DG EMPL published '*Employment and social developments in Europe 2014*'. Chapter 3 is about "the future of work in Europe: job quality and work

organisation for a smart, sustainable and inclusive growth". One of the paragraph titles is "Complementing technological innovation with workplace innovation". Presenting much empirical research – among which are Eurofound's European Working Conditions Surveys – its conclusion is that "Better jobs and work organisation yield a more productive workforce". Having better jobs and work organisation reduces the risk of stress, enhances wellbeing and leads to a lower tendency to quit the job. Better work organisation implies in particular a balance between job demands (job intensity) and job control (job autonomy), wholeness of tasks and more open access to decision-making processes. These are a few of the indicators which, the report suggests, should inform EU policy making.

Other topics in this chapter are wages, OSH, and work-life and gender balance. It explores the ways in which technological change and innovation will transform the job landscape of the future (polarisation) and can lead to a possible industrial renaissance in the EU. In this context managing the transition into a new labour market where many jobs succumb to automation must become a key priority for policymakers, according to DG EMPL.

The chapter then explores how work organisation can be shaped to increase productivity and labour market participation under the continuous pressure of ongoing structural changes (technological progress, globalisation, demographic change and the greening of the economy). It looks at how stimulating creativity and fostering exchanges between workers can prevent stress and help maintain good physical and mental health, while at the same time improving productivity and innovation capacity. It sees how special arrangements can be implemented to accommodate older workers, workers with disabilities or certain diseases, and workers with family responsibilities. The section then discusses future challenges with respect to workplace learning. It ends by examining how expanding global value chains will affect work organisation, focusing on risks related to the global restructuring of value chains, virtual collaboration across time zones and the absence of multi-layered social dialogue.

One of the conclusions is that for the knowledge-based potential to materialise, the knowledge triangle (knowledge, education, innovation) has to be complemented by forms of work organisation that use workers' human capital to their fullest. It will be important actively to engage employees in identifying and developing solutions while allowing them to participate in the implementation of work innovations so that they become more receptive to change.

"In this context, an important policy would be to facilitate the creation of EU-wide platforms that allow employees and employers to exchange experiences in developing and implementing solutions related to production and work organisation. The specific characteristics of such platforms will vary between production entities and may take place at European or national level. They can promote the exchange of experiences, help identify best practices, monitor their implementation, assess their impact on productivity and identify social implications" [European Commission, (2015), p.163].

The proposal to facilitate the creation of EU-wide platforms looks very similar to the EUWIN (2013–2016) which was commissioned by DG ENTR.

In the meantime the concept of workplace innovation gained policy profile. It was also used by the European Parliament (2013) and IndustriAll European Trade Union (IndustriAll European Trade Union, 2014) in their programs for an industrial renaissance as well as in national initiatives in Ireland and the UK and in the translations of national

programs in Finland, Netherlands, Germany, Flanders/Belgium and Basque Country/Spain.

2.4.4 An emerging European policy

As shown in the previous section, the policies of DG EMPL and DG GROW concerning workplace innovation have many topics in common. So an integrated European policy could arise. This could include DG Regions because workplace innovation alliances can play a major role in regional development as well as DG Research to support and improve these policies by research. So far in the EU2020 programs little attention is paid to research. Although Eurofound has strengthened workplace innovation in its surveys and EU-OSHA has put the subject in the list of research priorities, only a few new research opportunities have been created, so far in the context of 'advanced manufacturing' and 'social innovation'.

3 Theories supporting workplace innovation

Well, as said before workplace innovation is an urgent matter and it promises better organisational performance and better jobs. There is lots of evidence for the credibility of this promise, already in the nineties as described, but also from recent research (Ramstad, 2009; Gittell et al., 2010; Pot, 2011; Pot et al., 2012a, 2012b; Totterdill et al., 2012a, 2012b; Oeij et al., 2015). The next question is "how can be understood that workplace innovation works? Which theoretical foundations are applicable?" As said in the introduction, we draw on The Fifth Element concept of EUWIN (Totterdill, 2013) to show the current theoretical inroads to understand the changes and to help develop new theories and methods to support companies. The fifth element refers to the chemistry of integrating four elements: 'work organisation' (first element), 'structures and systems' (second element), 'learning and reflection' (third element) and 'workplace partnership' (fourth element) (Figure 1).

3.1 The first and second element: job design, work organisation, structures and systems

A first important theoretical source for workplace innovation is the Dutch sociologist, Ulbo De Sitter. In De Sitter's STSD theory the central idea is the balance between 'control requirements' (quantitative and qualitative demands) and 'control capacity' (job control). "It's not the problems and disturbances in the work that cause stress, but the hindrances to solve them" [De Sitter, (1981), p.155]. In order to maintain this balance, control capacity is required regarding the performance of a given job on individual job level (internal control capacity) as well as regarding the division of labour on production group and plant level (external control capacity): "from complex organisations with simple jobs to simple organisations with complex jobs" (De Sitter et al., 1997). So, besides internal control capacity, complex jobs also include participation in external control activities on production group and plant level (shop floor consultation on processes, division of labour, targets, etc.). The aim of this sociotechnical design is to simultaneously result in improved organisational performance, quality of working life and better labour relations.

The concept of complex jobs can also be found in two other theories: the action regulation theory – although in the wording of 'complete jobs' – which was developed by Hacker (2003) and Volpert et al. (1989) and the double loop learning theory by Argyris and Schön (1978; see next paragraph The third element). Hacker's "Action theory proves its value as a normative guide in work design and redesign, since it simultaneously aims at efficiency improvement as well as at humanisation. (…) This is laid down into the approach of complete vs. partial tasks and activities. (…) Activities can be considered to be sequentially complete when they do not merely allow people to execute the task, but also allow them to do the required preparatory cognitive operations (in particular goal setting and deciding on the measures to be taken). These cognitive operations are particularly necessary when people participate in organising the work, and checking the results of one's work. Moreover a task is considered to be hierarchically complete, when the mental regulation is not limited to automated processes, but requires controlled, i.e., knowledge-based and, moreover, intellectual control processes as well. Sequentially and hierarchically complete activities offer the crucial option of learning, as opposed to deterioration skills and abilities in simple and limited routine activities. Decision latitude (or autonomy) is the most important feature of complete activities. Complete activities offer the decision latitude that is necessary for setting one's goals. These are prerequisites of comprehensive cognitive requirements of a task, and determine the intrinsic task motivation, i.e., being motivated by a challenging job. These aspects serve as a well-known buffer against negative consequences of high workload" [Hacker, (2003), p.112].

De Sitter (1981) integrated the 'job demands-control-model' (Karasek, 1979) in his theory. The job demands-control (JDC)-model holds two predictions. High job demand and low job control separately represent risk factors that are detrimental to (mental) health outcomes such as work stress and coronary heart disease. The model also predicts that high job demand, as well as high job control fosters motivation and learning. The most commonly used definition of job control (or decision latitude) – which describes the features of jobs and not of individual job performers – is primarily the ability of the worker to use his or her skills on the job and to have authority to make decisions regarding how the work is done, and to set the schedule for completing work activities. Central features of the JDC-model are also the strain and learning hypotheses, referring to two interaction hypotheses on the balance between job demands and job control. Jobs with high demands and low control can be called 'high strain jobs' which are a risk for work-related stress. Moreover, stress inhibits learning. But jobs with high demands as well as high control are called 'active jobs' which offer opportunities for learning and coping with stressors (Karasek, 1979; Karasek and Theorell, 1990). Later, this JDC-model was extended with the social support dimension (support of colleagues and supervisor) and with innovative and productive work behaviour (Karasek and Theorell, 1990). There is empirical evidence for the JDC-model. Reviews of longitudinal studies lend support to these strain and learning interaction hypotheses (De Lange et al., 2003, 2005; Taris et al., 2003). The main effects of job demands and job control on health and well-being are more often found than demands-control-interaction effects (Häusser et al., 2010). However, empirical findings with the model also suggest that especially the presence of high job demands, more than a lack of job control, results in work stress and work-related health problems. Conversely, especially the presence of job control is associated with positive outcomes, such as learning, job engagement, well-being and organisational commitment (Demerouti et al., 2001; cf., Taris et al., 2003; Lyness et al.,

2012; Stansfeld et al., 2013; Gallie, 2013; Dhondt et al., 2014). Although these correlations have been investigated more frequently than other correlations job design and team working cover only part of the reality because a systemic view of the whole organisation is needed – hence the inclusion of all aspects of the First and Second Elements. Only then these outcomes represent a convergence between improved economic performance for the firm and improved quality of working life.

It goes without saying that work organisation and technical systems should be geared to each other. These days in the Netherlands (mid 2015) an official Parliamentary Inquiry is going on to find out why so many ICT-projects of government agencies turned out to be a disaster, practically as well as financially. Probably these dramas occur in private businesses as well. Moreover front office workers, for instance in banking and in call centres get stressed and experience (part of) the ICT as a hindrance to serve clients properly because of the structure of the formats and the decision rules in the software. From a sociotechnical point of view (De Sitter, 1994) it is clear what went wrong. Digitalisation and automation were implemented before optimising processes and work organisation. End users were not involved sufficiently. In their book 'The second machine age' Brynjolfsson and McAfee (2014) of MIT observe that in big companies with big ICT projects it takes five to seven years before the organisation has been redesigned and consequently before full benefits can be taken from the new technology. They say "Creativity and organizational redesign is crucial to investments in digital technologies" (p.138). Their concept is 'co-invention of organisation and technology'. This co-invention requires the creativity and collaboration on the part of the entrepreneurs, managers and workers. There can be no effective and sustainable returns on automation and digitalisation without workplace innovation.

3.2 The third element: learning, reflection and innovation

The proportional shift from tangible to intangible investments meant a lot for styles of management. As 'hard' technological innovations do not seem to explain persistent productivity differentials, Bloom and Van Reenen (2010) present evidence on another possible explanation for persistent differences in productivity at the firm and the national level – namely, that such differences largely reflect variations in management practices. They stand in the tradition of the *resource-based view of the organisation* as the framework of research into the conditions for acquiring and maintaining competitive advantage. The focus is not only on the competitiveness of products and services but on internal resources for competitive advantage as well, such as management skills, work organisation, knowledge and competences. Competitive advantage can be achieved when these resources improve efficiency and efficacy and when they are rare or difficult to copy. The *dynamic resource-based view* of today, taking into account necessary adaptations to changes in the environment is directed at *dynamic capabilities* (Eisenhardt and Martin, 2000). The OECD calls it 'knowledge-based capital' (KBC) (OECD, 2012). So, this is not only about management capabilities but about innovation capabilities on organisational level as well. One of these management capabilities is 'managing human resources', how to stimulate 'employee voice' or develop 'employee capabilities'.

In the learning theory by Argyris and Schön (1978) two levels of control can be recognised. "Ordinary repetitive acting corresponds with the 'given order with prescribed procedures' method. Innovative acting includes the characteristics of ordinary repetitive

acting, but is also aiming for improvement of procedures, working conditions, and results in order to enhance effectiveness or efficiency" [Argyris and Schön, (1978), p.117]. The theories of the first and second elements (STSD; job demands – control-model; complete jobs) can be related to this learning theory. Job autonomy (internal control capacity) relates to 'single loop learning' (doing things better) and complex or complete jobs with external control capacity facilitate 'double loop learning' (e.g., 'are we doing the right things?'). Another way of conceptualising learning on the organisational level is the use of the concept of 'productive reflection', covering jointly "the role that organisational structures have in articulating employee voice together with the active use of employee's formal and tacit skills and competences in the process of improvement, innovation and change" [Cressey et al., (2013), p.221].

Action-researchers stress that the design approach, which emphasises the expert-led introduction of prescribed organisational forms, has emerged as a roadblock rather than a motor for real change in organisations. Generalisable knowledge needs to be reinvented in the form of 'local theories' grounded in dialogue, cultural identity and organisational context (Fricke, 1997; Gustavsen, 1992). It is not sufficient to produce 'star' cases in the hope that wider diffusion will follow. All stakeholders have to be involved. Agencies with capacity for dissemination such as chambers of commerce, social partners and universities need to be active participants in programs and initiatives, and transferable lessons can be fed through inter-organisational learning networks.

3.3 The fourth element: workplace partnership

However, job control is not a sufficient condition and productive reflection is not only a matter of good intentions. Nobel-prize winner Akerlof (1982) contends from an economic perspective that participation needs to take the form of gift-exchange or reciprocity to be effective. Gustavsen (1992) emphasises the need for democratic relations to optimise the outcomes for management and employees alike. Workplace partnership is also about dealing with power relations and different interests. That is why employers' associations and trade unions as well as government agencies are involved in most workplace innovation initiatives and programs (Totterdill et al., 2009; Pot et al., 2012b). Sometimes the government is leading (e.g., Finland, Germany), sometimes the social partners are leading (e.g., UK, Netherlands). As we know from Naschold's (1994) 'best practice model' for national workplace development, the strategic justification should primarily arise from macro-level industrial policy issues rather than the industrial relations system or the research and development system alone. The most sustainable innovation can be achieved if companies, social partners, governments and research organisations work together.

3.4 The fifth element: integrated approach and alchemy

The sociotechnical design theory is a system's approach, integrating technological and social innovation. For the foundation of explanatory theories and design theories it can be related to the 'configurational approach of strategic human resource management' (SHRM). "In general, configurational theories are concerned with how the pattern of multiple independent variables is related to a dependent variable rather than with how individual independent variables are related to the dependent variable" [Delery and Doty, (1996), p.804]. From a design point of view this means that 'HR-bundles' are more

effective than separate interventions (Sheehan, 2013). In EUWIN-terminology we would say: integrating the four elements, the alchemy, is creating the fifth element.

4 Discussion and perspectives

Regarding work organisation the European Commission has been developing bits and pieces of policy since about 1995. Although it was always to achieve higher productivity, more innovation capability, more employment and better jobs simultaneously, the emphasis in the nineties was on productivity, in the beginning of this century on employment and the last ten years on innovation. The message that organisational performance and quality of working life are two sides of the same coin came primarily from the network of 'occupational safety, health and well-being'.

In the lobbying for and development of these policies an important role has always been played by researchers and their networks. Policies were developed bottom-up by coalitions of European Commission officials and researchers who organised seminars, etc., to convince the Commission's directors, directors-general and finally commissioners. Sometimes also a few representatives of trade unions and/or employers' associations were active in these networks. These coalitions have appeared to be successful.

Policies on work organisation and workplace innovation have remained fragmented. The 'workplace innovation people' refer to productivity, innovation, competitiveness and employment, but the 'productivity people', the 'innovation people', the 'competitiveness' people and the 'employment people' hardly refer to workplace innovation, with some exceptions. However, there is some progress. The policies of DG GROW and DG EMPL clearly overlap and more contacts between the two are being planned. It is helpful that there is agreement on the use of the concept of workplace innovation as using different concepts makes it very difficult to develop policies and common understanding.

The financial and economic crises did not seem to have much influence on the attention for workplace innovation. Important steps in EU-policy were put during the crisis as well as in some countries. To give some examples: in the Netherlands the general employers' association (AWVN) advocated in 2009 that because of the crisis workplace innovation had become even more urgent. In Ireland, the tripartite program on workplace innovation had ended according to plan just before the crisis, but the unions, in particular Services, Industrial, Professional and Technical Union (SIPTU), continued to organise seminars and develop projects. Finland and Germany renewed their programs during the crises as they did for decades and Belgium started the 'Flanders Synergy' program on workplace innovation in 2009. Nevertheless increased competition as a consequence of crisis and globalisation lures opposite reactions like cost cutting and a stronger command-and-control style of leadership, sometimes called 'the low road' (Totterdill et al., 2002). This is more likely to happen in organisations and countries which are not yet familiar with ideas and examples of workplace innovation. The 'high road' is to welcome globalisation as a challenge for competence development and more job control.

This is also understood by some agencies in the 'new member states'. The idea of workplace innovation is nowadays actively been disseminated in those countries, sometimes supported by the EUWIN, sometimes by national programs such as the

Finnish (Makó et al., 2015). Like in Western European countries researchers play an important role in disseminating the innovative ideas.

Policies of work organisation and workplace innovation have never resulted into legislation or regulations on EU-level. Mentioning the issues in Employment Guidelines did not seem to help much nor did national legislation in a few countries. Probably workplace innovation is not suitable for a legislative approach. Implementation depends very much on the social dialogue at European, national, sectoral and organisation level. But EU- and national-authorities can stimulate that dialogue and develop campaigns for knowledge dissemination and capacity building. Some of them do, but unfortunately for a short period of time. Germany and Finland are the exceptions with programs that have been renewed several times over the past decades.

For a number of reasons many enterprises, hospitals, government departments, etc., do not implement workplace innovation as a matter of course, in spite of the obvious benefits for employees and employers. That is why a better coordinated policy and more action is needed by governments, social partners and research institutes.

There is room for improvement. In the European Working Conditions Survey of 2010 one question was: "Are you involved in improving the work organisation or work processes of the department or organisation?" Of the responding employees in the EU-27 countries 46.7% answered 'always' or 'most of the time' (Eurofound, 2012).

Part of that policy should be research into the obstacles and mechanisms that contribute to not implementing workplace innovation as a matter of course and into the mechanisms that support implementation. A couple of countries have experiences with national campaigns but so far there is little evaluation research available.

Entrepreneurs do not have to wait for these policies. There is enough evidence that workplace innovation leads to enhanced organisational performance and better jobs. Facing dilemmas either 'operational excellence versus innovation', or 'short-term results versus long-term competitiveness', or 'demand and control versus participation and trust', the better choice to deal with these dilemmas is always workplace innovation. Maybe the 'fifth element approach' looks rather complicated, but it starts easily by asking the front line employees and their supervisors how their work could be organised better. Try it and you will be surprised.

References

Akerlof, G.A. (1982) 'Labor contracts as partial gift exchange', *Quarterly Journal of Economics*, Vol. 97, No. 4, pp.543–569.

Alasoini, T., Ramstad, E., Hanhike, T. and Lahtonen, M. (2005) *European Programmes on Work and Labour Innovation – A Benchmarking Approach*, Work-In-Net, Helsinki/Bonn.

Andreasen, L.E., Coriat, B., den Hertog, J.F. and Kaplinsky, R. (1995) *Europe's Next Step: Organisational Innovation, Competition and Employment*, Frank Cass, Ilford.

Argyris, C. and Schön, D. (1978) *Organizational Learning*, Addison-Wesley, Massachusetts.

Bloom, N. and Van Reenen, J. (2010) 'Why do management practices differ across firms and countries?', *Journal of Economic Perspectives*, Vol. 24, No. 1, pp.203–224.

Bolwijn, P.T., van Breukelen, Q.H., Brinkman, S. and Kumpe, T. (1986) *Flexible Manufacturing: Integrating Technological and Social Innovation*, Elsevier, Amsterdam.

Brödner, P. and Latniak, E. (2002) *Sources of Innovation and Competitiveness: National Programmes Supporting the Development of Work Organisation*, Report to DG Employment and Social Affairs, Institute for Work and Technology, Gelsenkirchen.

Brynjolfsson, E. and McAfee, A. (2014) *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, W.W. Norton, New York/London.

Corrado, C. and Hulten, C. (2010) 'How do you measure a technological revolution?', *American Economic Review*, Vol. 100, No 5, pp.99–104.

Cressey, P., Totterdill, P. and Exton, R. (2013) 'Workplace social dialogue as a form of 'productive reflection'', *International Journal of Action Research*, Vol. 9, No. 2, pp.209–245.

De Lange, A.H., Taris, T.W., Kompier, M.A.J., Houtman, I.L.D. and Bongers, P.M. (2003) 'The very best of the millennium: longitudinal research and the demand-control-(support) model', *Journal of Occupational Health Psychology*, Vol. 8, No. 4, pp.282–305.

De Lange, A.H., Taris, T.W., Kompier, M.A.J., Houtman, I.L.D. and Bongers, P.M. (2005) 'Different mechanisms to explain the reversed effects of mental health on work characteristics', *Scandinavian Journal of Work, Environment and Health*, Vol. 31, No. 5, pp.3–14.

De Sitter, L.U. (1981) *Op weg naar nieuwe fabrieken en kantoren (Translated: Heading for New Factories and Offices*), in Dutch, Kluwer, Deventer.

De Sitter, L.U. (1994) *Synergetisch produceren. Human Resources Mobilisation in de produktie: een inleiding in de structuurbouw*, Van Gorcum, Assen.

De Sitter, L.U., den Hertog, J.F. and Dankbaar, B. (1997) 'From complex organizations with simple jobs to simple organizations with complex jobs', *Human Relations*, Vol. 50, No. 5, pp.497–534.

Delery, J.E. and Doty, D.H. (1996) 'Modes of theorizing in strategic human resources management: tests of universalistic, contingency, and configurational performance predictions', *The Academy of Management Journal*, Vol. 39, No. 4, pp.802–835.

Demerouti, E., Bakker, A.B., Nachreiner, F. and Schaufeli, W.B. (2001) 'The job demands-resources model of burnout', *Journal of Applied Psychology*, Vol. 86, No. 3, pp.499–512.

Dhondt, S., Pot, F. and Kraan, K. (2014) 'The importance of organizational level decision latitude for wellbeing and organizational commitment', *Team Performance Management: An International Journal*, Vol. 20, Nos. 7/8, pp.307–327.

Dhondt, S., van Gramberen, M., Keuken, F., Pot, F., Totterdill, P. and Vaas, F. (2011) *Workplace Innovation, Social Innovation Europe Launch Event, Brussels*, UKWON, Nottingham [online] http://portal.ukwon.eu/document-store/social-innovation-europe-lauch-event-why-is-workplace-innovation-a-key-dimension-of-social-innovatio (accessed 13 August 2015).

Docherty, P., Forslin, J. and Dhani, A.B. (Eds.) (2002) *Creating Sustainable Work Systems: Emerging Perspectives and Practice*, Routledge, London/New York.

Dortmund-Brussels Declaration (2012) [online] http://portal.ukwon.eu/document-store/dortmund-brussels-position-summary-workplace-innovation-as-social-innovation (accessed 13 August 2015).

EANPC (2005) *Productivity, the High Road to Wealth*, European Association of National Productivity Centres, Brussels.

Eeckelaert, L., Dhondt, S., Oeij, P., Pot, F., Nicolescu, G.I., Webster, J. and Elsler, D. (2012) *Review of Workplace Innovation and Its Relation with Occupational Safety and Health*, European Agency for Safety and Health at Work, Bilbao.

EESC (2011) *Opinion of the European Economic and Social Committee on Innovative Work Places as a Source of Productivity and Quality Jobs* [online] http://www.eesc.europa.eu/resources/docs/ces543-2011_ac_en.doc (accessed 9 November 2012).

Eisenhardt, K.M. and Martin, J.A. (2000) 'Dynamic capabilities: what are they?', *Strategic Management Journal*, Vol. 21, Nos. 10–11, pp.1105–1121.

Ennals, R. (1998) 'Partnership for a new organisation of work and Europe as a development coalition: an interview with Allan Larsson, Director-General of DG-V, European Commission', *Concepts and Transformation*, Vol. 3, Nos. 1–2, pp.143–152.

Ennals, R., Totterdill, P. and Ford, C. (2004) 'A national coalition for working', in Fricke, W. and Totterdill, P. (Eds.): *Action Research in Workplace Innovation and Regional Development*, pp.331–336, John Benjamins Publishing, Amsterdam.

Eurofound (2012) *Fifth European Working Conditions Survey*, Publications Office of the European Union, Luxembourg.

Eurofound (2013) *Third European Company Survey: First Findings*, Dublin.

European Agency for Safety and Health at Work (EU-OSHA) (2013a) *Priorities for Occupational Safety and Health Research in Europe: 2013–2020*, EU OSHA, Bilbao.

European Agency for Safety and Health at Work (EU-OSHA) (2013b) *Well-being at Work – Creating a Positive Work Environment*, EU OSHA, Bilbao.

European Commission (2003) *Council Decision of 22nd July 2003 on Guidelines for the Employment Policies of the Member States*, OJEC, 5.8.2003, L 197/13, para 14.

European Commission (2010a) Europe 2020: A strategy for smart, sustainable and inclusive growth, COM(2010) 2020 final, 3 March 2010, Brussels.

European Commission (2010b) *Proposal for a Council Decision on Guidelines for the Employment Policies of the Member States: Part II of the Europe 2020 Integrated Guidelines*, COM92010 193/3, Brussels.

European Commission (2014) *Advancing Manufacturing – Advancing Europe – Report of the Task Force on Advanced Manufacturing for Clean Production*, SWD(2014) 120 final, Commission staff working document, Brussels.

European Commission (2015) *Employment and Social Developments in Europe 2014*, Brussels.

European Foundation for the Improvement of Living and Working Conditions (Eurofound) (1997) *Employee Participation and Organisational Change: EPOC Survey of 6000 Workplaces in Europe*, European Foundation, Dublin.

European Parliament (2013) *Report on Reindustrializing Europe to Promote Competitiveness and Sustainability*, 2013/2006(INI).

European Work & Technology Consortium (1998) *A Medium Term Plan for Collaborative Action*, Centre for Work & Technology, Nottingham.

EWON (2002) *The Use of ESF Funds in Supporting the Modernisation of Work Organisation,* Unpublished report for the European Commission [online] http://uk.ukwon.eu/File%20Storage/5032375_7_EC-Work-Organisation-ESF-Final-Report.pdf (accessed 13 August 2015).

Fricke, W. (1997) 'Evaluation of the German work and technology programme from an action research point of view', in Alasoini, T., Kyllönen, M. and Kasvio, A. (Eds.): *Workplace Innovation: A Way of Promoting Competitiveness, Welfare and Employment*, National Workplace Development Programme, Helsinki.

Gallie, D. (2013) 'Direct participation and the quality of work', *Human Relations*, Vol. 66, No. 4, pp.453–473.

Gittell, J.H., Seidner, R. and Wimbush, J. (2010) 'A relational model of how high performance work systems work', *Organization Science*, Vol. 21, No. 2, pp.490–506.

Grootings, P., Gustavsen, B. and Héthy, L. (Eds.) (1991) *New Forms of Work Organization*, Transaction Publishers, New Brunswick, New Jersey.

Gustavsen, B. (1992) *Dialogue and Development: Theory of Communication, Action Research and the Restructuring of Working Life*, Van Gorcum, Assen.

Hacker, W. (2003) 'Action regulation theory: a practical tool for the design of modern work', *European Journal of Work and Organizational Psychology*, Vol. 12, No. 2, pp.105–130.

Häusser, J.A., Mojzisch, A., Niesel, M. and Schulz-Hardt, S. (2010) 'Ten years on: a review of recent research on the job demand-control (-support) model and psychological well-being', *Work & Stress*, Vol. 24, No. 1, pp.1–35.

Høyrup, S., Bonnafous-Boucher, M., Hasse, C., Lotz, M. and Møller, K. (Eds.) (2012) *Employee-Driven Innovation: A New Approach*, Palgrave Macmillan, London.

IndustriAll European Trade Union (2014) *Manifesto to Put Industry Back to Work*, Brussels.

Ioannou, C.A. (2006) 'Why is modern work organisation lacking from Southern European public policies? The case of Greece', *The International Journal of Comparative Labour Law and Industrial Relations*, Vol. 22, No. 1, pp.19–37.

Karasek, R.A. (1979) 'Job demands, job decision latitude, and mental strain: implications for job redesign', *Administrative Science Quarterly*, Vol. 24, No. 2, pp.285–308.

Karasek, R.A. and Theorell, T. (1990) *Healthy Work; Stress, Productivity and the Reconstruction of Working Life*, Basic Books, New York.

Kesselring, A., Blasy, C. and Scoppetta, A. (2014) *Workplace Innovation: Concepts and Indicators*, European Commission, Brussels.

Lyness, K.S., Gornick, J.C., Stone, P. and Grotto, A.R. (2012) 'It's all about control: worker control over schedule and hours in cross-national context', *American Sociological Review*, Vol. 77, No. 6, pp.1023–1049.

Makó, C., Illéssy, M., Csizmadia, P. and Balázs, H. (2015) 'Mapping the context for transfer of Finnish workplace development practice: the case of Finland, Hungary and Romania', *Journal of Self-Governance and Management Economics*, Vol. 3, No. 2, pp.7–29.

Mohr, B. and Van Amelsvoort, P. (Eds.) (2015) *Co-creating Humane and Innovative Communities of Work: The Evolution of STS Design Practice and Perspective*, to be published in September 2015.

Naschold, F. (1994) 'The politics and economics of workplace development', in Kauppinen, T. and Lahtonen, M. (Eds.): *National Action Research Programmes in the 1990s, (Labour Policy Studies 86)*, Ministry of Labour, Helsinki, pp.109–155.

OECD (2010a) *The OECD Innovation Strategy: Getting a Head Start on Tomorrow*, OECD, Paris [online] http://www.oecd.org/sti/45326349.pdf (accessed 13 August 2015).

OECD (2010b) *Innovative Workplaces: Making Better Use of Skills Within Organizations*, OECD, Paris [online] http://www.oecd.org/sti/inno/innovativeworkplacesmakingbetteruseofskillswithinorganisations.htm (accessed 13 August 2015).

OECD (2012) *New Sources of Growth, Knowledge-Based Capital Driving Investment and Productivity in the 21st Century*, OECD, Paris.

Oeij, P., Žiauberytė-Jakštienė, R., Dhondt, S., Corral, A., Totterdill, P. and Preenen, P. (2015) *Workplace Innovation in European Companies*, Eurofound, Dublin.

Pot, F., Dhondt, S. and Oeij, P. (2012a) 'Social innovation of work and employment', in Franz, H-W., Hochgerner, J. and Howaldt, J. (Eds.): *Challenge Social Innovation: Potential for Business, Social Entrepreneurship, Welfare and Civil Society*, pp.261–274, Springer, Berlin.

Pot, F., Dhondt, S., de Korte, E., Oeij, P. and Vaas, F. (2012b) 'Workplace innovation in the Netherlands', in Houtman, I. (Ed.): *Work Life in the Netherlands, TNO Work and Employment*, pp.173–190, Hoofddorp.

Pot, F.D. (2011) 'Workplace innovation for better jobs and performance', *International Journal of Productivity and Performance Management*, Vol. 64, No. 4, pp.405–415.

Ramstad, E. (2009) 'Promoting performance and the quality of working life simultaneously', *Internal. Journal of Productivity and Performance Management*, Vol. 58, No. 5, pp.423–436.

Sandberg, A. (Ed.) (2013) *Nordic Lights: Work, Management and Welfare in Scandinavia*, SNS FÖRLAG, Stockholm.

Savage, P. (Ed.) (2001) 'New forms of work organisation: the benefits and impact on performance', Thematic paper presented to *DG Employment and Social Affairs*, European Work Organisation Network (EWON), Nottingham.

Sheehan, M. (2013) 'Human resource management and performance: evidence from small and medium-sized firms', *International Small Business Journal*, published online 6 January, doi: 10.1177/0266242612465454.

Stansfeld, S.A., Shipley, M.J., Head, J., Fuhrer, R. and Kivimäki, M. (2013) 'Work characteristics and personal social support as determinants of subjective well-being', *PLoS ONE*, Vol. 8, No. 11, p.e81115, doi:10.1371/journal.pone.0081115.

Taris, T.W., Kompier, M.J., De Lange, A.H., Schaufeli, W.B. and Schreurs, P.J.G. (2003) 'Learning new behaviour: a longitudinal test of Karasek's active learning hypothesis among Dutch teachers', *Work & Stress*, Vol. 17, No. 1, pp.1–20.

Totterdill, P. (2003) 'Europe's advantage? Work organisation, innovation and employment', in Cowling, K. (Ed.): *Industrial Policy in Europe: Theoretical Perspectives and Practical Proposals*, pp.74–87, Routledge, Oxford.

Totterdill, P. (2010) *Workplace Innovation: Europe 2020's Missing Dimension*, Report of a workshop hosted by DG Employment, Social Affairs and Equal Opportunities, 23 June, UKWON, Nottingham.

Totterdill, P. (2013) *Workplace Innovation: The Fifth Element*, EUWIN, Nottingham [online] http://portal.ukwon.eu/the-fifth-element-new (accessed 13 August 2015).

Totterdill, P., Exton, R., Exton, O. and Gold, M. (2012a) 'Closing the gap between evidence-based and common practice. Workplace innovation and public policy in Europe', *Lifelong Learning in Europe (LLinE)*, No. 4 [online] http://www.lline.fi/en/article/policy/totterdill/closing-the-gap-between-evidence-based-and-common-practice-workplace-innovation-and-public-policy-in-europe#title14 (accessed 13 August 2015).

Totterdill, P., Cressey, P. and Exton, R. (2012b) 'Social innovation at work: workplace innovation as a social process', in Franz, H-W., Hochgerner, J. and Howaldt, J. (Eds.): *Challenge Social Innovation: Potential for Business, Social Entrepreneurship, Welfare and Civil Society*, pp.241–260, Springer, Berlin.

Totterdill, P., Dhondt, S. and Milsome, S. (2002) *Partners at Work? A Report to Europe's Policy Makers and Social Partners*, The Work Institute, Nottingham [online] http://portal.ukwon.eu/document-store/partners-at-work (accessed 13 August 2015).

Totterdill, P., Exton, O., Exton, R. and Sherrin, J. (2009) *Workplace Innovation Policies in European Countries*, UKWON, Nottingham.

Volpert, W., Kötter, W., Gohde, H-E. and Weber, W.G. (1989) 'Psychological evaluation and design of work tasks: two examples', *Ergonomics*, Vol. 32, No. 7, pp.881–890.

Work-In-Net (WIN) (2010) *The Grand Societal Challenge: Sustainable European Work to Withstand Global Economic Change and Crisis*, Declaration 11–12 March, WIN, Berlin.

Green construction and team design. Low road and high road teams to build energy-friendly houses

Monique Ramioul*

Research Institute for Work and Society – HIVA,
KU Leuven, Parkstraat 47, 3000 Leuven, Belgium
Fax: +32 (0) 16-32-33-44
Email: monique.ramioul@kuleuven.be
*Corresponding author

Jos Benders

Centre for Sociological Research,
KU Leuven, Parkstraat 45, 3000 Leuven, Belgium
Fax: +32 (0) 16-32-32-32
Email: jos.benders@kuleuven.be

Jan Van Peteghem

Research Institute for Work and Society – HIVA,
KU Leuven, Parkstraat 47, 3000 Leuven, Belgium
Fax: +32 (0) 16-32-33-44
Email: jan.vanpeteghem@kuleuven.be

Abstract: Two case studies were conducted to investigate how construction companies, focusing on the growing market of energy-friendly houses, design teamwork. The first company opts for a low-road type with high levels of control and standardisation as well as a focus on an operation-based production flow. The strategy of the second company, in contrast, can be characterised as a high-road type: it is an employee-centred organisation model based on participation, empowered teamwork and investments in skills of the workers. The effects on the job quality of the construction workers in both companies are substantially different.

Keywords: green construction; energy-efficient construction; teamwork; high-road teamwork; low-road teamwork; job quality; team design and management; energy-friendly houses.

Reference to this paper should be made as follows: Ramioul, M., Benders, J. and Van Peteghem, J. (2016) 'Green construction and team design. Low road and high road teams to build energy-friendly houses', *World Review of Entrepreneurship, Management and Sustainable Development*, Vol. 12, No. 1, pp.33–49.

Biographical notes: Monique Ramioul holds a PhD in Social Sciences. She is head of the research group on work and organisation at HIVA-KU Leuven and Professor at the Centre for Sociological Research at KU Leuven (Belgium).

Jos Benders holds a PhD in Policy Sciences. He is a Guest Professor at the Centre for Sociological Research at KU Leuven (Belgium).

Jan Van Peteghem is a safety engineer. He is a Guest Professor at the Faculty of Engineering – KU Leuven (Belgium).

This paper is a revised and expanded version of a paper entitled 'Green construction: a straight road to teamwork?' presented at the 16th International Workshop on Teamwork (IWOT16), NTNU, Trondheim, Norway, 6–7 September 2012.

1 Introduction

One of the key EU policy objectives as expressed in the Lisbon goals (EC, 2004) and reconfirmed in the Europe 2020 Strategy is to 'create more and better jobs'. Despite ongoing job destruction, new jobs have been created in Europe (Fernandez-Macias, 2010; Vandekerckhove and Ramioul, 2015) but little is known about their quality and impact on the employees' quality of working life. The same holds for the organisational and institutional preconditions that support the development of 'better', high-quality jobs. Hence, it may be that new jobs offering poor job content, little autonomy, problematic working conditions, precarious employment and low wages are still being created. Such an empirical finding would contrast with the growing policy awareness of the importance of good quality jobs and with the related widely available prescriptions about how to design these. The key objective of this paper was to investigate a possible empirical contrast between prescriptions and practices of job design, more specifically in teamwork settings, in one of the branches showing job growth, namely the green construction industry, and to assess the impact on the job quality of construction workers.

In construction, teamwork is a traditional way of organisation (Stroink, 1993), but teamwork does not guarantee high-level jobs in itself and there is a gamut of different forms of team working. At the high road, self-managing teams have been propagated as the hallmark of employee participation and of broad jobs where team members must possess a variety of skills (Buchanan, 2000). Yet as Bacon and Blyton (2000) framed it, there is also a low road of team working where team members' jobs are narrow and the needed skills are limited. The question then is what factors work into the hand that low road and high road teams are being set up. We focus on a specific segment of the construction industry, namely the construction of energy-efficient private dwellings (Pauwels et al., 2012a). This is theoretically interesting because it is a relatively new and very dynamic segment where companies are looking for innovative and distinctive ways of competing. Since stricter requirements concerning the energy efficiency of private dwellings are urging construction companies to adapt their products and processes, it is to be expected that the market segment of passive and energy efficient houses will grow and that more companies will innovate. The question here is: does that drive involve innovative work organisations and job design as well?

Hence, we can formulate the central research question as: What types of teamwork have come into being in the new market for building energy-friendly houses?

In the first section we resume theory on management strategies regarding teamwork settings, teamwork characteristics and job quality outcomes. Second, we clarify the meaning of 'greening' in construction and the impact of energy-efficiency on the industry. Third, we describe the data collection of the study. In the fourth section, the strategies of two companies are described, compared and analysed. The fifth and conclusive section summarises the main findings.

2 Managerial choice, teamwork design and job quality outcomes

To define our conceptual framework, we draw on a range of relevant theoretical perspectives.

In 1972, Child argued that the structural contingency approach in which patterns of association between environmental and organisational characteristics are sought for, ignores the political processes in which decisions concerning the future courses of action are taken. These strategic choices are made by the 'dominant coalition', generally understood to be the key managers and/or company owners. These choices may concern the internal functioning of the organisation but also the manipulation of environmental factors or the selection of the environment to operate in. As a result, managers may make diverging choices in the same environment. Ortmann (1995) made an important point strengthening this room for managerial decision when he stressed that, unlike most economic and management theories maintain, it is sufficient to satisfy external conditions at a minimum level. Organisations do not have to perform at a top level, yet only well enough to survive. This does not mean that external conditions do not matter for organisation design. Particular external conditions may render particular designs infeasible. This position opens up room for prescriptions on organisation and team design. Such 'organisation concepts' (Benders and Van Veen, 2001) contain rules about how to design organisations. Based on these insights, it is pertinent to include in our observation and analysis not only the broader external environment of construction companies (product market and regulatory context), but also (possibly diverging) managerial strategic choices and responses to changes in this external environment.

Following on this, Bacon and Blyton (2000, p.1427) emphasise the key role plaid by the objectives and intentions of management when introducing teamwork for its actual nature and outcome. Managerial rationales for team working may be economic, social or cultural. Different objectives may either lead to high road or to low road types of teamwork. Managerial objectives such as increased worker commitment and motivation are likely to be associated with high road teams because these are associated with high involvement models. Low cost strategies and objectives predominantly aiming for maximising productivity, on the other hand, will more likely be pursued by low road teamwork [Bacon and Blyton, (2000), p.1429]. Both high road and low road teams are described by different dimensions by the authors. These include: task composition and variety, skill composition and allocation of workers, decision-making and responsibility. Other authors, such as scholars adhering modern sociotechnical systems theory and total workplace innovation (Dhondt and Van Hootegem, 2015), identify characteristics of teams and of other work organisation types by analysing the nature and level of division of labour at different levels of the transformation process (van Eijnatten and van der Zwaan, 1998; Van Hootegem, 2000; Achterbergh and Vriens, 2009). Following de Sitter (1981) a key distinction is made between order-based structure production

structures and operation-based production structures. In order-based production structures each different (groups of similar) order types have their own specific set of operational sub transformations. These production processes are organised around a product or order. Operation-based production flows decouple these technical operations and bundle them for all products on the basis of their technical similarity. The latter form the basis for production structures designed according to Taylorist division of labour principles, and are likely to lead to standardised and fragmented tasks [Van Hootegem, (2000), p.75; Achterbergh and Vriens, (2009), p.245].

The specific production structure highly influences job quality. Next to the external environment, managerial rationale and strategies, work organisation and teamwork characteristics, we also want to observe job quality. Today, researchers agree about the complex and multidimensional nature of job quality and the difficulties to capture it in a conclusive but specific definition. Generally speaking, most job quality definitions boil down to variations of "the extent to which a job has work and employment-related factors that foster beneficial outcomes for the employee, particularly psychological well-being, physical well-being and positive attitudes such as job satisfaction" (Green, 2006; Holman, 2012). Yet, building on Karasek and Theorell's (1990) job demand and job control model, the two most essential factors determining these outcomes may be confined to learning opportunities and stress risks, which are dependent on the balance between job demands and job control or decision latitude. Hence, these are relevant indicators when comparing and drawing conclusions on job quality outcomes in different organisational settings including teamwork.

Following these arguments, we include in our observation the variables listed in Table 1 for analysing the redesign of teamwork in green construction and typify this as a low road or high road teamwork setting.

Table 1 Observation scheme

External environment: regulations on energy-efficient construction.
Managerial rationale and strategy: dominant market strategy, corporate culture, corporate strategy, level of product standardisation, subcontractor strategy.
Organisational design: functional organisation of the construction process (order-based vs. operation-based), levels of standardisation.
Teamwork characteristics: task composition and variety, allocation of workers, planning, problem-solving and decision latitude of teams, required skills of team members.
Job quality dimensions: learning opportunities and stress risks

3 Setting the scene: green construction and the impact on the organisation of the building process

3.1 Traditional organisational and teamwork characteristics in construction

Building a house is a project-based activity. Each construction has a clear starting and finishing point, involves a sequential process (e.g. plastering necessarily comes after bricklaying) and the performance of one craftsman strongly influences the jobs of those coming after him. At a typical building site, different craftsmen are present, working or not under the direct orders of the principal contractor. Traditionally, there is a succession

of small teams each consisting of two to four blue-collar workers, each of them disposing of their own expertise such as masonry, roofing, carpentry, plastering, sanitary installations and plumbing, and heating facilities. In the traditional construction company, the principal contractor often has most crafts in house and composes teams that build houses from A to Z. Applying the characteristics of organisation design and teamwork as listed above, we can describe the traditional construction industry typically as an order-based organisation with decentralised regulation and planning. Teams are as a rule relatively stable with a front-line supervisor or team leader who is in charge of the daily management: allocating the various tasks, providing team members with the right equipment and materials and controlling the quality of the finishing. Skills of the team members are craft-based. Tasks are distributed on the spot in a relatively flexible way and are as a rule relatively broad. They enable sufficient latitude for planning and execution and team members interact and collaborate closely. On-site and ad hoc adaptations and regulations of disturbances as described are facilitated by the way construction teams operate and the way their work is organised (order-based). These typical features enable good coordination, operational planning and logistics, while at the same time, sufficient levels of flexibility, creativity and improvisation at construction sites are secured.

3.2 Fast changing regulations and related changes in products and processes

The growing importance of sustainable construction is to an important extent driven by EU policies, regulating a stepwise improvement of energy-efficiency. In most countries, this European policy is translated into local standards and action plans (e.g. tax benefits and subsidies for double glazing, roof insulation, solar panels, etc.). Legislation aiming at tightening construction standards to support sustainable construction techniques is rapidly gaining ground. As a result, more and more sustainable materials for construction are being produced and companies shift to energy-efficient constructions such as passive houses.

In the 'green' construction sector, the terms sustainable, passive, energy-friendly, eco-friendly are often mixed up. To label a construction as passive, it needs adhering to three criteria. First, heating should not surpass 15 KWh/m^2.year (for a classical construction, this oscillates between 105 and 150 KWh/m^2.year). Second, the construction should be air-tight. This is tested before delivery of the construction by means of a pressurisation test: by applying an under- or an overpressure to the construction, one can calculate the air losses occurring at a pressure difference. Third, in summertime overheating of the rooms should be limited. The energy-friendliness of building elements refers to the E-standards as regulated by the EU. It is expressed in terms of the amount of heat that permeates through the element per unit surface area and per unit temperature difference between the inner and the outer environment. E-standards are based on the insulation characteristics of a building and the nature of the heating sources. So-called low energy houses have an E-value below 60. Eco-friendly construction is a somewhat vaguer concept and refers to sustainability and recyclability. The use of renewable raw materials is the first concern. Many constructions have skeletons made out of wood, in principle FSC[1] labelled. The heating system is based on renewable energy sources, like heat pumps or solar collectors. Electricity should as much as possible be provided by photovoltaic cells, water consumption out of the public distribution net is kept low and so on. Eco-friendly construction techniques ban solvent containing chemical products and use natural fibres rather than polyurethane foam as an

insulating material. Several construction elements are common to all three environmental building concepts. These include triple-glazed windows in draught-free mountings, draught free doors, absence of thermal bridges, reinforced insulation of roof, floor and cavity walls, mechanical ventilation equipped with a heat exchanger and air-tightness.

3.3 Impact of energy-efficiency on the organisation of the construction process

The key feature of green construction is that high quality, extremely accurate production in all steps of the process and a strict sense of detail are paramount in order to pass energy-efficiency tests and to acquire the green label (Pauwels et al., 2012b). Matching building elements, finishing off corners, doors, sockets and ducts, taping insulation mats in-between cavity walls, mounting standard triple glazed windows and insulating roof truss constructions: all has to be done with extreme caution. If not, air-tightness tests fail without mercy. An additional difficulty is that these tests can only be performed once the entire construction is finished and thus it is only in the end that mistakes made during the construction process are detected.

A first consequence of these requirements is the growing integration of design and production at the principal contractor. Construction is one of the rare industries where, traditionally, design is organised separately from production [Gieskens, (2012a), p.101ff]. The design is outlined by the property developer or the final customer, represented by his architect, whereas the principal contractor, the construction company, is in charge of the execution of the blueprints. This is referred to as the triangular relationship 'customer-architect-contractor'. Because of the technical characteristics of energy-efficient construction, the principle of 'design for production' has become pre-eminently applicable because a strict control by the principal contractor over the feasibility of the blueprint is indispensable. This induces a shift of the design and work preparations from the customer/architect to the construction company. In order to be able to better control the blueprints and make the work preparations, but partially also to control costs, companies switch over to concept construction and draw the blueprints themselves. As a result, the principal contractor becomes the dominant actor in the construction process.

A second and related evolution is the standardisation of products and processes and the trend to prefabricate building elements [Gieskens, (2012a), p.109]. This can be done at central workshops of the principal contractor or by specialised contractors. Volumetric construction units are prefabricated to form the structure of the building, thereby enclosing the usable space and implying that eventually up to 80–90% of the building process can be delivered as modules at the building plot for final assembly. These off-site manufacturing techniques started with panel building systems but similar developments are observed in the off-site fabrication of roofs. This phenomenon goes hand in hand with the growing importance of a central technical department at the principal contractor which makes the detailed work preparation and produces building plans drawn up in great detail (including e.g. the position of heating elements and ventilation shafts).

A third trend reinforced by green construction is the growing length and complexity of the construction value chain. This is related to the overall standardisation, specialisation and related division of labour. On the one hand, mergers and takeovers grow because of the required competence and knowhow in a whole range of green technologies and in view of the achievement of critical mass and economies of scale. On the other hand, due to the growing specialisation of techniques and equipment, these

larger companies are necessarily complemented with a growing number of subcontracted micro-enterprises or self-employed craftsmen. The latter focus on specific niches or tasks such as solar panels, heat pumps, and ventilation devices equipped with heat recovery appliances. Moreover, at the construction site the contractors are joined by safety coordinators, environmental coordinators, quality inspectors and so on [Gieskens, (2012b), p.112]. This rapid growth of the number of actors on construction sites has also been described as a 'travelling circus' [Manhanden, (2012), p.126]. The trend of specialisation and increasing division of labour leads to a growing complexity of the coordination of the construction process as well as to a growing number of actors present on site with a variety of contracts and assignments. This requires not only tight planning, logistics and coordination, but also more communication and administrative tasks (such as detailed documentation) [Manhanden, (2012), p.126]. In such 'extended' construction value chain involving a large number of workers coming from a large number of contractors the 'team spirit' may be under pressure [Gieskens, (2012b), p.111].

Last but not least, with the application of green construction techniques and materials, the common practices at construction sites to adapt blueprints and work instructions on the spot become counterproductive. The traditional practice is related to several characteristics of the construction process. First, every site is unique because the construction process by definition takes place in varying environmental circumstances [Gieskens, (2012b), p.111]. The accessibility and orientation of the building plot and the nature of the soil can require changing plans and procedures. Weather conditions and the traffic density in the area are liable to revision of time schedules. Second, some aspects of the blueprints designed by the architect often appear not to be very practical or feasible to construct once the work has to be carried out on a concrete building plot. Technical details may be underspecified or the specificities of materials may have changed. Third, it is not uncommon that a mistake created earlier in the process is detected and solved by the next craftsman or team in stage. Hence improvisations, corrections and adaptations on the spot are a common practice in traditional construction and are necessary to solve problems and secure quality. In green constructions, however, they have to be banned at all cost otherwise the energy performance tests fail. This is illustrated with the following interview citation: "When you want to reach your targets in terms of insulation properties, your degrees of freedom are limited on the site. Contrary to traditional building, you just cannot make an incidental hole in a wall or add some last minute lay-out changes" (Project Manager, ECOBUILD).

In sum, the changes in product and process induced by energy-friendly construction regulations confront construction companies with increasingly detailed work preparations and technical instructions, a shift to off-site pre-fabrication of modules, severe accuracy requirements for all operations and tasks, increased coordination, tighter planning and logistics and last but not least, virtually no room for ad hoc improvisation or last minute problem-solving. The key question now is how companies shifting to energy-friendly construction redesign their teamwork to meet these requirements.

4 Method and data

The empirical data collection consisted of three different phases. First, in-depth interviews were carried out with all relevant industry stakeholders on the general trends in construction and on the specific evolutions related to greening. In total, spokespersons

of nine different organisations were interviewed, including employer organisations, trade unions, environmental organisations and sectoral funds providing vocational training (Pauwels et al., 2012a). In the second phase, in-depth case studies were carried out in three construction companies, selected on their promoting the construction of energy-efficient or passive houses (Van Peteghem et al., 2012a, 2012b, 2012c). The three cases were suggested by the stakeholders interviewed in the first research phase (amongst others representatives from two different employer organisations) in response to our question: "which construction companies are active on the market of passive houses, as the most advanced form of energy-efficient constructions?". The implementation of green construction was the key criterion used for the cases selection, in line with the overall project research focus on 'new jobs' and their characteristics. The limitations with respect to the number of case studies that could be carried out within the frame of the research project (and its limited funding provided for each national team) render the study an explorative character, rather than explanatory power.

Each case study included interviews with six to seven management representatives (members of top, middle and lower management, commercial and technical staff members), and five to six workers, as well as on-site visits at the shop floor and construction sites. The interview topics were comprehensive and broader than the list of variables described above and used for the analysis: corporate history and strategy; networking and subcontracting; organisational structure; technological developments; work organisation; employment data and HRM; industrial relations, job quality etc.

All semi-structured interviews were recorded and transcribed for analysis. In the third research phase, the case study findings were fed back to and discussed in four different focus groups with the same representatives of the industry as in phase one (Ramioul and Van Peteghem, 2012). This permitted to validate and finalise the research findings.

Given the specific focus of this article on work organisation and teamwork, the data of the two industry-level research phases and the findings of two of the three in-depth company case studies are used. Upon our visit to the three companies selected, it appeared that the third company had recently abandoned green construction and returned to traditional houses, amongst others due to a local shortage of skilled construction workers, thus postponing to comply to the stricter energy regulations that will be enforced in a couple of years. Moreover, it was a very small business operating with only two construction teams. As a result, the analysis presented here is confined to two cases. It should be emphasised that the study only investigated the construction of new private dwellings. This excludes an important part of the construction industry, renovation and refurbishing, which in quantitative terms (employment and turnover) may be more important.

5 Contrasting managerial solutions

The first company, nicknamed ECOBUILD, is a large construction company delivering both standardised and tailor-made passive houses, the first representing the majority of their order portfolio. The second company, 'TREEHOUSE', is an SME delivering wooden skeleton eco-friendly constructions, both based on a number of relatively standardised blueprints and tailor-made, with the second as their main asset.[2]

5.1 The low-road version: standardisation, centralisation and control at ECOBUILD

ECOBUILD is a family-owned construction company that up to a few years ago used a classical building concept. The firm was organised and operating as a traditional construction company as described above. ECOBUILD employs about 200 employees, not including a range of partner companies and subcontractors. They deliver up to 350 new standardised dwellings a year. When energy-friendly construction techniques gained ground, the company was one of the first to venture into passive construction. They switched 'overnight' to passive house building in order to enter aggressively and massively into the market segment of passive houses. This swift and encompassing corporate change and the technical requirements of green construction were the key drivers for ECOBUILD to change their management fundamentally from a traditional construction company into what they called a 'lean' firm. The technological knowledge necessary for passive house construction was entirely developed in-house and led to a complete redesign of the company's processes. To realise this, ECOBUILD now adheres to a corporate strategy based on maximising efficiency, short delivery times and productivity and the associated centralisation and high levels of control in a dominant orientation on optimised processes and procedures. One of the engineers stated: "the company's success has more to do with the quality of the processes than with the individual behavior of the worker" (Engineer, ECOBUILD). They call 'lean production' the cornerstone of their corporate strategy. In the case of ECOBUILD, lean construction is understood as optimising flows and making them seamless in view of shorter delivery times. In order to maximise efficiency, minimise costs and increase productivity, the company introduced formal management techniques, such as detailed ex-ante and ex-post cost calculations, a sharp focus on logistics and just-in-time delivery of all materials and supplies, the establishment of formal organisation charts and function descriptions, the use of key performance indicators to monitor progress and so on.

The most fundamental change, however, was the shift from the traditional order-based flow to an operation-based flow, building several houses simultaneously at one given housing estate and standardising all operations to the maximum extent possible. An essential strategy is to prefabricate standard elements. The company has constructed an in-house wall-factory which reminds of an industrial site with conveyer belts; standard bricks are cut to the right size and put on the right spot in a prefabricated wall. The production process is highly automated, the jobs machine-bound and short-cycled. Job content and working conditions (and personnel characteristics) differ greatly from traditional construction sites and the jobs do not require any formal knowledge or education. The roof structures, in turn, are entirely prefabricated by a specialised company that delivers them on a just-in-time basis at the construction sites. They only need to be fixed on the brick walls and the roof worker's job is limited to covering the bare structure and applying the insulation and plastic coverings in order to secure air-tightness. In traditional construction the workers on site had considerable decision latitude in planning and execution as described. In the redesigned process, the detailed description of responsibilities implies that every function is narrowed down to its bare essentials:

> "All jobs in ECOBUILD have grown extremely rationalized and partly specialized, there is hardly any waste time. You can compare it with a surgery unit in a hospital: the surgeon isn't bothered with preparing scalpels or gloves, nor fetching the patient or giving him anesthetics: all this is done by other specialists or nurses who take over the routine jobs. The same has happened here". (Operations Director, ECOBUILD)

All these interventions are implemented in order to control costs, to shorten lead-times and, at the same time, to limit risks of failing energy performance tests. Up to a few years ago, putting up a carcass structure (including the roof truss) took several weeks. This has been reduced to less than one week.

One of the main instruments to cut down dead time and material use is optimising logistics. This highly impacts on the planning of the work of the construction teams. Detailed planning is made up by headquarters one day in advance on the basis of the information passed on by the team leaders about the progress of the work. In the afternoon, picking orders are established and the central warehouse prepares the content of the trucks coming back from the building sites. Once the planning for a given site has been established, it is down to logistics to see to it that all building materials and prefabricated elements, together with the right equipment, are delivered on a just-in-time basis. The central warehouse is supported by computers providing detailed inventory control. Eventually, team leaders dispose of a detailed script when entering the site in the morning and all materials and equipment are available. Shorter lead times also enable to rationalise the planning of the allocation of the construction workers so that they can shift from one building to another during the various stages of finishing. Workers are informed the evening before at which site they are expected and they move frequently between sites. The company also steers its subcontractors in a top-down way and subjects them to similar centrally designed and strictly monitored procedures. Detailed instructions are communicated systematically and tight follow-up systems detect the slightest sub-standard performance.

The shift to an operation-based work organisation, the standardisation of components and processes and the tight time schedules have considerable consequences for the teamwork and job content. Tasks tend to become more short-cycled and repetitive, in particularly at the wall factory. The increased mobility of construction workers between sites, the shortening and fragmentation of their tasks, the growing standardisation and specialisation and the systematic elimination of ad-hoc and decentralised decisions and changes to plan erode the traditional team-based work at the construction sites, where every worker has to restrict to his assigned and prescribed task with limited collaboration or interaction with other workers. The absence of basic information on site and the fact that information on the next work to be done is only provided in the last minute are major sources of stress for workers. Overall, the global outcome points at a deterioration of the job quality with more stress risks and less learning opportunities. On the other hand, it is acknowledged that a just-in-time delivery of semi-finished construction elements produced off-site limit the physical workload and avoid material and equipment shortages at the construction sites. Pre-fabricating elements also enable to decrease health and safety risks, which are a traditional Achilles tendon in construction.

5.2 Going for the high-road: network integration, teamwork and participation at TREEHOUSE

TREEHOUSE is active in the woodwork segment of the eco-friendly construction sector. The company has gradually grown to a medium-sized enterprise with 31 persons. At the time of the study, the annual production was 40 houses. The objective for 2016 is to grow towards 52 houses per year. In contrast to the aggressive and massive market entrance of ECOBUILD, TREEHOUSE opted for a 'slow' market entry strategy, based on following a learning curve in the construction of passive houses, in particular by opting for a majority share of custom-made houses rather than dwellings based on standardised blueprints. The company phrases its commercial approach as follows:

> "If you go for TREEHOUSE, you are in for building sustainably: we not only deliver a solid, long-lasting construction, but set great store by healthy, ecological and socially acceptable applications. The use of renewable raw materials and FSC-labeled wood is a key principle."[3]

Woodwork is TREEHOUSE's core competence and the company takes into account the environmental impact of the whole life cycle of the product.

The strategy of TREEHOUSE can be characterised as an employee-centred organisation model based on participation. The management of TREEHOUSE is convinced that top-down management, lack of commitment of all layers in the organisation and poor communication incur additional costs due to careless work. Such fault costs make a decent green construction and the quality level required for eco-friendly building impossible to achieve according to the management. "Collaboration and participation are required because precisely in construction it is impossible to foresee and assess local conditions and anticipate on all incidences from behind a central drawing desk" asserts the CEO. He argues that local conditions and feasibility of blueprints can only be properly assessed on site and this requires involving all concerned. The need for contextualised knowledge, decentralised problem-solving and high involvement of all dominates in the corporate strategy and is reflected in the design of the work organisation (see below). In order to achieve high levels of worker involvement, collaboration, communication and interaction have to be incorporated at all levels of the company's structures, culture and practices. This includes that TREEHOUSE wants to keep a critical mass of knowledge and work force present on a day-to-day basis at the construction site. As a consequence, it limits the number of building sites that can be initiated and governed simultaneously.

As in ECOBUILD, the back-office has expanded in recent years leading to centralised design for production. Delicate building elements are traced out by the in-house drawing office and are being pre-fabricated off-site in the central workshop. Apart from sharing these trends, there are large differences with ECOBUILD.

The work organisation indeed combines this centralised design and off-site prefabrication with an order-based work flow on site applying decentralised autonomy and team-based work organisation. Construction teams are established at the start and involve all parties. Subcontractors are included on the basis of their specific competences and considered as equal partners with equal responsibilities. Subcontracting is characterised by long-term contracts to a limited number of companies that adhere to the same ecological principles as TREEHOUSE. The customer, the architect and the various contractors sit together already at the design phase. The various partners continuously

communicate and interact during regular on site visits to jointly follow-up the entire construction process. Project managers are the liaison officers with the customer. Before the start of every new building site and until a dwelling is completely finished, there is an intensive contact between the project manager and the team leader, who is the front-line manager of the construction teams. They meet weekly to discuss the progress of work. They fine-tune the planning, the various tasks to be accomplished and order equipment and building materials to be transported.

Also for the construction workers, it is considered vital that they are informed about the importance of precision in ecological constructions. "Control is not the preferred way to get things properly done. We try to motivate our blue-collar workers to do things right out of their own conviction about the principles of ecological constructions", emphasises the CEO. On-site team-based work organisation has been introduced with the aim of reinforcing decentralised process coordination, the development of tacit knowledge and experience and adequate regulation and intervention capacities. The blue-collar workers work in teams consisting of two to four persons, depending on the size of the building site. The team composition regularly changes for different constructions. Team members work closely together. In principle, all workers meet every morning at headquarters to discuss the planning of the day. The tasks of the construction workers are broad and varied and all construction workers gain a clear insight into the end product. This has much to do with the TREEHOUSE's focus on an integrated and order-based instead of operation-based work organisation:

> "When you work in a big construction company, the job content is way more monotonous: you concentrate for instance on the bare brickwork, and are being sent from one site to another while doing practically the same thing everywhere. Here at TREEHOUSE, you feel responsible for one given dwelling, and logically you'll want to make the best of it." (Team leader, TREEHOUSE)

Additional elements of workers' involvement are a limited span of control of project managers and team leaders, the considerable amount of time that is devoted to face-to-face contacts and the easy access to top management. Last but not least, the company systematically invests in skill development and knowledge exchange of all staff by means of off-the-job and on-the-job training. These investments in skill development are not only meant for strengthening the workers and securing high quality performance, but also to enhance worker commitment and motivation.

5.3 Comparative analysis

Both companies operate on the same, emerging and growing, market of passive houses where prices are high and customers have to be well-off. They are faced with similar organisational challenges related to the application of energy-efficient construction techniques that are imposed by the stricter regulations and they operate in the same technological environment. They use to a large extent similar construction techniques to comply to these requirements as they have been described. For instance, they share the trend of growing in-sourcing of design and work preparation (concept building) and the off-site production of prefabricated modules. Both companies offer as well products that are standardised and houses that are designed to the wishes of the customers, albeit to different extent. Next to the size of both companies, the main difference with respect to the organisational context boils down indeed to levels of product standardisation, with

more customised houses produced by TREEHOUSE and more standardised houses offered on the market by ECOBUILD. Apparently, the choice between more standardised versus more individualised passive houses was a first key decision both companies made differently. It appears that the organisational and teamwork design options that are then taken by the respective management are coherent with the high road and low road literature. A systematic focus on productivity, short lead-times and maximising control implies that ECOBUILD abandons almost overnight the traditional way of organising the construction process and its traditional teams and opts instead for an operation-based model with (for some: very) narrow tasks, limited skill requirements of the workers and limited learning opportunities. TREEHOUSE's strategy for customised and high quality products, in contrast, leads to a highly intensified teamwork model with an empowered workforce that is typical for the high road strategy in order to meet the increased complexity of its product and processes.

In other words, despite the relatively similar technological and economic contexts, these contrasting organisational choices and managerial strategies accompanying the shift to passive house construction had a great impact on the way the overall work organisation and the teamwork were redesigned. Table 2 compares the key characteristics of both companies.

Table 2 Organisational characteristics and outcomes of two construction companies

	ECOBUILD	*TREEHOUSE*
Company characteristics		
Number of employees	200+	31
Number of houses built	350	40
Product	Passive houses	Ecology-friendly and energy-efficient houses
Managerial rationale		
Dominant market strategy	Price and delivery time	Quality
Overall managerial strategy	Productivity, centralisation and control	Quality, decentralisation and involvement
Corporate culture	Top-down	Participatory
Product design	In-house centralised	In-house centralised
Subcontractor strategy	Risk-transfer subcontracting, contractors subjected to corporate control structures and procedures	Limited number of long-term relationships and full involvement in construction teams
Organisational design		
Organisation of construction process	Operation-based	Order-based
	Fragmentation and high levels of division of work	Task integration and involvement from design to finishing
Level of standardisation	Standardisation and off-site prefabrication of subassemblies	Standardisation and off-site prefabrication of subassemblies
	Standardisation of operations and assembly at construction site	Customised operations at construction site

Table 2 Organisational characteristics and outcomes of two construction companies (continued)

	ECOBUILD	*TREEHOUSE*
Teamwork characteristics		
Task composition and variety, collaboration amongst team members	Short-cycled and repetitive work both off-site and on-site with limited collaboration between team members	Broad tasks and intensive collaboration on construction site
Allocation of workers	Highly mobile to execute a limited number of tasks at different construction sites	Stable construction teams for the whole duration of the building process
Planning	Centralised, computer-based process coordination and just-in-time	Fine-tuned and updated on-site by project leader in close interaction with workers and subcontractors
Problem-solving/decision latitude	Risks of disturbances are managed by centralised problem-solving and standardised procedures	Risks of disturbances are managed at team-level on the basis of decision latitude and contextualisation opportunities
Required skills	Limited, specialised to specific, narrow task	Required knowledge/training of energy-efficient construction principles and materials and of key steps in construction process
Job quality dimensions		
Learning opportunities and stress risks	Tight schedules, limited discretion and fragmented work induce high stress risks and low learning opportunities	Teamwork and decentralised problem-solving enable knowledge sharing and learning and reduce stress risks

Both company strategies come to the fore as equivalent, alternative models to meet similar technical product and process requirements related to changed regulations and standards of green construction. At the time of the investigation, both firms are competitive and have concrete growth prospective despite the enduring economic crisis that hit the industry. The contrasting responses and their consequences for the way the teams are designed and operate and especially for the job quality of the workers involved are striking. The almost archetypical examples of high road and low road work organisation types observed result in highly contrasting outcomes for teams and eroded in order to establish maximum control and limit every risk of unpredictable behaviour. As a result, there is a risk that the construction workers loose insight into the construction process and on the end product and lose any leeway for intervention. The outcome is a low road type of teamwork aimed at minimising decision latitude and maximising control. The essential argument why TREEHOUSE choose the opposite – high road – strategy is that due to the growing complexity and technicity of the construction process, unpredictability can never be ruled out and therefore precisely requires more flexibility. Because the process has become more vulnerable to errors, there is a growing need for ad hoc interventions and adaptations on the spot. In this company, teams are enlarged and empowered in construction teams in view of decentralised regulation and

capacity-building. The emphasis on contextualised knowledge, ad hoc problem-solving and high involvement of all dominates in the corporate strategy.

6 Conclusions

The evolution towards energy-friendly constructions leads to an acceleration and reinforcement of more general trends in the construction industry. The strict requirements of accuracy, technicity and quality in all process stages imposed by energy-efficient construction lead to increased specialisation and a corresponding lengthening of the value chain, a growing importance of technical design and detailed work preparation, growing standardisation and modularisation of construction components, shortening of lead-times. Overall the process becomes highly sensitive for disturbances and requires rigid coordination and logistics. In such an organisational environment, the tempting managerial response seems to be to maximise control and minimise risks, which would lead to more centralisation, standardisation and bureaucratised, top-down process-coordination. Such corporate strategies induce higher levels of division of labour and standardised and short-cycled work which imply the erosion of the traditional team-based work organisation. In such working environment, jobs score low on job quality as outlined above.

As TREEHOUSE demonstrated, this scenario is not necessarily developed. TREEHOUSE adheres to the opposite strategy to respond to the same strategic challenges. The outcome in terms of job quality is far better. Apparently the shift to green construction techniques does not enforce a single organisational response. Looking at the company strategies and characteristics, it appears that the overall corporate strategy, corporate culture and managerial rationale and choices can to a large extent account for these contrasting responses to the new regulations and technical requirements for energy-efficient construction. ECOBUILD opts for producing more standardised dwellings. Controlling costs and delivery times are decisive elements in the managerial choice for centralised process-control, standardisation and operation-based flow production. The management of TREEHOUSE opts to focus more on the high-end niche. Securing quality and adhering to ecological principles dominate and limit standardisation opportunities and, consequently, purely quantity-driven growth ambitions. In all, it appears that the combination of economic and social managerial rationales and choices are likely to explain these contrasting outcomes. Such an observation is a strong argument in favour of the theory of organisational choice as well as a convincing confirmation that both high road and low road corporate strategies occur in similar economic and technological environments.

The least we can conclude from the observations made in this research is that the impact of ‘the green economy’ on the quality of jobs does not point in a clear direction. Even when the impacts of greening on the product, the production process and on the techniques and equipment are very specific and clear-cut, such as it is the case in this narrow segment of the private house building, apparently there remains considerable organisational choice for the implementation of these innovations. The two case studies demonstrate that managerial strategies and corporate culture can make a decisive difference on the outcome of greening for workers. A more systematic and large scale investigation of company strategies in this industry, with much more and diversified case studies, would be desirable to scrutinise our findings. The fact that EU regulation with

respect to energy-efficiency will be imposed at relatively short-term implies that most construction companies on the market of private dwellings will be confronted with similar choices as ECOBUILD and TREEHOUSE. This development not only opens new avenues for more systematic research on workplace innovation in this industry.

From the perspective of creating 'good jobs', our observations imply that there is room for campaigns and incentives promoting workplace innovation, both on the company level and at the sector level . Given the fact that construction is one of the most important sectors in Europe in terms of employment and assuming that quality and 'sustainability' of jobs is an equally important EU policy goal as the achievement of 'more' jobs, ongoing attention to the impact of greening to the quality of work and ways of working is needed.

Acknowledgements

The research on which this article is build is carried out in the frame of the WALQING project, Work and Life Quality in New and Growing Jobs, funded by the European Union under its 7th Framework Programme, reference SSH-CT-2009-244597.

We are grateful for the comments made on a first draft presented at the International Workshop on Teamworking 16, held in Trondheim, 6–7 September 2012.

References

Achterbergh, J. and Vriens, D. (2009) *Organizations: Social Systems Conducting Experiments*, Springer, New York.

Bacon, N. and Blyton, P. (2000) 'High road and low road team working; perceptions of management rationales and organizational and human resource outcomes', *Human Relations*, Vol. 53, No. 11, pp.1425–1458.

Benders, J. and Van Veen, K. (2001) 'What's in a fashion? Interpretative viability and management fashions', *Organization*, Vol. 9, No. 1, pp.31–51.

Buchanan, D. (2000) 'An eager and enduring embrace; the ongoing rediscovery of team working as a management idea', in Procter, S. and Mueller, F. (Eds.): *Teamworking*, pp.25–42, Macmillan, London.

Child, J. (1972) 'Organizational structure, environment and performance; the role of strategic choice', *Sociology*, Vol. 6, No. 1, pp.1–22.

de Sitter, L.U. (1981) *Op weg naar nieuwe fabrieken en kantoren: productie-organisatie en arbeidsorganisatie op de tweesprong*, Kluwer, Deventer.

Dhondt, S. and Van Hootegem, G. (2015) 'Reshaping workplaces: workplace innovation as designed by scientists and practitioners', *European Journal of Workplace Innovation*, Vol. 1, No. 1, pp.17–24.

European Communities (EC) (2004) *Facing the Challenge*, Office for Official Publications of the European Communities, Luxembourg.

Fernandez-Macias, E. (2010) *Changes in the Structure of Employment and Job Quality in Europe 1995 2007*, Universidad de Salamanca, Madrid.

Gieskens, B. (2012a) 'Ketenintegratie in de bouwsectoren', in Heijinck, J. (Ed.): *Flexibiliseren in ketens en netwerken, OR-strategie en beleid thema 16*, Kluwer, Alphen aan den Rijn, pp.101–106.

Gieskens, B. (2012b) 'Het bouwproces op de bouwplaats en de coördinatie ervan', in Heijinck, J. (Ed.): *Flexibiliseren in ketens en netwerken, OR-strategie en beleid thema 16*, Kluwer, Alphen aan den Rijn, pp.107–114.

Green, F. (2006) *Demanding Work: The Paradox of Job Quality in the Affluent Economy*, Princeton University Press, Princeton and Oxford.

Holman, D. (2012) 'Job types and job quality in Europe', *Human Relations*, Vol. 66, No. 4, pp.475–502.

Karasek, R.A. and Theorell, T. (1990) *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*, Basic Books, New York.

Manhanden, N. (2012) 'Fragmentering van arbeid in de bouw. Van de bouwkolom naar een kluwen van bouwactiviteiten', in Heijinck, J. (Ed.): *Flexibiliseren in ketens en netwerken, OR-strategie en beleid thema 16*, Kluwer, Alphen aan den Rijn, pp.125–134.

Ortmann, G. (1995) *Formen der Produktion; Organisation und Rekursivität*, Westdeutscher Verlag, Wiesbaden.

Pauwels, F., Opdenkamp, H. and Ramioul, M. (2012a) *Greening in Construction and the Impact on Work: New Challenges or More of the Same?*, WP5 report of the WALQING project, SSH-CT-2009-244597.

Pauwels, F., Van Peteghem, J. and Ramioul, M. (2012b) *Greening is Not Enough: The Gap Between Societal Evolutions and Shop Floor Practices in Green Construction*, Internal report for WP6 of the WALQING project, SSH-CT-2009-244597.

Ramioul, M. and Van Peteghem, J. (2012) *Walqing Action Research: Job Quality in the Belgian Green Construction*, WP9 report of the WALQING project, SSH-CT-2009-244597, HIVA-KU Leuven, Leuven.

Stroink, K. (1993) 'Gruppenarbeit in der Bauwirtschaft: die Kolonne', *WSI-Mitteilungen*, Vol. 46, No. 2, pp.110–118.

van Eijnatten, F.M. and van der Zwaan, A.H. (1998) 'The Dutch IOR approach to organizational design: an alternative to business process re-engineering?', *Human Relations*, Vol. 51, No. 5, pp.289–318.

Van Hootegem, G. (2000) *De draaglijke traagheid van het management; Tendensen in het productie- en personeelsbeleid*, Acco, Leuven.

Van Peteghem, J., Pauwels, F. and Ramioul, M. (2012a) *Passive Housebuilding: Company Strategies and their Consequences for Work*, ECOHOUSE, Internal report for WP6 of the WALQING project, SSH-CT-2009-244597.

Van Peteghem, J., Pauwels, F. and Ramioul, M. (2012b) *Ecofriendly Construction and Sustainable HRM Practices in a Visionary Company*, TREEHOUSE, Internal report for WP6 of the WALQING project, SSH-CT-2009-244597.

Van Peteghem, J., Pauwels, F. and Ramioul, M. (2012c) *Company Strategies of a Small Construction Company: Facing a Changing Environment*, MANOR, Internal report for WP6 of the WALQING project, SSH-CT-2009-244597.

Vandekerckhove, S. and Ramioul, M. (2015) 'Using business functions to identify new and growing jobs', in Holtgrewe, U., Kirov, V. and Ramioul, M. (Eds.): *Hard Work in New Jobs. The Quality of Work and Life in European Growth Sectors*, Palgrave McMillan, Houndmills.

Notes

1 Forest Stewardship Council, see http://www.fsc.org.

2 In accordance with the guidelines of the WALQING study, all companies participating in the case study research are anonymised.

3 Quotation from the company's website (translation into English by the authors).

An alternative typology for teamwork

Paul-André Lapointe*

Département des relations industrielles,
Pavillon J.-A.De Sève,
1025, av. des Sciences-Humaines,
Université Laval,
Québec QC, G1V 0A6, Canada
Email: paul-andre.lapointe@rlt.ulaval.ca
*Corresponding author

Guy Cucumel

Department of Accounting Studies,
School of Management,
Université du Québec à Montréal (UQAM),
C.P. 888, Succursale Centre-Ville,
Montréal (Québec), H3C 3P8, Canada
Email: cucumel.guy@uqam.ca

Abstract: A new typology of teamwork, differentiating hierarchical from democratic teams, is proposed. It is an effective way to study the impact of work teams on working conditions and the factors associated with their prevalence. Democratic teams have better working conditions (greater autonomy and less work intensification and peer pressure), than hierarchical teams and employees working under Taylorism. Hierarchical team adoption is based on a logic of standardisation, labour cost reduction, and incentive pay without job security guarantees, representation, or partnership. Conversely, democratic team adoption is based on job security guarantees, representation, and partnership, without managerial strategy to reduce labour costs and to use incentive pay. These findings are based on a survey conducted in the Québec manufacturing sector.

Keywords: workplace innovation; social innovation; participation; democracy at work; teamwork; typology of work teams; lean teams; semi-autonomous teams; democratic teams; hierarchical teams.

Reference to this paper should be made as follows: Lapointe, P-A. and Cucumel, G. (2016) 'An alternative typology for teamwork', *World Review of Entrepreneurship, Management and Sustainable Development*, Vol. 12, No. 1, pp.50–73.

Biographical notes: Paul-André Lapointe is a Professor at the Department of Industrial Relations at Laval University since 1994. He received his PhD in Sociology from the Université du Québec à Montréal (UQAM). He is the co-Director of the Communauty University Research Alliance (CURA) 'Innovation, Work and Employment'. He is also a Researcher at the Center for Research on Social Innovations (CRISES). His main research topics focus on innovations in work organisation and labour relations as well as quality of work and employment.

Guy Cucumel is a Professor at the School of Management Sciences, UQAM. He received his PhD in Applied Mathematics from the University Paris-Dauphine (1989). As a Statistician Social Scientist, he is a Researcher at the Centre for Research on Social Innovations (CRISES). He completed his Post-doctorate in Sociology at UQAM. His expertise is recognised in statistical analysis of databases applied to social sciences.

This paper is a revised and expanded version of a paper entitled 'Teamwork diversity and social innovations' presented at the ISA 2014 World Congress of Sociology, Sociology of Work Session, Yokohama, Japan, 16 July 2014.

1 Introduction

The field of teamwork can be broken down into two opposing traditions – the socio-technical approach, which is more widespread in Scandinavian countries, and lean production, which first appeared in Japan's industrial sector (Procter and Mueller, 2000). In the socio-technical approach, teamwork is associated with quality of work life and greater industrial democracy, while lean production management strives to improve organisational performance through teamwork, peer pressure, and work intensity.

But as lean teams become increasingly prevalent, even in Sweden – the birthplace of semiautonomous teams – and as the two types are considered to converge in an hybrid form, the traditional typology no longer seems to apply. An alternative typology is needed.

In industrial democracy, work teams are considered a form of direct democracy, while unions and other bodies representing workers are forms of representative democracy. Industrial democracy requires relationships of mutual support between its direct and representative forms. But this relationship of mutual support is in question today as work teams are becoming more prevalent, unions are on the decline in most countries, and individualism is on the rise. Teamwork typology and its relationships with democracy at work are the main issues that we will address in this article. We will attempt to shed light on these concerns using the results of a survey of Québec's manufacturing sector. First, we will review the relevant literature and state our research hypotheses, then, we will explain our methodology and present and discuss our findings.

2 Literature review

Given our research questions, the literature review will look at two topics: work team typology and the role of representative democracy, especially the unions one, in work team prevalence.

2.1 Teamwork typology

Since the early 1990s, the specialised literature on work teams has used a dominant typology that differentiates between teams that belong to the democratic tradition from Scandinavia and the Japanese tradition, which stresses efficiency and productivity. They

translate into two opposing work team models: semiautonomous teams and lean teams (Berggren, 1992; Busck et al., 2010; Pruijt, 2003; Kyzlinková et al., 2007; Oeij et al., 2013). Each is a coherent system that is a response to a different context. Semiautonomous teams appeared in the context of an employment crisis and a labour shortage. They were a response to demands by a workforce that had grown intolerant of Taylorism. Repetitive, monotonous, physically demanding, boring work done by unskilled labour under the watchful eye of an oppressive hierarchy was falling out of favour and becoming increasingly unbearable. For some, work was now contrary to human nature (Herzberg, 1966). In the USA and Europe (especially in Scandinavian countries and Germany), theoretical approaches emerged that grew into labour reform movements supported by unions and, in some cases, by public policy. The socio-technical approach gave rise to the industrial democracy and work humanisation movements in Scandinavia and Germany. In the USA, job design ushered in the quality of working life movement. Even employers were sympathetic to these movements. They were willing to experiment with these new approaches through new forms of work organisation. In some cases, Taylorism's negative effects on performance in terms of turnover, absenteeism, poor work quality, and social conflict far outweighed the positives. Employers were therefore willing to set aside Taylorism for forms of work organisation that were more in line with what employees wanted (Berggren, 1992; van Eijnatten, 1992; Gustavsen, 2007; Johansson and Abrahamsson, 2009; Johansson et al., 2013; Kuipers et al., 2004).

According to Womack et al. (1990), lean production originated in a completely different part of the world in a completely different context: 1990s Japan. In Japan, companies fashioned a new form of Taylorism without the rigidity, workstation isolation, low quality products, and waste inherent in abundant inventories and buffer stock. Japanese companies turned the dominant notions of production management and work organisation on their heads (Coriat, 1991). They focused on flexibility and fluidity of the production process and moved from inventory to just-in-time production. They placed a premium on product specification compliance as part of the total quality and standardisation movement. And they set out on an endless quest to eliminate waste – of both human and non-human resources – in an effort to continuously improve quality and day-to-day operations known as Kaizen. In the 1990s, as new markets were opening up and competition was increasing, Japanese companies rose above the fray (Benders and Van Hootegem, 2000; Olivella et al., 2008; de Treville and Antonakis, 2006). When they opened plants in the USA and elsewhere to circumvent protectionist measures, they asserted their organisational supremacy by demonstrating that it was not predicated on the Japanese culture of work. Japanese companies designed and developed a unique approach rooted in productivity and the ability to respond to consumer needs more quickly and efficiently. At least that is what proponents of the high performance work system (HPWS) would say (Adler and Docherty, 1998; MacDuffie and Pil, 1997; Womack et al., 1990).

These two team approaches do agree on one major point, however, the critical importance of teamwork to work organisation. Both seek to leverage the effects of cooperation, emulation, and learning fostered by group work. But work is done according to two completely different models within these approaches. In the socio-technical approach (including job design and work humanisation), a semi-autonomous team comes together to work on a production segment or overarching task with clear boundaries to ensure greater work pace autonomy and boost cycle times, thereby increasing work

variety. This also makes for more enriching work since workers complete tasks requiring different skill levels. Specifications are kept to a minimum so workers have more freedom to choose their work methods. Employees also enjoy greater autonomy because they are responsible for coordinating and monitoring their own work, and there is a great deal of democracy because team leaders are elected by their teammates, not appointed by management (Berggren, 1992; Kuhlmann, 2002; Kuipers et al., 2004).

Under the Japanese model, work teams are primarily focused on improving economic performance. There are still assembly lines and production lines, but buffer stock has been eliminated to improve process fluidity. Cycle times are still very short, and work is more standardised to ensure that products meet their specifications. But team members are highly motivated to improve product quality and work methods. Once management approves new methods, workers must follow them and the team leader must enforce them. Employees rotate through workstations requiring the same skills, so there is no job enrichment. And though the team has some work coordination and monitoring responsibilities, they are carried out by the management-appointed team leader, who wields substantial power. Democracy is therefore virtually non-existent within teams, and the team leader and team members have a purely hierarchical relationship (Benders and van Hootegem, 1999; Olivella et al., 2008; Womack et al., 1990).

Over the past 15 years, the prevalence of teams following the Japanese model has continued to grow. In Sweden, the poster boy plants of the Swedish model, Kalmar and Uddevalla, were shuttered in the mid '90s when lean production was all the rage. While some authors maintain that the two models have converged into a hybrid model in recent years (Dabhilkar and Ahlström, 2013; Pil and Fujimoto, 2007), others believe the lean approach has replaced the Scandinavian approach altogether, even in Swedish and European auto plants (Cooney, 2004; Johansson and Abrahamsson, 2009; Johansson et al., 2013; Jonsson et al., 2004). In the USA, with the exception of Appelbaum and Batt (1994), who make the distinction in their book between lean teams (following the US lean model) and teams following the Scandinavian model (US team model), authors believe work teams adhere to a single model – the high performance work team model associated with the HPWS [Appelbaum et al., 2000; Benders, (2005), pp.63–64], which is basically inspired by the Japanese model. Is this the result of the quasi-total domination of the Japanese work team model, which could be said to have virtually eliminated the relevance and analytical power of the traditional typology?

And yet, the traditional typology is still widely used, especially in Europe. In the European Working Conditions Survey (EWCS), work teams are categorised by degree of autonomy (Eurofound, 2012; Oeij et al., 2013). Autonomy is measured according to team member accountability for three responsibilities: team leader selection, timetable of work and division of labour. Teams that are entrusted with all three responsibilities are associated with a high degree of autonomy and are described as self-managed teams in keeping with the socio-technical tradition. A second category is used to describe teams with at least one responsibility and a certain degree of autonomy, while teams with no responsibility are described as having no autonomy. The latter two categories are in line with the lean production model. In fact, this typology is both similar to and different from the traditional typology discussed above.

However, the EWCS typology has created ambiguity because in the second category, team autonomy is defined as team members having one or two of the three possible responsibilities (team leader selection, work schedule, and division of labour). A team in

this category is considered to have a certain degree of autonomy. But if the team leader is appointed by management rather than selected by the team members, the fact that the team has one of the other two responsibilities does not mean the team members (excluding the team leader) have a certain degree of autonomy. The team leader could carry out these responsibilities him or herself, in which case the team is built around the hierarchical power of the team leader. Team members would be left with no autonomy, even if the team could be said to have a certain degree of autonomy concentrated in the hands of the team leader [Benders and van Hootegem, (1999), pp.617–618; Doorewaard et al., (2002), p.359].

Moreover, by including team leader selection as a responsibility for the purpose of evaluating team member autonomy, the EWCS has paved the way for a new typology. It is a statement of just how important team leader selection and status are within the power dynamic and democracy of work teams. Team leader selection method and status indicate to whom the team leader is accountable, the group the team leader represents, and the interests he or she must defend. The selection method also determines the leader's source of legitimacy. In short, team leader selection method and status are an important dimension of democracy at work, which is supposedly a central feature of semiautonomous work teams [Bambra et al., (2007); Box 1, p.1029]. Some studies on the German auto industry have looked at team leader selection method, status, and roles in a similar manner (Kuhlmann, 2002; Wergin, 2003). This calls to mind the union struggles of the early 1990s in the US auto industry.

2.2 Teamwork democratisation and union role

For lean US auto plants (i.e., nearly all of them), the 1990s were characterised by union struggles around team leader status and selection method. At the time, the team leader was considered a key part of lean production [Parker and Slaughter, (1992), p.10], so power and democracy were at stake. Does the team leader represent the employees to management, or does the team leader represent management to the employees? Do team leaders need to mobilise their team members to improve working conditions and attenuate work intensification, or do they need to exercise control over them to enforce the work methods and pace imposed by management? The answer depends on the status of team leaders (workers or managers) and how they are selected (elected by their team members or appointed by management). The authors who recounted the struggles over these issues and analysed lean production, which is likened to management by stress, also underscored the role of unions in supporting team leaders as representatives of their teams (Parker and Slaughter, 1988, 1992, 1993; Hunter et al., 2002; Shaiken et al., 1997).

One cannot study the issues of power and democracy within work teams without coming across Thompson and Wallace's (1996) theoretical approach, dubbed the team dimensions model. Inspired by the labour process theory, this approach thinks of work teams as just another way to control workers. This control can come in three forms corresponding to three different dimensions of the work team: technical control related to the division of labour; normative control, which relates to the culture, perceptions, norms, and behaviours that team members must adopt; and control by means of governance mechanisms, which relates to leadership and responsibilities within the team. The exact manifestation of these forms of control varies, so empirical case studies are the preferred methodology (Findlay et al., 2000; Richards et al., 2012; Sederblad, 2004; Van den Broek et al., 2004). By rejecting the traditional typology and HPWS, which

define work teams according to standard assumptions, this analytical model brings the issues of control and power to the forefront of the study and dynamic of work teams.

Kuhlmann's (2002) paper on the German auto industry takes a similar tack. In the plants studied, team leaders were elected, which gave work teams a certain democratic foundation. But the level of democracy within teams varied by governance structure and team leader independence. Democracy is considered the main factor in improving working conditions within teams because democracy bolsters cohesion, cooperation, and assistance among workers. In the absence of democracy, peer pressure contributes to work intensification. Democracy also increases the number of autonomous regulation activities. According to Karasek and Theorell's (1990) model, they mitigate the negative impact of work intensification on physical and psychological health. Democracy also helps offset work intensification because it allows workers to negotiate workloads and identify work methods that are better for their well-being. As representatives of their teams, team leaders are highly motivated to initiate these negotiations because they are accountable to the team members who elected them. Wergin's (2003) studies of the roles of team leaders in four German plants confirm these conclusions.

In his work team design inspired by the socio-technical approach, Berggren (1993) considers union involvement in work organisation one of the three main features of semiautonomous teams. The other two are autonomy and non-assembly line production. Berggren stresses the critical contribution unions must make to the design and operation of work teams to strengthen democracy and enhance worker well-being. The aforementioned paper on German work teams and the paper on union struggles in the US auto industry discussed above also highlight the importance of unions' roles and strategies in supporting democracy within work teams. When confronted with the initial experiences of newly introduced work teams, many unions abandoned their opposition strategies and went on the offensive to demand greater democracy within work teams and better working conditions. Other unions simply adopted a hands-off approach since they considered work organisation a management matter that did not concern them. Still other unions supported the introduction of work teams as designed by management in an effort to protect jobs (Eaton and Voos, 1989; Frost, 2008; Lapointe, 2007). Union involvement in the design and implementation of work teams, union demands for greater democracy within work teams and better working conditions, and union support for teams and team leaders are the factors most strongly associated with the spread of democracy within work teams and enhanced worker well-being [Gollan and Markey, (2001), pp.324 and 328; Huzzard et al., 2004; Eurofound, 2013; Knudsen et al., 2011; Vidal, 2007]. On balance, industrial democracy, which combines direct and representative democracy in a relationship of mutual support, is an effective framework for analysing work teams (Frege, 2007; Poole et al., 2001; Knudsen et al., 2011; Lansbury, 2009).

3 Research questions and hypotheses

With the marginalisation of semiautonomous teams spawned by the socio-technical approach and with the growing prevalence of lean teams inspired by the Toyota model, the analytical relevance of the traditional typology is up for debate. What is more, the two types of teams no longer represent coherent wholes. In recent years, we have seen the reintroduction of assembly lines and the introduction of primary production management

tools typical of lean management in Swedish plants, which were formerly considered the bastions of semiautonomous teams. We are also seeing variations within team models that go against their fundamental principles. Team leader selection method is a team differentiator. Team leaders are elected in semiautonomous teams and appointed by management in lean teams. The way teams actually operate violates this principle. In the wake of 1990s union struggles, it is commonplace to meet leaders in US lean teams who were elected or selected based on other criteria to offset management's influence and arbitrariness and strengthen the bonds of representation between team leaders and team members. Selection methods include rotation, seniority, and union-management cooperation (Parker and Slaughter, 1988; Shaiken et al., 1997). These democratic dimensions injected into lean teams are contrary to the hierarchical principle supposedly at the heart of their design. Vidal (2007) has shown that in some US factories that had implemented the lean production work teams had evolved towards forms of substantial participation under pressure from unions. At the other end of the spectrum, we see semiautonomous teams in the Swedish auto industry whose team leaders have been appointed by management (Thompson and Wallace, 1996), flying in the face of the democratic principles they are supposedly rooted in.

So what differentiates work teams? This is our first research question. Based on the literature review above, governance structure appears to be the answer. The democratic or hierarchical nature of governance is the differentiator. More specifically, some papers use team leader status and leadership role to differentiate work teams. Doorewaard et al. (2002) distinguish between two types of teams (shared responsibility teams and hierarchical teams) based on whether team members or the team leader is responsible for designing, supporting, and monitoring work (358). Delarue et al. (2003) focus on the leadership style within teams and distinguish between two types of work teams: autocratic leadership teams and self-leading teams. In autocratic teams, the team leader has a formal hierarchical position and supervises team member activities. In self-leading teams, the team leader is a team member whose role is more like that of a coach (6). In a study of Norwegian work teams, Kalleberg et al. (2009) identify two opposing types of work teams: self-directed teams and supervised teams. The distinction is based on who is responsible for coordinating and monitoring work and whether these duties are mainly or marginally performed by team members. In the latter case, they are formally carried out by a supervisor (102 and 106). In essence, these typologies are all very similar.

We can further assume that team leader supervision and leadership are strongly associated with team leader status and selection method. When team leaders are supervisors or team members appointed by management, they are accountable to management and thus supervise team members as a representative of management. When elected by their co-workers or selected independent of management control or arbitrary decision, i.e., based on seniority, rotation, or union-management cooperation, team leaders represent their co-workers and have a difficult time playing a hierarchical supervisory role on behalf of management without losing legitimacy. This is also how left-leaning US union activists of the 1990s described the issue in the journal Labor Notes (http://www.labornotes.org/):

> Team leaders (hourly workers who direct and assist other workers) are a key part of the MBS ('management by stress') system. Management does all it can to co-opt team leaders to its side, and they are often a prime target of resentment from other team members. Too often, team members blame team leaders for their problems rather than the MBS system as a whole. Therefore,

> within each team, the union needs to fight to get the most union-conscious person (rather than the apple-polisher) chosen as team leader. The team leader should see herself or himself as an advocate for team members to management, not a middle-person between workers and management. The union must be sure to define the role carefully. Usually, the best way to get good team leaders is to insist that they be elected. This makes the leader most responsible to the members and least to management. Seniority and rotation are also possibilities; appointment by management is the worst option. [Parker and Slaughter, (1992), p.10]

The fundamental issue is the dynamic of work democratisation and power relationships. The goal is to make the work team a collective actor independent of management that can take part to the determination of its own work rules and working conditions. Transforming teams into collective actor is a key to the team democratisation process. Shaiken et al. (1997) illustrate this with the example of new work standards being implemented to boost team productivity. They describe how a team leader, with the support of the team members who elected him, negotiates with management so that productivity is not boosted by means of increased workloads, but rather more efficient work methods. They also mention that during negotiations, the team leader had substantial support from his union (37–38). It can therefore be inferred that, with the support of their local unions, democratic teams secure better working conditions for workers.

Based on the argument above, our first research hypothesis proposes a new work team typology and implicitly assumes that each type of team has its own unique set of main work characteristics. Our first hypothesis is that:

H1 Work teams can be divided into democratic teams and hierarchical teams based on team leader status (supervisor or worker) and selection method (appointed by management or chosen independent of management control or arbitrariness, i.e., by election, rotation, seniority, or union-management cooperation). Each type of team also has its own unique set of work organisation and working condition characteristics.

Team democratisation, or substantive empowerment as Vidal (2007, pp.203–204) has shown it, depends largely upon union action and thus whether a workplace is unionised or not. Thus, our second research question is the following: what role does representative democracy and, especially, unions play in work team prevalence and dynamics? This question gives rise to the tree following hypotheses.

It is important to understand the institutional framework in North America, where there is a stark difference between unionised and non-unionised workplaces. A union may only be present in a workplace if a majority of workers joins the union during a union organising campaign. If the campaign is successful, the union becomes the sole representative of the workers and negotiates and signs a collective bargaining agreement with the employer. Given the important role that unions play in the work team dynamic, it is reasonable to assume that democratic teams in unionised workplaces have superior working conditions. Here then is our second hypothesis:

H2.1 Democratic teams in unionised plants have superior working conditions.

To extend the argument regarding the ties between work teams and union action, we can hypothesise that union action plays a key role in the work team democratisation process.

More specifically, it is not just union presence that matters, but rather the strategies that unions adopt and their involvement in various consultative bodies that help shape work team configuration. This hypothesis is also consistent with the paradigm of industrial democracy, which presupposes strong ties between direct democracy in the form of work teams or other vehicles for employee expression, and representative democracy in the form of unions or other bodies such as labour-management committees (Eurofound, 2013; Knudsen et al., 2011). This hypothesis is especially germane to labour relations systems like those in North America that almost always negotiate local contracts. In such instances, collective bargaining agreements are negotiated and signed with plant management, and the workplace is the focal point of union activity. Union activity therefore varies considerably from one workplace to the next. According to the specialised literature (Eaton and Voos, 1989; Frost, 2008; Lapointe, 2007; Vidal, 2007), unions that go on the offensive and adopt a proactive work team strategy foster work team democratisation. Our third hypothesis is therefore the following:

H2.2 In unionised workplaces, local unions that proactively support work teams and are actively involved in labour-management bodies foster the adoption of democratic teams.

Labour-management committee are not compulsory in North America in workplaces over a certain size. That means employee associations are the only form of representative democracy to be found in non-unionised workplaces, and it is difficult to determine how independent of employers these organisations are. But one thing that can be a signal of some degree of independence is the existence of a formal complaints procedure. That brings us to our fourth hypothesis:

H2.3 In non-unionised workplaces, the existence of an employee association and a formal complaints procedure is positively associated with the presence of democratic work teams.

4 Methodology

This article is based on a 2001 phone survey of managers of Québec manufacturing plants with 50 or more employees. The survey was conducted by a research team with funding from the Social Sciences and Humanities Research Council of Canada. Questionnaires were sent to 2,042 plant managers, and 712 completed questionnaires were returned (392 from managers of unionised workplaces and 320 from managers of non-unionised workplaces), for a response rate of 34.9%. Excluding outliers, the sample comprised 364 unionised plants and 264 non-unionised plants, for a total of 628 workplaces.

The questionnaire included 130 statements on a variety of organisational innovations as well as external context, human resource practices, and labour relations (Bélanger et al., 2002). Using binary logistic regression analysis, we were able to assess the relative contribution of independent variables (such as production management programs, business strategies, human resource management practices, and labour relations practices) to the adoption of teamwork, which was divided into two types: democratic teams and hierarchical teams. One of the most common problems encountered with this technique is that of unbalanced data, i.e., when there is a major disparity between the

prevalence of the two dependent variable categories. This often results in poorly estimated independent variable coefficients. One way to compensate is to under sample the majority class to rebalance the overall sample (Hostla et al., 2013). To maximise the number of observed data points used in the logistic regressions, we used all data points in the 'teams' category and randomly selected an equal number of data points in the 'no teams' category. Finally, statistical analysis, t-tests, and ANOVAs (or Kruskal-Wallis tests when ANOVAs could not be performed) were conducted by differentiating non-unionised plants from unionised plants.

To measure the presence of teamwork in a plant, the following question was asked:

> "In your plant, are there teams in which production workers have some responsibilities when it comes to organizing their own work (e.g., teamwork, semiautonomous teams, self-managed teamwork, but not including quality improvement groups)?"

We used a broad definition in order to encompass the many different ways organisations define work team [Benders and Van Hootegem, 2000; Richards et al., (2012), p.238]. Moreover, the question and the clarifications in parenthesis were worded carefully to indicate that the teams in question are 'online', bringing together workers performing interdependent tasks within a team that is responsible in some way for organising its own work. The responsibilities, on the other hand, were intentionally left vague since they vary and may be carried out by the workers as a group or by a team leader.

In keeping with other surveys of this kind, the question asked about core employees (Osterman, 1994). Since our survey focused on the manufacturing sector, we used production workers in the question. They accounted for just over 90% of the workers in the sample.

5 Presentation of findings

5.1 First research question and work team typology

Our first research question is about the existence of an alternative to the traditional typology of teamwork. We proposed that the team leader status and its mode of selection are the main factors of differentiation. On this basis, the teams are distinguished in two classes with their own set of work organisation or working condition characteristics. The first class comprises those teams whose leader is a supervisor or an employee appointed by plant management to serve as team leader. This is the 'hierarchical teams' class because the team enjoys just a small degree of democracy or no democracy at all. The second class includes teams whose leader is selected by team members (elected), by seniority, by management, jointly by union and management, or by other methods. This is the 'democratic teams' class. It is characterised by a higher degree of democracy and autonomy. When plants with no teams are included, the typology comprises three classes: no teams, hierarchical teams, and democratic teams (Table 1). Democratic teams are less prevalent than hierarchical teams and are more prevalent in non-unionised plants than in unionised plants.

To better comprehend work team prevalence, we added an internal prevalence or penetration criterion (i.e., the percentage of workers on work teams when teams are present in a workplace). A distinction was made between plants in which less than 50%

of workers are on teams and 50% or more of workers are on teams. When the internal prevalence rate is taken into account, team prevalence drops off sharply once penetration reaches 50% (Table 2). It is striking how uncommon it is for over 50% of workers to be on democratic teams (this is the case in only about 5% of plants, regardless of union status). There are also significant differences in internal team prevalence based on plant union status and type of team. Hierarchical teams with a high level of penetration and democratic teams with a low level of penetration are twice as common in non-unionised plants as in unionised plants. These types of work teams are more prevalent in non-unionised plants because the requirements for their introduction are less stringent for employers.

Table 1 Teamwork classes

	Non-unionised plants		*Unionised plants*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*
Without team	133	50.4	221	60.7	354	56.4
Hierarchical teams	72	27.3	91	25.0	163	26.0
Democratic teams	59	22.3***	52	14.3***	111	17.7
Total	264	100.0	364	100.0	628	100.0

Notes: t-test. Significance is reported at the 0.01*** level.

Table 2 Teamwork classes, taking into account the percentage of workers involved in teams

		Without team	*Hierarchical teams*		*Democratic teams*		*Total*
			< 50%	*>= 50%*	*< 50%*	*>= 50%*	
Non-unionised plants	N	133	51	21	46	13	264
	%	50.4	19.3	8.0*	17.4**	4.9	100
Unionised plants	N	221	76	15	33	19	364
	%	60.7	20.9	4.1*	9.1**	5.2	100

Notes: T-test. Significance is reported at the 0.01** level and the 0.05* level.

Table 3 Dimensions of work organisation

Skill	Time required by a new production worker to acquire the abilities to carry out the normal production tasks (less than two weeks = 0; between two weeks and one month = 0.5; more than one month = 1)
Autonomy in work pace	Percentage of production workers who control their work pace
Autonomy in work methods	Percentage of production workers who decide the best way to do their work
Task complexity	Percentage of production workers who do not do simple and repetitive tasks
Problem-solving activities	Percentage of production workers who were involved in problem-solving groups during the last year
Task rotation	Percentage of production workers who do rotation from one job to the other
Work intensification	The changing workload of production workers during the five last years (increased = 1; remained the same = 0; decreased = –1)

Work organisation characteristics, or working conditions, vary by work team classes. The survey looked at the characteristics of skill, autonomy (work pace and work methods), task complexity, problem-solving activities, task rotation, and work intensification (Table 3). As presented below, in the next section, each teamwork class is related to specific work organisation characteristics or working conditions. In most cases, democratic teams are associated with better working conditions (Tables 4, 5 and 6).

5.2 Second research question and representative democracy

The second research question is concerned with the role of representative democracy regarding teamwork impact on working conditions and prevalence. It gives rise to three hypotheses. With the first one (H2.1), we suppose that democratic teams in unionised plants are associated with better working conditions. The other two hypotheses posit a positive relation between proactive unions, in unionised plants (H2.2), or the existence of an employee association, in non-unionised plants, and democratic team prevalence (H2.3).

Table 4 Work organisation dimensions across team classes, non-unionised plants (means, standard deviations)

		Without team	*Hierarchical teams*		*Democratic teams*		*Total*
			< 50%	*>= 50%*	*< 50%*	*>= 50%*	
	N	133	51	21	46	13	264
Skill*	Mean	0.527	0.696	0.700	0.512	0.692	0.580
	Std. dev.	0.395	0.362	0.340	0.401	0.253	0.386
Autonomy in work pace	Mean	0.456	0.373	0.393	0.321	0.595	0.415
	Std. dev.	0.397	0.370	0.388	0.362	0.393	0.386
Autonomy in work methods	Mean	0.267	0.341	0.338	0.290	0.475	0.302
	Std. dev.	0.347	0.337	0.307	0.326	0.304	0.337
Task complexity***[a]	Mean	0.432	0.606	0.617	0.689	0.765	0.542
	Std. dev.	0.340	0.292	0.306	0.288	0.229	0.333
Problem-solving activities	Mean	0.283	0.420	0.321	0.397	0.486	0.360
	Std. dev.	0.347	0.372	0.332	0.381	0.385	0.363
Task rotation	Mean	0.335	0.286	0.364	0.324	0.409	0.329
	Std. dev.	0.373	0.315	0.374	0.327	0.421	0.355
Work intensification*	Mean	0.271	0.373	0.476	0.178	0.667	0.310
	Std. dev.	0.556	0.564	0.602	0.614	0.492	0.576

Notes: ANOVA (F)
[a]Kruskal Wallis test
Significance is reported at 0.001*** level, and the 0.05* level.
The Tukey-b test was used to make pairwise comparisons among the individual treatment means.
With regard to task complexity, the test confirmed the difference between the without team classes mean and those of all other classes.
For skill, the test did not confirm any difference between the classes mean.
Concerning work intensification, the test confirmed the difference between the SA teams (>= 50%) classes mean and those for all other classes.

The findings are presented by class and by team penetration rate in two tables – one for unionised plants and one for non-unionised plants. In non-unionised plants, skill, task complexity, and work intensification vary significantly by team class (Table 4). Task complexity is much greater in the hierarchical and democratic classes than in the 'no teams' class, regardless of penetration rate. Work intensification appears to be much greater in the democratic class with a high penetration rate than in any other class. And though it is not significant, work intensification is also very high in the hierarchical class with a high penetration rate.

Work characteristics in unionised plants are very different from those in non-unionised plants. There are significant differences in autonomy and problem-solving activities (Table 5). Work pace and work method autonomy are much greater in democratic plants in which over half of workers are on a work team, while problem-solving activities are much more common in the democratic classes, especially when 50% or more of workers are on such a team. Finally, unlike in non-unionised plants, work intensification does not vary significantly by class in unionised plants.

Table 5 Work organisation dimensions across team classes, unionised plants (means, standard deviations)

		Without team	*Hierarchical teams*		*Democratic teams*		*Total*
			< 50%	*>= 50%*	*< 50%*	*>= 50%*	
	N	221	76	15	33	19	364
Skill	Mean	0.535	0.547	0.533	0.606	0.667	0.551
	Std. dev.	0.378	0.404	0.297	0.370	0.383	0.380
Autonomy in work pace*[a]	Mean	0.429	0.427	0.479	0.234	0.612	0.421
	Std. dev.	0.369	0.373	0.464	0.249	0.424	0.372
Autonomy in work methods**	Mean	0.254	0.350	0.338	0.283	0.522	0.295
	Std. dev.	0.314	0.300	0.363	0.312	0.364	0.321
Task complexity	Mean	0.476	0.521	0.511	0.533	0.573	0.498
	Std. dev.	0.315	0.287	0.361	0.299	0.315	0.309
Problem-solving activities***	Mean	0.305	0.335	0.421	0.469	0.708	0.366
	Std. dev.	0.347	0.289	0.384	0.391	0.342	0.356
Task rotation	Mean	0.292	0.273	0.365	0.318	0.328	0.296
	Std. dev.	0.325	0.284	0.372	0.303	0.349	0.317
Work intensification	Mean	0.259	0.274	0.333	0.303	0.316	0.272
	Std. dev.	0.631	0.559	0.488	0.585	0.478	0.597

Notes: ANOVA (F)

[a]Kruskal Wallis test (p = 0.062)

Significance is reported at 0.001*** level, the 0.01** level and the 0.05* level.

The Tukey-b test was used to make pairwise comparisons among the individual treatment means.

With regard to autonomy in work pace, the test confirmed the difference between the SA team (< 50%) classes mean and those of all other classes.

For autonomy in work methods, the test confirmed the difference between the without team classes mean and those of all other classes except for democratic teams (>= 50%) mean.

Concerning problem-solving activities, the test confirmed the difference between the two SA team classes and those of those of all other classes.

Work team classes are also differentiated by changes in peer pressure in recent years (Table 6). There are marked differences between the classes. Peer pressure is up dramatically in hierarchical teams with a high penetration rate, while it has risen only slightly in democratic teams.

Table 6 Peer pressure* across team classes, unionised workplaces (means, standard deviations)

		Hierarchical teams		*Democratic teams*		*Total*
		< 50%	*>= 50%*	*< 50%*	*>= 50%*	
	N	127	36	79	32	274
Unionised workplaces**[a]	Mean	0.279	0.692	0.364	0.053	0.308
	Std. dev.	0.542	0.480	0.653	0.405	0.566
Non-unionised workplaces	Mean	0.250	0.524	0.279	0.182	0.301
	Std. dev.	0.484	0.512	0.591	0.603	0.542

Notes: ANOVA (F)
[a]Kruskal Wallis test
Significance is reported at the 0.01** level.
The Tukey-b test was used to make pairwise comparisons among the individuals treatment means.
The test confirmed the difference between the SA team (>= 50%) classes mean and those democratic teams (< 50%) and lean teams (>= 50%).
*Peer pressure: the changing peer pressure of team members during the last five years (increased = 1; remained the same = 0; decreased = –1).

5.3 Factors associated with team prevalence

There is extensive literature on the factors associated with the prevalence of organisational innovations in the workplace. We could not even begin to review it in this paper (based on references, Demers, 2007; Osterman, 1994; Godard, 2007; Bikalvi et al., 2014; Eurofound, 2013). These factors can, however, be divided into three main categories:

1 External environmental factors: market, technology, company size, business sectors, etc. These factors are cited most frequently in the literature. They play a central role in contingency theory.

2 Corporate strategy factors: R&D investment, high road business strategies (niche strategies focusing on product quality and diversity and skilled labour), and low road business strategies (volume strategy for standard products in markets where companies compete on price, primarily labour costs). These factors are given considerable weight in the wake of the strategic shift in industrial relation theory. They also include human resource management practices and values. Note that strategies here are the dominion of management.

3 Institutional factors: These factors play an important role in international comparisons. But in studies focusing on a single country, the only institutional factor usually taken into account is whether a workplace is unionised or non-unionised, at least in North America.

Using this typology of factors associated with work team prevalence, we dug deeper by analysing such human resources practices as giving workers guarantees when organisational innovations like work teams are introduced. We looked at union strategies regarding organisational innovations. We also looked at consultative mechanisms within unionised companies such as joint committees on training, work reorganisation, and technology changes.[1] In non-unionised plants, we asked questions to determine if an employee organisation and a formal complaints procedure were in place.

After controlling for a number of factors (plant size, ownership, sectors, production process and business strategies other than labour cost reduction), we retained those factors that are significantly associated with work team prevalence. These independent variables were as follows:

- the degree of technological sophistication (automation)
- the presence of new production management programs
- labour cost reduction strategies
- human resource management practices (collective variable pay, training, and guarantees given in case of organisational changes)
- employee representation in non-unionised plants
- labour relations (labour-management committees and union strategies with regards to organisational change) in unionised plants (Table 7).

Table 7 Definition of independent variables

Automation	Percentage of production workers working on computers, robots or programmable controllers.
Production management programs	Sum of indicators measuring the presence of five production management practices (just-in-time, set-up time reduction, production management and planning programs, statistical process control and cellular manufacturing) (scale 0 to 5).
Labour cost reduction business strategy	Five-degree scale measuring business strategy, based on the importance of labour 'cost reduction' in the plant's general business strategy (essential = 4 and insignificant = 0).
Collective variable pay	Presence of four collective schemes of variable pay: knowledge-based, profit-sharing, team bonuses and stock options (scale = 0 to 4).
Training	Indicators measuring the annual hours of training per worker.
Guarantees	Sum of the commitments made by management (none = 0, verbal commitment = 1 and written commitment = 2) for each of the following guarantees: against subcontracting, for new investments, for training and against lay-offs (scale = 0 to 8).
Employee representation	Sum of two indicators measuring the presence of employee association and internal due process scheme, in non-unionised plants
Union strategies	Weighted average of union strategies in four categories of organisational innovations (scale = 0.25 to 1.00), in unionised plants (the weighted average is calculated as following: the sum of the scores obtained for each of changes divided by the number of types of changes for which the respondent indicated a union strategy).
Union management committees	Number of union management committees, in unionised plants (scale 0 to 7).

Table 8 Workplace characteristics used as independent variables (means, standard deviations)

Workplace characteristics		*Non-unionised plants (n = 264)*			*Unionised plants (n = 364)*			*Total*
		Without team	*Hierarchical teams*	*Democratic teams*	*Without team*	*Hierarchical teams*	*Democratic teams*	
	N	133	72	59	221	91	52	628
Automation**[a]	Mean	15.6	16.5	23.0	22.9	21.5	33.9	21.3
	Std. dev.	22.1	23.5	28.1	28.3	28.1	35.6	27.5
Production management***[a]	Mean	0.462	0.536	0.600	0.524	0.653	0.627	0.546
	Std. dev.	0.330	0.316	0.299	0.285	0.265	0.271	0.302
Labour cost reduction business strategy	Mean	0.613	0.632	0.633	0.651	0.711	0.642	0.647
	Std. dev.	0.296	0.288	0.266	0.271	0.255	0.251	0.272
Collective variable pay***[a]	Mean	0.206	0.368	0.326	0.191	0.264	0.236	0.241
	Std. dev.	0.214	0.269	0.252	0.222	0.269	0.224	0.243
Training***	Mean	0.314	0.385	0.454	0.338	0.468	0.473	0.381
	Std. dev.	0.355	0.347	0.353	0.341	0.393	0.317	0.351
Guarantees***[a]	Mean	0.222	0.262	0.321	0.308	0.340	0.410	0.299
	Std. dev.	0.183	0.217	0.236	0.226	0.238	0.250	0.227
Employee representation**	Mean	0.608	0.606	0.897				0.672
	Std. dev.	0.670	0.665	0.718				0.702
Union strategies**[a]	Mean				0.721	0.758	0.795	0.742
	Std. dev.				0.200	0.179	0.166	0.191
Union management committees***[a]	Mean				0.442	0.522	0.613	0.486
	Std. dev.				0.207	0.252	0.218	0.228

Notes: ANOVA (F)
[a]Kruskal Wallis test
Significance is reported at 0.01*** level and 0.05** level.

Table 9 Logistic regression estimate of hierarchical and democratic teams (B, standard error and Wald)

Independent variables		*Non-unionised plants*		*Unionised plants*	
		Hierarchical teams (n = 120)	*Democratic teams (n = 90)*	*Hierarchical teams (n = 148)*	*Democratic teams (n = 92)*
Automation	B	–0.014	0.010	–0.026***	0.007
	Std. dev.	0.009	0.010	0.007	0.008
	Wald	2.451	1.054	11.778	0.900
Production management	B	–0.090	0.283	0.478***	0.245
	Std. dev.	0.134	0.175	0.158	0.204
	Wald	0.453	2.633	9.140	1.462
Labour cost reduction business strategy	B	0.196	–0.068	0.438**	–0.403*
	Std. dev.	0.180	0.207	0.189	0.244
	Wald	1.189	0.107	5.363	2.725
Collective variable pay	B	0.779***	–0.011	0.402*	–0.597**
	Std. dev.	0.237	0.268	0.215	0.297
	Wald	10.808	0.002	3.492	4.027
Training	B	0.123	0.153	0.661***	–0.127
	Std. dev.	0.200	0.216	0.224	0.266
	Wald	0.381	0.502	8.674	0.228
Guarantees	B	–0.147	0.262*	–0.018	0.134
	Std. dev.	0.136	0.144	0.105	0.121
	Wald	1.169	3.339	0.030	1.232
Employee representation	B	–0.622**	0.823**		
	Std. dev.	0.317	0.390		
	Wald	3.857	4.459		
Union strategies	B			–0.0158	0.664*
	Std. dev.			0.276	0.343
	Wald			0.328	3.761
Union management committees	B			–0.073	0.407**
	Std. dev.			0.125	0.177
	Wald			0.340	5.290
Chi-square		16.862**	16.145**	34.175***	19.564**
–2 Log likehood		149.493	108.622	170.997	107.975
Cox & Snell R square		0.131	0.164	0.206	0.192
Nagelkerke R square		0.175	0.219	0.275	0.255

Notes: Significance is reported at 0.01*** level, 0.05** level and 0.1* level.
Binary logistic regressions analysis (performed with SPSS software) is used because the dependent variables are dichotomous. In order to balance the cases with teams and without team in each model, we formed a sub-sample at random containing all cases with the team and an equal number of cases without team.

With the exception of production management programs and labour cost reduction strategies, which are more common in hierarchical teams in unionised plants, all independent variables are more prevalent in democratic teams in unionised plants, with the exception of collective variable pay, which is more common in non-unionised plants. Employee representation is more widespread in democratic teams in non-unionised plants, while social dialogue is more common in democratic teams in unionised plants (Table 8).

Logistic regression was performed with union status and teamwork classes (hierarchical teams and democratic teams) as dependent variables. There are thus four models of logistic regression (Table 9). Some patterns emerge, as do some similarities. The first model concerns hierarchical teams in non-unionised plants. In these teams, teamwork adoption is significantly and positively associated with collective variable pay and negatively associated with employee representation. Democratic team adoption in non-unionised plants (second model) is almost the exact opposite. It is positively linked to employee representation and guarantees (H2.3). The third model addresses the adoption of hierarchical teams in unionised plants. In this case, teamwork adoption is associated with production management practices, labour cost reduction, collective variable pay, and training, but is negatively associated with automation. The fourth model looks at democratic team adoption in unionised plants. The only factors positively associated with democratic team adoption are related to labour relations, i.e., union strategy and union-management committees (H2.2). More specifically, this means that union adoption of a proactive work team strategy in which the union promotes its own work team design and negotiates the conditions of work team introduction and operation, combined with the presence of joint committees, fosters the presence of democratic teams. The presence of democratic teams is negatively associated with labour cost reduction and collective variable pay, however.

5.4 The dynamics of teamwork democratisation

Hierarchical teams are much more common than democratic teams. This is because the conditions associated with democratic teams come at a price for employers. Indeed, democratic teams are related to better working conditions, greater autonomy, and less work intensification, and require more job security guarantees and a consultative body. These conditions are regarded by employers as higher labour costs, but they do not necessarily mean better economic and organisational outcomes, at least in the short term. In other words, they are not necessarily a win-win situation as proponents of the HPWS claim. That means the issue is more on the sharing of productivity gains, in terms of improving working conditions and employment. That is why the teams that are best for workers, i.e., democratic teams with a high penetration rate, were so uncommon. They were found in just 5% of workplaces (Table 2). This figure is in line with the other surveys' findings on the most common types of work teams (Edwards et al., 2002). This is a far cry from a work transformation, if one refers to the diffusion of democratic teams.

The way work is organised in democratic teams translates into better conditions for workers, especially in plants where such teams are highly prevalent. These teams have more work pace and work method autonomy, while work intensification and peer pressure have grown much more slowly in these teams. This underscores the importance of social dynamics and relationships of power between a company's social stakeholders.

It invalidates, at least in part, the traditional typology assumption that the transfer of responsibilities from management to work teams is the best explanation for differences in working conditions. Our research findings, as well as the 1990s union struggles in the auto industry, indicate that these differences are instead attributable to the tensions and conflicts that arise from work team introduction and how they are resolved. This brings us back to the relationship of power between stakeholders. When teams are represented by a team leader who, with union support, defends worker demands to management and negotiates workloads and other aspects of work organisation, working conditions improve. This spurs the team to work together as a group, reducing peer pressure dramatically.[2] Team cohesion helps eliminate competition among team members, which could otherwise fuel peer pressure and work intensification.

These findings should inform union strategies. Of course job quality should be championed the way Swedish unions do with their good work program. But when it comes to teamwork, it seems that the key to improving working conditions is to support and strengthen democratic work teams so that members work together as a collective actor. Some authors (Johansson and Abrahamsson, 2009; Johansson et al., 2013) are of the opinion that Swedish unions have forgotten all about the collective dimension of work and have stopped demanding teamwork – centrepieces of their industrial democracy agenda of the 1970s and '80s. They believe this has left Swedish unions powerless to fight corporate management practices that individualise work and weaken work groups. To reverse this trend, the authors propose that work teams rather than individuals should be the focus of practices and policies to improve working conditions.

6 Conclusions

According to the first hypothesis, the team leader status and its mode of selection are supposed to represent the main factors that make it possible to differentiate work teams into classes, hierarchical teams and democratic teams. With this hypothesis, we would like to propose an alternative to the traditional typology which distinguishes between lean and semi-autonomous teams. This old typology seems obsolete given the huge predominance of lean teams, the emergence of hybrid forms, the loss of internal coherence within each type, and the difficulty to properly assess the team autonomy, especially when the team leader is appointed by management, even though autonomy is the differentiation factor of teams inside this typology. The first research question, concerning what differentiates work teams, supported the validity for a new typology. This typology helped to distinguish effectively work teams regarding their work organisation characteristics and the factors associated to their prevalence. It also helped to consistently combine the two dimensions of democracy at work, given that the presence of democratic teams relies heavily on the support of the representative democracy.

Three hypotheses were set out in relation to the second research question concerning the role of representative democracy in the prevalence of team classes and their impact on working conditions. The first of these hypotheses assumed that democratic teams in unionised plants, which represent the higher development of industrial democracy, are going along with better working conditions. This is actually the case. Democratic teams in unionised plants are characterised by more autonomy, more learning activities, less intensification, and less peer pressure.

Within the perspective of industrial democracy, the two other hypotheses showed a positive association between the prevalence of democratic teams and well developed forms of representative democracy, e.g., proactive unions with independent agenda and involved in labour-management committees, in unionised workplaces, or employee associations with formal complaints procedure, in non-unionised workplaces. These two hypotheses were confirmed. Indeed, the democratic team adoption is characterised by social dialogue through employee representation in non-unionised plants and through labour–management committees in unionised plants. In the latter case, proactive union strategies play an important role. These union strategies are characterised by a independent union agenda and change negotiation. In unionised workplaces where democratic teams have been introduced, there is a strong relationship between direct and representative participation. In these plants, the introduction and operation of democratic teams require union involvement to negotiate working conditions and terms of employment, team democratisation, and the transfer of responsibilities to workers. Conversely, the adoption of hierarchical teams is mainly driven by production management (production standardisation) and labour cost reduction programs in unionised plants, and by collective variable pay without employee representation in non-unionised plants.

7 Discussion

Considering how long ago this survey was conducted, the relevance of the findings presented in this paper is open for debate. What is more valuable: to analyse old data with a new theoretical approach or to study new data with an old theoretical approach? An old approach applied to new data may not be able to apprehend new issues and new dynamics. On the other hand, a new approach built on old data could make it possible to analyse and understand new issues and emerging trends, that old approach are unable to perceive. Our findings, however, do illustrate issues that are still relevant today, – particularly teamwork democratisation. They also highlight emerging trends that have been borne out by changes over the past ten years. Democratic teams have grown less prevalent as hierarchical teams have grown more prevalent. These trends go hand in hand with the decline of unions in North America and Europe characterised by dwindling union membership and diminished bargaining power in the broader context of globalisation and finance-led capitalism. Unions have had no choice but to turn their attention away from work organisation and working condition initiatives in favour of job and wage protection efforts. These trends clearly deserve further study. More specifically, in the context of weakening local union power and of union strategies mainly oriented towards wages and employment at the expense of working conditions, it would be very relevant to study the union contribution to teamwork democratisation. Another appropriate study could address the support local unions have to give to team leaders and team members in order to transform hierarchical teams in democratic ones. Given the supremacy of lean production, in manufacturing sector as well as in service industry, we also need more studies on the tensions and conflicts within teamwork implementation and functioning and how these dynamics are associated with power and democracy at work.

Besides that it is based on rather old data, our study includes a few more shortcomings. First of all, the management representatives were our only source of

information. This constitutes an important limitation especially when it comes to evaluate working conditions and local union strategies. Moreover, the study is about teamwork in manufacturing sector. Given the job decline in this sector which represents a minority of jobs, with low skills, it is difficult to extend these study findings to the service economy and high skill jobs. Finally, we must not forget that institutions matter. Thus, a study about teamwork in North America cannot necessarily produce results that are equally relevant for other parts of the World.

A new typology, based upon democracy at work, proved to be a possible way to differentiate work teams. It looked at their impact on working conditions and the factors associated with work team prevalence. The issue of democracy at work boils down to power and the conflict surrounding working conditions. Considering how they enjoy greater autonomy and experience less work intensification and peer pressure, democratic work teams are one avenue to improving working conditions.

Factors associated with teamwork adoption were compared through the lens of two different logics. Hierarchical team adoption was based on a logic of standardisation, labour cost reduction, and incentive pay without job security guarantees, representation, or partnership. Conversely, democratic team adoption was based on job security guarantees, representation, and partnership. Democratic teams have better working conditions than hierarchical teams and employees working under Taylorism. They also enjoy greater democracy at work. However, they require an appropriate institutional context, favourable to productivity sharing and to working condition improvement, difficult to implement or to develop in this era of finance-led capitalism, dominated by short-termism. It is no wonder, then, why hierarchical teams are much more widespread than democratic teams.

This new typology is very useful today to study the dynamics of teamwork democratisation and how the transition from one type of work team to the other is done. The transition from democratic to hierarchical teams and the opposite transition could be both studied, depending on the specific dynamics of power and democracy working in each case study, whether it be a workplace or a country. This new typology is especially useful because it makes it possible to study work organisation and teamwork from the perspective of unions and workers. Given the tensions and conflicts within lean production, this new typology, rested upon democracy at work, helps to shed new light on teamwork changes, more or less favourable to workers.

References

Adler, P. and Docherty, P. (1998) ‘Bringing business into sociotechnical theory and practice’, *Human Relations*, Vol. 51, No. 3, pp.319–345.

Appelbaum, E. and Batt, B. (1994) *The New American Workplace*, IRL Press, Ithaca, NY.

Appelbaum, E., Bailey, T. and Berg, P. (2000) *Manufacturing Advantage Why High-Performance Work Systems Pay Off*, IRL Press, Ithaca, NY.

Bambra, C., Egan, M., Thomas, S., Petticrew, M. and Whitehead, M. (2007) ‘The psychosocial and health effects of workplace reorganization 2. A systematic review of task restructuring interventions’, *Journal of Epidemiology and Community Health*, Vol. 61, No. 12, pp.1028–1037.

Barker, J.R. (1993) ‘Tightening the iron cage: concertive control in self-managing teams’, *Administrative Science Quarterly*, Vol. 38, No. 3, pp.408–437.

Bélanger, P.R., Cucumel, G., Langlois, P., Lapointe, P.A. and Lévesque, B. (2002) *Questionnaire sur les innovations en milieu de travail dans le secteur manufacturier au Québec*, Cahiers du CRISES, Collection études théoriques, No. ET0206 [online] http://crises.uqam.ca/upload/files/publications/etudes-theoriques/ET0206.pdf (accessed 19 May 2015).

Benders, J. (2005) 'Team working: a tale of partial participation', in Harley, B. et al. (Eds.): *Participation and Democracy at Work*, pp.55–74, Palgrave, New York.

Benders, J. and van Hootegem, G. (1999) 'Teams and their context: moving the team discussion beyond existing dichotomies', *Journal of Management Studies*, Vol. 36, No. 5, pp.609–628.

Benders, J. and Van Hootegem, G. (2000) 'How the Japanese got teams', in Procter, S. and Mueller, F. (Eds.): *Teamworking*, pp.43–59, MacMillan Press Ltd., Basingstoke, Hamsphire and London.

Berggren, C. (1992) *Alternatives to Lean Production*, IRL Press, Ithaca, NY.

Berggren, C. (1993) *The Volvo Experience: Alternatives to Lean Production in the Swedish Auto Industry*, Macmillan, Basingstoke.

Bikalvi, A., Jäjer, A. and Lay, G. (2014) 'The incidence and diffusion of teamwork in manufacturing – evidences from a Pan-European survey', *Journal of Organizational Change Management*, Vol. 27, No. 2, pp.206–231.

Busck, O., Knudsen, H. and Lind, J. (2010) 'The transformation of participation: consequences for the work environment', *Economic and Industrial Democracy*, Vol. 31, No. 2, pp.285–305.

Cooney, R. (2004) 'Empowered self-management and the design of work teams', *Personnel Review*, Vol. 33, No. 6, pp.677–692.

Coriat, B. (1991) *Penser à l'envers: travail et organisation dans l'entreprise japonaise*, C. Bourgois, Paris.

Dabhilkar, M. and Alhlström, P. (2013) 'Converging production models: the STS versus lean production debate revisited', *International Journal of Operations &Production Management*, Vol. 33, No. 8, pp.1019–1039.

de Treville, S. and Antonakis, J. (2006) 'Could lean production job design be intrinsically motivating? Contextual, configurational, and levels-of-analysis issues', *Journal of Operations Management*, Vol. 24, No. 2, pp.99–123.

Delarue, A., Gryp, S. and Van Hootegem, G. (2003) *Productivity Outcomes of Teamwork as an Effect of Team Structure*, Working paper, Steunpunt OOI, Catholic University of Leuven [online] http://www.ondernemerschap.be/documents/pdf/wp_productivity_outcomes_of_teamwork.pdf (accessed 21 November 2011)

Demers, C. (2007) *Organizational Change Theories A Synthesis*, SAGE Publications, Los Angeles.

Doorewaard, H., van Hootegem, G. and Huys, R. (2002) 'Team responsibility structure and team performance', *Personnel Review*, Vol. 31, No. 3, pp.356–370.

Eaton, A.E. and Voos, P.B. (1989) 'The ability of unions to adapt to innovative workplace arrangements', *The American Economic Review*, Vol. 79, No. 2, pp.172–176.

Edwards, P., Geary, J. and Sisson, K. (2002) 'New forms of work organization in the workplace: transformative, exploitative, or limited and controlled?', in Murray, G. et al. (Eds.): *Work Employment Relations in the High-Performance Workplace*, pp.72–119, Continuum, London.

Eurofound (2012) *Fifth European Working Conditions Survey*, Publications Office of the European Union, Luxembourg.

Eurofound (2013) *Work Organization and Employee Involvement in Europe*, Publications Office of the European Union, Luxembourg.

Findlay, P., McKinlay, A., Marks, A. and Thompson, P. (2000) 'Flexible when it suits them: the use and abuse of teamwork skills', in Procter, S. and Mueller, F. (Eds.): *Teamworking*, pp.222–243, Macmillan Business, London.

Frege, C.M. (2007) *Employment Research and State Traditions*, Oxford University Press, Oxford.

Frost, A.C. (2008) 'The high performance work systems literature in industrial relations', in Blyton, P. et al. (Eds.): *The Sage Handbook of Industrial Relations*, pp.420–433, SAGE Publication Ltd., London.

Godard, J. (2007) 'Unions, work Practices, and wages under different institutional environments: the case of Canada and England', *Industrial and Labor Relations Review*, Vol. 60, No. 4, pp.760–790.

Gollan, P.J. and Markey, R. (2001) 'Conclusions: model of diversity and interaction', in Markey, R. et al. (Eds.): *Models of Employee Participation in a Changing Global Environment: Diversity and Interaction*, pp.322–343, Aldershot, Ashgate.

Gustavsen, B. (2007) 'Work organization and 'Scandinavian model'', *Economic and Industrial Democracy*, Vol. 28, No. 4, pp.651–671.

Herzberg, F. (1966) *Work and the Nature of Man*, World Publishing Company, New York.

Hostla, M., Striz, R., Kupcik, J., Zendulka, J. and Hruska, T. (2013) 'Constrained classification of large imbalanced data by logistic regression and genetic algorithm', *International Journal of Machine Learning and Computing*, Vol. 3, No. 2, pp.214–218.

Hunter, L.R., MacDuffie, J.P. and Doucet, L. (2002) 'What makes teams take? Employee reactions to work reforms', *Industrial and Labor Relations Review*, Vol. 55, No. 3, pp.448–472.

Huzzard, T., Gregory, D. and Scott, R. (Eds.) (2004) *Strategic Unionism and Partnership*, Palgrave Macmillan, Basingstoke.

Johansson, J. and Abrahamsson, L. (2009) 'The good work – a Swedish trade union vision in the shadow of lean production', *Applied Ergonomics*, Vol. 40, No. 4, pp.775–780.

Johansson, J., Abrahamsson, L. and Johansson, S. (2013) 'If you can't beat them, join them? The Swedish trade union movement and lean production', *Journal of Industrial Relations*, Vol. 55, No. 3, pp.445–460.

Jonsson, D., Medbo, L. and Egström, T. (2004) 'Somme considerations relating to the reintroduction of assembly lines in the Swedish automotive industry', *International Journal of Operations & Production Management*, Vol. 24, No. 8, pp.754–772.

Kalleberg, A.L., Nesheim, T. and Olsen, K.M. (2009) 'Is participation good or bad for workers? effects of autonomy, consultation and teamwork on stress among workers in Norway', *Acta Sociologica*, Vol. 52, No. 2, pp.99–116.

Karasek, R. and Theorell, T. (1990) *Healthy Work, Stress, Productivity, and the Reconstruction of Working Life*, Basic Books, New York.

Knudsen, H., Busck, O. and Lind, J. (2011) 'Work environment quality: the role of workplace participation and democracy', *Work, Employment & Society*, Vol. 25, No. 3, pp.379–396.

Kuhlmann, M. (2002) 'Group work and democracy', in Docherty, P. et al. (Eds.): *Creating Sustainable Work Systems*, pp.126–138, Routledge, London and New York.

Kuipers, B.S., De Witte, M.C. and van der Zwaan, A.H. (2004) 'Design or development? Beyond the LP-STS debate; inputs from a Volvo truck case', *International Journal of Operations & Production Management*, Vol. 24, No. 8, pp.840–854.

Kyzlinková, R., Dokulilová, L. and Kroupa, A. (2007) *Teamwork and High Performance Work Organization*, European Foundation for the Improvement of Living and Working Conditions, Dublin [online] http://eurofound.europa.eu/sites/default/files/ef_files/ewco/reports/TN0507TR01/TN0507TR01.pdf (accessed 3 August 2010).

Lansbury, R.D. (2009) 'Workplace democracy and the global financial crisis', *Journal of Industrial Relations*, Vol. 51, No. 5, pp.599–616.

Lapointe, P.A. (2007) 'Social innovations, participation and partnership in the workplace', in Pelletier, J. (Ed.): *Intervention Practices in Firms*, pp.109–132, Éditions Réseau ANACT, Paris.

MacDuffie, J.P. and Pil, F.K. (1997) 'Changes in auto industry employment practices: an international overview', in Kochan, T.A. et al. (Eds.): *After Lean Production*, pp.9–42, IRL Press, Ithaca, NY.

Oeij, P., Kraan, K. and Dhondt, S. (2013) *Work Teams and Psychosocial Risks and Work Stress* [online] OSHWiki.http://oshwiki.eu/wiki/Work_teams_and_psychosocial_risks_and_work_stress (accessed 22 March 2015)

Olivella, J., Cuatrecasas, L. and Gavilan, N. (2008) 'Work organization practices for lean production', *Journal of Manufacturing Technology Management*, Vol. 19, No. 7, pp.798–811.

Osterman, P. (1994) 'How common is workplace transformation and who adopts it?', *Industrial and Labor Relations Review*, Vol. 47, No. 2, pp.173–188.

Parker, M. and Slaughter, J. (1988) *Choosing Sides: Unions and the Team Concept*, A Labor Note Book, Detroit.

Parker, M. and Slaughter, J. (1992) *A Union Strategy Guide for Labor-Management Participation Programs*, A Labor Note Publication, Detroit.

Parker, M. and Slaughter, J. (1993) 'Surviving lean production: two auto > workers locals in the United States', Paper presented at *The Lean Workplace Conference*, 30 September–3 October, Centre for Research on Work and Society, York University, Toronto.

Pil, F. and Fujimoto, T. (2007) 'Lean and reflective production: the dynamic nature of production models', *International Journal of Production Research*, Vol. 45, No. 16, pp.3741–3761.

Poole, M., Lansbury, R.D. and Wailes, N. (2001) 'A comparative analysis of developments in industrial democracy', *Industrial Relations*, Vol. 40, No. 3, pp.490–525.

Procter, S. and Mueller, F. (2000) 'Teamworking: strategy, structure, systems and culture', in Procter, S. and Mueller, F. (Eds.): *Teamworking*, pp.3–24, MacMillan Press Ltd., Basingstoke, Hamsphire and London.

Pruijt, H. (2003) 'Teams between Neo-Taylorism and Anti-Taylorism', *Economic and Industrial Democracy*, Vol. 24, No. 1, pp.77–101.

Richards, J., Chillas, S. and Marks, A. (2012) 'Every man for himself teamwork and customer service in the hospitality industry', *Employee Relations*, Vol. 34, No. 3, pp.235–254.

Sederblad, P. (2004) 'Special issue on new forms of teamworking editorial introduction', *Economic and Industrial Democracy*, Vol. 25, No. 2, pp.187–196.

Shaiken, H., Lopez, S. and Mankita, I. (1997) 'Two routes to Team Production; Saturn and Chrysler Compared', *Industrial Relations*, Vol. 36, No. 1, pp.17–45.

Thompson, P. and Wallace, T. (1996) 'Redesigning production through teamworking', *International Journal of Operations & Production Management*, Vol. 16, No. 2, pp.103–118.

Van den Broek, D., Callaghan, G. and Thompson, P. (2004) 'Teams without teamwork? Explaining the call centre paradox', *Economic and Industrial Democracy*, Vol. 24, No. 2, pp.197–218.

van Eijnatten, F.M. (1992) *The Paradigm that Changed the Work Place Annals of STSD* [online] http://alexandria.tue.nl/repository/books/382594.pdf (accessed 15 May 2015).

Vidal, M. (2007) 'Manufacturing empowerment? 'Employee involvement' in the labour process after Fordism', *Socio-Economic Review*, Vol. 5, No. 2, pp.197–232.

Wergin, N.E. (2003) 'Teamwork in the automobile industry – an Anglo-German comparison', *European Political Economy Review*, Vol. 1, No. 2, pp.152–190.

Womack, J.P., Jones, D.T. and Ross, D. (1990) *Le système qui va changer le monde*, Dunod, Paris.

Notes

1 The questionnaire listed seven issues: labour relations, occupational health, occupational safety, task classification, and the three issues mentioned above.

2 The dynamics of teamwork democratisation, supported by proactive unions or, more modestly by employee association in non-unionised plants, is completely absent of Barker (1993) teamwork case study.

Why job autonomy matters for young companies' performance: company maturity as a moderator between job autonomy and company performance

Paul T.Y. Preenen*

TNO, Netherlands Organisation for Applied Scientific Research,
Schipholweg 77-89, P.O. Box 3005, 2301 DA Leiden, The Netherlands
Email: paul.preenen@tno.nl
*Corresponding author

Peter R.A. Oeij

TNO, Netherlands Organisation for Applied Scientific Research
P.O. Box 3005, 2301 DA Leiden, The Netherlands
Email: peter.oeij@tno.nl

Steven Dhondt

TNO, Netherlands Organisation for Applied Scientific Research,
P.O. Box 3005, 2301 DA Leiden, The Netherlands
and
Catholic University of Leuven,
Oude Markt 13, P.O. Box 5005,
3000 Leuven, Belgium
Email: steven.dhondt@tno.nl

Karolus O. Kraan and Emma Jansen

TNO, Netherlands Organisation for Applied Scientific Research,
P.O. Box 3005, 2301 DA Leiden, The Netherlands
Email: karolus.kraan@tno.nl
Email: emma.jansen@tno.nl

Abstract: Although the positive impact of job autonomy has been widely shown for individual-level employee outcomes, research on job autonomy and company-level outcomes has been surprisingly scarce. Therefore, among 3,311 companies in the Netherlands, we investigate the relationship between employees' job autonomy and company performance growth (revenue, profit). Moreover, we investigate the moderating effect of company maturity (young vs. older companies) in this relationship. Results indicate that job autonomy is positively related to growth of company revenue and this relationship is stronger for young companies. Job autonomy was positively related to company profit but only for young companies. These results suggest that it is important for young companies especially, to provide their employees with job autonomy and its supporting practices. Implications for theory and practice will be discussed.

Keywords: job autonomy; work autonomy; decision latitude; active jobs; company performance growth; company revenue; company profit; company maturity; company age; workplace innovation.

Reference to this paper should be made as follows: Preenen, P.T.Y., Oeij, P.R.A., Dhondt, S., Kraan, K.O. and Jansen, E. (2016) 'Why job autonomy matters for young companies' performance: company maturity as a moderator between job autonomy and company performance', *World Review of Entrepreneurship, Management and Sustainable Development*, Vol. 12, No. 1, pp.74–100.

Biographical notes: Paul T.Y. Preenen is a Researcher and Consultant at TNO with the Sustainable Productivity and Employability group, with a focus on organisational behaviour, labour flexibility and social innovation. He is involved with and leads research projects for national governments, the EU and major public organisations and companies. His work has been discussed in (inter)national media and has been published in international academic journals such as *Economic and Industrial Democracy*, *Group and Organization Management*, *European Journal of Work and Organizational Psychology*, *Journal of Applied Social Psychology*, *Journal of Experimental Social Psychology* and *Proceedings of the Royal Society B*.

Peter R.A. Oeij is a Senior Researcher at TNO with the Sustainable Productivity and Employability group and a PhD candidate at the School of Management of the Open University, the Netherlands. His research topics include social innovation, workplace innovation and innovative work behaviour in teams. He leads research projects for national governments, the EU and major public organisations and companies. His work has been published in *European Journal of Industrial Relations*, *International Journal of Social Quality*, *European Journal of Social Quality* and *Journal of Industrial Psychology*.

Steven Dhondt is a Senior Researcher at TNO, Sustainable Productivity and Employability, and part-time Professor at the University of Leuven (Chair: Workplace Innovation). He coordinates major Dutch, Belgian and EU (FP7) research programs on social innovation, corporate entrepreneurship, integrated care, workplace innovation and organisational innovation. He has published in *Behaviour and Information Technology*, *International Journal of Operations and Production Management*, *European Journal of Social Quality*, *International Journal of Social Quality*, *Team Performance Management* and *International Journal of Care Coordination*.

Karolus O. Kraan has been a Researcher at TNO since 1998. He has conducted many quantitative studies on quality of working life, work organisation and technology usage in relation to employer and employee outcomes, such as innovation and well-being. He carries out research projects for national governments and several EU organisations. His latest publication, in *Behaviour and Information Technology*, was on computers and types of control – especially types of job autonomy – in relation to work stress and learning.

Emma Jansen is obtaining her Master's in Social and Organisational Psychology from Leiden University, with a specialisation in research. She is currently working full-time as a Research Intern in the Behavioral and Societal Sciences Department at TNO. She obtained her Bachelor's in Psychology and Middle Eastern Studies from McGill University, Canada.

This paper is a revised and expanded version of a paper entitled 'Workplace innovation and consequences for employees and organizational performance in the Netherlands' presented at the ISA 2014 World Congress of Sociology, Sociology of Work Session, Yokohama, Japan, 16 July 2014.

1 Introduction

In European countries "research programs on the implementation of new and combined interventions in the fields of work organisation, HRM and supportive technologies" (Pot, 2011) are beginning to emerge (e.g., Dhondt et al., 2014; Howaldt et al., 2012; Oeij et al., 2012, 2014; Pot, 2011). These programs are an important element of strategies for the smart, sustainable and inclusive growth of European economies (EU2020 Strategy) through higher productivity, a better quality of working life and more innovation capability. Job autonomy has been mentioned as an important factor to stimulate both a better quality of working life as well as productivity (e.g., Dhondt et al., 2014; Howaldt et al., 2012). In fact, it has been mentioned that in order to be (socially) innovative and successful, "enabling more self-organization and allowing more freedom for individual formatting of job handling" [Howaldt et al., (2012), p.71] of employees is required.

In support of the latter idea, a wealth of literature has already shown the beneficial effects of job autonomy for a long list of individual-level, employee outcomes (for overviews, see Fried and Ferris, 1987; Humphrey et al., 2007; Spector, 1986). Job autonomy is defined here as "the degree to which the job provides substantial freedom, independence, and discretion to the employee in scheduling the work and in determining the procedures to be used in carrying it out", [Hackman and Oldham, (1975), p.162]. For example, job autonomy has been found to be positively related to employee motivation, skill development, commitment, job satisfaction, well-being, and individual performance, and negatively related to stress, burnout, absenteeism, and employee turnover (see Fried and Ferris, 1987; Humphrey et al., 2007; Spector, 1986) and psychological contract breach (Oeij, 2006). Several mechanisms may underlie these effects. For example, job autonomy may enhance control over the general work environment and work-life balance, which buffers against job stressors (Karasek, 1979; Wall et al., 1996), lowers absenteeism, and enhances job satisfaction and job performance (e.g., Greenberger et al., 1989). Also, job autonomy may relate to inherent needs of people, such as the need for autonomy, which is an individual's universal urge to be a causal agent of one's own life and act in harmony with one's integrated self (Deci and Ryan, 2000, 2010) and may therefore elicit positive feelings about the job, job attitudes and actual work behaviour.

However, the beneficial effects of job autonomy have been foremost investigated for individual-level employee outcomes. Surprisingly, the specific impact of job autonomy on company-level performance outcomes has, to our knowledge, not been scrutinised. Although based on the research findings and literature suggestions it may be assumed that job autonomy also beneficially impacts organisational outcomes, such as company revenue and company profit, the empirical evidence for this idea is still scarce.

Indeed, a substantial amount of studies also exist that associate broad HRM work systems, such as high performance work systems, high commitment work practices, and

high road work practices that may contain some practices that enhance job autonomy, with company performance, innovation, and R&D investments (e.g., Huselid, 1995; Michie and Sheehan, 1999, 2001, 2005; see Appelbaum, 2000; Osterman, 1999 for discussions of high-performance work organisations). However, these systems involve views of the entire HRM system, management, and strategy at the organisational level and concern rather specific and concrete work practices (i.e., personnel selection, training, performance appraisal, employee motivation, and compensation (e.g., Huselid, 1995). These practices do not necessarily or directly assess job autonomy, which can be rather seen as an outcome of certain HRM practices and a general psychological work construct. These HRM practices and systems are also often less apparent in smaller companies (Kroon et al., 2013).

Therefore, although these results may also advocate a positive relationship between job autonomy and company performance, the specific question of whether employee job autonomy positively impacts company performance has not to our knowledge been empirically investigated. The lack of research may actually indicate that significant relationships between job autonomy and company performance are hard to establish. Indeed, it is difficult to associate employee work factors with company performance outcomes, which are influenced by many other and perhaps more salient factors (Boselie et al., 2005; Guest, 1997). However, moderating factors may also be at play. For example, the expected positive impact of job autonomy on company performance may depend on organisational factors such as company maturity. That is, it might be argued that job autonomy is especially important for young companies to be successful and grow because for example, young companies often deal with changing, stressful and challenging conditions in which it might be especially important for employees to enjoy high job autonomy in order to be able to deal with these circumstances.

In the present study, we will therefore examine the relationship between job autonomy and company performance growth (revenue, profit) and the moderating role of company maturity (young vs. older companies) in these relationships. We will investigate this by using a unique, representative study sample of 3,311 companies in the Netherlands. With our study we make several contributions. First, we aim to fill the empirical research gap on the effect of job autonomy on company performance outcomes and contribute to the HRM and organisational psychological literature. Second, we add to knowledge within the relatively small but growing entrepreneurship literature on factors that influence performance of young companies. Third, our study generates empirical and theoretical information useful for practitioners, companies, and policymakers. Learning more about the relationship between company work practices and growth possibilities for younger companies is important to battle the current economic crisis (Criscuolo, 2014). In comparison to previous crises, many more small young companies are experiencing difficulties growing. Finally, our study may stimulate debate on the current trend in the Netherlands (Van Zwieten et al., 2014) and the European Union (Lopes et al., 2014) of decreasing levels of job autonomy among employees in recent years.

In what follows, we develop our propositions about how job autonomy is expected to be related to company performance and the moderating role of company maturity in this relationship. Hereafter, we describe our methods and results. We end with a general discussion of the results and implications for theory and practice.

2 Theory and hypotheses

2.1 Job autonomy and company performance

Based on the above-mentioned beneficial individual-level outcomes (e.g., job satisfaction, commitment) of job autonomy, we expect that job autonomy is positively related to company performance indicators, such as growth of company revenue and profit. Although direct empirical evidence for a positive impact of many individual-level employee attitudes (i.e., employee motivation, job satisfaction, organisational commitment) on company performance indicators is fairly scarce, it seems plausible that hardworking, committed, and satisfied employees are important for company performance.

Empirical evidence may come from Korean research that has found positive relationships between positive work attitudes, such as job satisfaction and commitment, and organisational performance in the public sector (Kim, 2005). Moreover, research has shown that positive attitudes are associated with reduced staff turnover and superior financial performance (Ryan et al., 1996). In addition, in a meta-analysis, weak correlations at the business unit level between a composite index of employee satisfaction and engagement, and customer satisfaction, productivity, and profit were found (Harter et al., 2002). More indirect evidence comes from research investigating the effects of HRM practices, in which positive job perceptions such as employee morale (Vandenberg et al., 1999), work climate (Gelade and Ivery, 2003), positive job attitudes and motivation (Boxall and Macky, 2014; Park et al., 2003) have been found to mediate the effect of HRM practices on organisational performance.

Additionally, it can be argued that the lower levels of absenteeism and employee turnover associated with job autonomy saves company resources (money, time, effort) usually spent on replacing employees, which may benefit company performance outcomes. In support of this idea, research has demonstrated that job autonomy (i.e. job discretion) was negatively associated with quit rates and labour costs (Holman et al., 2009). In addition to this, research has found that high commitment (high autonomy) focused HRM systems have higher productivity and lower employee turnover than those with control (low autonomy) focused HRM systems (Arthur, 1994). Not surprisingly, Pot and Koningsveld (2009) argue and conclude in their review article on the relationship between quality of working life (in which job autonomy is a crucial element) and company performance that both can go together very well.

Hence, we propose the following:

Hypothesis 1 Job autonomy is positively related to both growth of company revenue (1a), and company profit (1b).

2.2 Job autonomy, company performance, and company maturity

We expect that the positive impact of job autonomy on company performance may depend on companies' maturity. With company maturity we refer to the age of companies. More specifically, in this study we define a company as being young or immature when it is five years old or younger, and an older, mature company as being six years or older. Although arbitrary to some extent, this specific cut-off point for dividing young and older companies can be understood from the findings that after reaching the

five-year milestone, companies' long-term survival rates are higher and companies add more economic value (e.g., Falck, 2007). Studies have reported that firms that survive over the longer term of five years, contribute significantly and in a more positive way to industry GDP than new, young firms that only survive for one or just a few years, and who may even contribute negatively to industry GDP (e.g., Falck, 2007). Although not fully mature yet, firms older than five years have passed their most severe market test by surviving the first years after start-up. In addition, the category of young firms up to and including five years is chosen because it is the age limit defined by the OECD for young high-growth firms (OECD, 2010).

Making a distinction between young and older companies also seems relevant to explaining the relationship between job autonomy and company performance indicators (Arthur, 1994). Specifically, we argue that job autonomy might be important for young companies to be successful and grow. Alternatively said, the expected positive effect of job autonomy on company performance growth will be stronger for young companies. We expect this for several reasons.

First, though it differs per industry, the survival rate for businesses in the first five years is discouragingly low, often with more than 50% folding within the first couple of years (Brüderl et al., 1992; Van Praag, 2003), because as Honjo (2000, p.558) has put it: "new firms often compete against dominant incumbent firms and have to invest a substantial amount of capital in introducing advanced technologies. Moreover, undesirable macroeconomic situations, such as depression, may have more severe effects on new firms which have to survive through a learning period without profit". New businesses need to learn a great deal in a short period of time; they need to gain knowledge and experience, build relationships and contacts, provide a product or service that will actually be in demand, and create a business model that can execute these plans as quickly as possible. In addition, roles, tasks, procedures and rules are not always well-defined yet, company structures, systems (e.g., IT, management), and work processes are often dealing with start-up problems, machines, other work equipment and production processes may still need to be streamlined and employees need time to learn to work together. Suffice it to say, many employees in young companies will, on average, and mostly irrespective of the job level or company type, work under more novel, changing, stressful, demanding, and challenging conditions, than their more matured counterparts. Job autonomy may help these employees to better cope with these circumstances.

Research shows that the positive effects of job autonomy (control) for lowering stress and strain are found to be especially strong in challenging, high strain work conditions (Karasek, 1979; Wall et al., 1996). It seems that in highly demanding situations it is especially important that employees have control and decision latitude in how to perform and arrange their work. Indeed, it has been argued that those with discretion and control in complex jobs can more effectively resolve problems because they have the freedom to choose strategies to deal with the situation (Frese and Zapf, 1994). The unstructured and precarious nature of the often more complex, dynamic jobs in young companies require workers to exercise judgment, decision-making and other discretionary behaviours simply in order for the startup to survive. Hence, job autonomy may facilitate better performance among employees and consequently company performance for young companies in particular.

Second, although innovation is generally regarded as a fundamental source of competitive advantage in today's increasingly changing environment (e.g., Dess and Picken, 2000; Tushman and O'Reilly, 1996), it may be even more salient for many young companies. New companies often deal with little resources, need to establish a name first, and find a niche market. This requires creativity and being inventive, adaptive and innovative. Indeed, research shows that, on average, innovative new firms perform better (e.g., Cefis and Marsili, 2005; Schneider and Veugelers, 2010; Vivarelli and Audretsch, 1998). Job autonomy may actually foster innovation and creativity. Autonomous employees feel more responsible and in control when handling challenges and problems at work. Job autonomy also provides people with more freedom and space to experiment with new, innovative behaviour and to start innovative projects. Indeed, job autonomy has been positively associated with innovative behaviour (e.g., Axtell et al., 2000; De Jong and Den Hartog, 2005; Spreitzer, 1995) and personal initiative taking, idea implementation and problem solving (Bindl and Parker, 2010). Moreover, job autonomy was found to increase ownership of problems and recognition of a wider range of skills and knowledge as important for their roles by employees (Parker, 1998; Parker et al., 1997). Hence, the impact of job autonomy for company performance may be stronger for young companies as compared to older ones because job autonomy fosters innovation, which is in particular important for young companies.

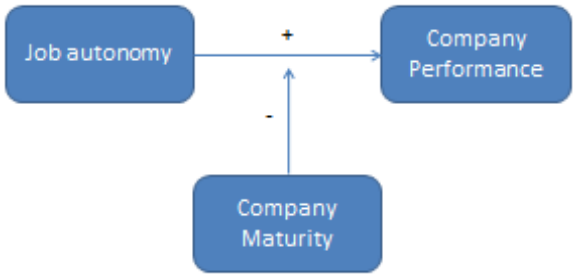
Third, as mentioned earlier, job autonomy may relate to an inherent need of people, namely, the need for autonomy (Deci and Ryan, 2000, 2010). It might be that employees who work and/or seek to work at young companies may have a higher need for (job) autonomy. It can be argued that, on average, employees working for younger companies specifically seek to work there due to the freedom they receive in their work, the multiple roles they have to perform, and the creativity that is demanded. These people might especially be more positively susceptible to having autonomy in their jobs. This may mean that they will perform better, work harder, and are more innovative when they are provided with more job autonomy.

Fourth, an indirect argument stems from small business starters, who are also self-employed employees when they start. They often start businesses because of the decisional freedoms and responsibilities with regard to the what, how, and when aspects of work. Additionally, they start businesses for the fulfilment of other motives, such as resistance towards bosses or rules (Van Gelderen and Jansen, 2006). Hence, they may find it important to create a culture that promotes autonomy among their employees as well.

In summary, job autonomy may lead to higher job and company performance for young companies especially (see Figure 1). We therefore hypothesise:

Hypothesis 2 The positive relationship between job autonomy and company revenue (2a), and company profit (2b) will be stronger for younger companies (<= 5 years) than older companies (6+ years).

Figure 1 Proposed model for the relationship between job autonomy and company performance and the moderating role of company maturity (see online version for colours)



3 Methods

3.1 Study design and sample

To test our hypotheses, we investigate the relationship between company job autonomy and company maturity (young vs. mature) with two subjectively assessed company performance indicators, namely, self-reported qualitative growth of company revenue and profit over the past two years. The validity of subjective company performance measures and the relationships with objective company performance measures have been found to be good (Wall et al., 1996). In all analyses we control for the organisational factors company size, industry, company independence (branch vs. independent company), as these often have been reported to possibly influence company performance indicators (e.g., Boselie et al., 2005; Damanpour, 2010; Delaney and Huselid, 1996; Preenen et al., 2013; Zhou et al., 2011). In addition, we control for the employee characteristics of gender, age, and higher education level, as these might be related to company outcomes (e.g. Boselie et al., 2005; Crook et al., 2011; Kim, 2005) and/or autonomous (challenging) jobs (e.g., Preenen et al., 2011).

Our study variables were derived from the Netherlands Employers Work Survey 2012 (NEWS, in Dutch: Werkgevers Enquête Arbeid 2012; Oeij et al., 2013) database gathered in late 2012. The NEWS 2012 is a large-scale, cross-sectional, biennial and representative questionnaire survey among Dutch profit and non-profit organisations at branch level. Hence, the sample involves independent organisations or branches (i.e., establishments) of larger organisations. For the NEWS 2012, a total of 14,599 organisations with at least two employees were approached through the LISA branch register, a database of Dutch companies and institutions at branch level. The sample was stratified by sector and company size. Respondents were first contacted by phone and then received a questionnaire online or in the mail. The net response consisted of 5,230 organisations (36%). The respondents were (managing) directors, owners, HR or establishment managers that answered question about their company, hence all our variables were assessed at company level. The response group is representative of the Dutch company population at branch level (for more information, see Oeij et al., 2013).

Table 1 Means, standard deviations, and correlations among study variables[1]

		M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1	Company size (2–4)[2]	0.17	0.37	1											
2	Company size (5–9)	0.19	0.39	–.21**	1										
3	Company size (10–49)	0.31	0.46	–.30**	–.32**	1									
4	Company size (50–99)	0.13	0.33	–.17**	–.18**	–.25**	1								
5	Company size (100+)	0.21	0.41	–.23**	–.25**	–.35**	–.20**	1							
6	Agriculture, forestry, and fishery	0.02	0.15	–.01	–.01	.08**	–.03	–.05**	1						
7	Industry	0.23	0.42	–.08**	–.07**	.02	.09**	.04*	–.09**	1					
8	Construction	0.09	0.28	–.03	–.02	.02	.02	.01	–.05**	–.17**	1				
9	Trade	0.20	0.40	.07**	.08**	–.06**	–.04*	–.04*	–.08**	–.27**	–.15**	1			
10	Hotel and catering	0.06	0.23	–.05**	–.02	.03	.00	.03	–.04*	–.13**	–.08**	–.12**	1		
11	Transport and communication	0.09	0.28	–.02	–.02	–.02	.04*	.03	–.05**	–.17**	–.10**	–.15**	–.08**	1	
12	Financial services	0.04	0.20	.01	.00	–.01	–.01	.01	–.03	–.11**	–.06**	–.10**	–.05**	–.06**	1
13	Commercial services	0.19	0.39	.02	.03	–.02	–.02	–.01	–.08**	–.26**	–.15**	–.24**	–.12**	–.15**	–.10**
14	Education	0.02	0.14	.03	–.01	.04*	–.03	–.03*	–.02	–.08**	–.05**	–.07**	–.04*	–.05**	–.03
15	Healthcare and welfare	0.03	0.17	.01	.03	.03	–.04*	–.03	–.03	–.10**	–.06**	–.09**	–.04*	–.06**	–.04*
16	Other services	0.04	0.19	.08**	.00	–.03	–.05**	–.01	–.03	–.11**	–.06**	–.10**	–.05**	–.06**	–.04*
17	Company independence[3]	0.57	0.50	.24**	.16**	.05**	–.15**	–.31**	.07**	–.05**	.08**	–.07**	.02	.00	–.03
18	Gender (% male)	64.25	30.15	–.11**	–.07**	.03	.09**	.05**	.04*	.17**	.27**	–.12**	–.17**	.10**	–.09**
19	Employee age (% < 24)	16.23	21.03	–.03	.04*	.03	–.05**	.00	.05**	–.16**	–.05**	.17**	.27**	–.03*	–.08**
20	Employee age (%25–44)	46.56	24.36	–.03	.03	.10**	–.03	–.09**	–.01	–.05**	–.01	–.09**	–.08**	.00	.04*
21	Employee age (%45–54)	25.28	20.37	–.01	–.03	–.09**	.07**	.08**	–.01	.15**	.04*	–.05**	–.11**	–.01	.05**
22	Employee age (%55+)	11.98	15.06	.10**	–.05**	–.07**	.02	.03	–.04*	.11**	.03	–.02	–.11**	.06**	–.01
23	Higher education (%)	23.24	29.45	–.01	–.03	–.02	.02	.03*	–.08**	–.10**	–.15**	–.14**	–.08**	–.10**	.09**
24	Job autonomy	3.37	0.80	.09**	.07**	.05**	–.09**	–.13**	–.04*	–.05**	.01	–.04*	–.07**	–.04*	.03
25	Company maturity[4]	0.92	0.27	–.08**	–.02	.00	.05**	.05**	.03	.06**	.03	–.02	–.02	.01	–.02
26	Company revenue	2.99	0.99	–.08**	–.03	.01	.01	.09**	.01	.01	–.07**	.00	–.03	.01	.02
27	Company profit	2.85	1.01	–.04*	0.00	–.02	–.03	.09**	–.02	.01	–.10**	.01	–.02	–.01	.04*
	N			3,247	3,247	3,247	3,247	3,247	3,247	3,247	3,247	3,247	3,247	3,247	3,247

Notes: [1]Variables 1–17 and 25 are dummy variables. [2]1 = included. [3]0 = branch, 1 = independent. [4]0 = 1–5 years, 1 = >6 years. †p < .10, *p< .05, **p < .01.

Table 1 Means, standard deviations, and correlations among study variables[1] (continued)

		M	*SD*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*
13	Commercial services	0.19	0.39	1														
14	Education	0.02	0.14	–.07**	1													
15	Healthcare and welfare	0.03	0.17	–.09**	–.03	1												
16	Other services	0.04	0.19	–.09**	–.03	–.03*	1											
17	Company independence	0.57	0.50	.01	.04*	.00	.03	1										
18	Gender (% male)	64.25	30.15	.04*	–.08**	–.28**	–.19**	–.02	1									
19	Employee age (% < 24)	16.23	21.03	–.10**	–.01	–.03	.09**	.05**	–.16**	1								
20	Employee age (%25–44)	46.56	24.36	.17**	–.04*	.06**	.01	–.02	–.01	–.38**	1							
21	Employee age (%45–54)	25.28	20.37	–.05**	.03	–.01	–.08**	–.04*	.10**	–.38**	–.52**	1						
22	Employee age (%55+)	11.98	15.06	–.06**	.05**	–.05*	–.03	.02	.10**	–.28**	–.39**	.01	1					
23	Higher education (%)	23.24	29.45	.42**	.14**	.06**	–.06**	–.10**	–.04*	–.14**	.19**	–.05**	–.05**	1				
24	Job autonomy	3.37	0.80	.16**	.07**	–.03	–.03	.10**	.06**	–.09**	.08**	.00	.00	.22**	1			
25	Company maturity (dummy)	0.92	0.27	–.05**	–.03	–.04*	.00	–.03	.04*	–.09**	–.03	.10**	.05**	–.07**	–.05**	1		
26	Company revenue	2.99	0.99	.03	.03	.00	–.01	–.06**	.03	.06**	.08**	–.09**	–.09**	.10**	.04*	–.11**	1	
27	Company profit	2.85	1.01	.05**	.03	.00	.00	–.06**	–.02	.03	.08**	–.07**	–.08**	.11**	.03†	–.10**	.81**	1
	N			3,247	3,247	3,247	3,247	3,247	3,168	3,159	3,159	3,159	3,159	3,145	3,176	3,247	3,205	3,204

Notes: [1]Variables 1–17 and 25 are dummy variables. [2]1 = included. [3]0 = branch, 1 = independent. [4]0 = 1–5 years, 1 = >6 years. †$p < .10$, *$p < .05$, **$p < .01$.

Because we aim to predict performance of companies (i.e., profit organisations), we removed non-profit organisations. (N = 1536) from the NEWS sample. Moreover, we excluded companies younger than two years old (N = 79), because no useful company performance measures were available. Company performance and financial data from firms established less than two years ago is often not available (Koski and Pajarinen, 2013). We deleted participants with missing variables (N = 304), which resulted in a base data sample of 3,311 companies and with which we tested our hypotheses. We used list wise deletion of missing values. Specific N's for each analysis are reported in the accompanying tables.

Of the respondents, 49% were managing director or owner, 30% HR-manager or HR-head, 12% establishment manager, and 9% had a different job function or no information was available. Absolute company sizes ranged from 2 to 6,750 employees (*mean* = 78.65, *SD* = 267.18). The company size category was quite evenly divided with the lowest percentage in the 50–99 employees category (13%) and the highest percentage in the 10–49 employees category (31%). For sector we found the lowest percentage of companies in agriculture, forestry and fishery, and education (2%). The highest percentage of companies was found in industry (23%). All descriptives (M, SD) and/or distributions of organisational age and size, industry, company independence and the other study variables are shown in Table 1.

3.2 Measures

3.2.1 Job autonomy

Job autonomy (at company level) was measured with three items derived from the job content questionnaire (JCQ; Karasek, 1985; Karasek et al., 1998) that assessed to what extent respondents' employees had experienced decision latitude in

1 their working methods

2 scheduling their work

3 solving problems and disruptions in their work.

Respondents rated these items on a five-point scale ranging from 1 (not at all) to 5 (to a very large extent). Internal consistency was .80.

3.2.2 Company maturity

To distinguish between young and mature companies, we developed a dummy variable (company maturity) in which we labelled 0 (young, 1–5 years) and 1 (mature, 6 years and older) to test our hypotheses. In earlier studies on new firm growth, similar company ages for young companies have been used (e.g., Koski and Pajarinen, 2013; Stam and Wennberg, 2009).

3.2.3 Company performance

Company performance was assessed by asking respondents about the growth of

1 *organisational revenue*

2 *organisational profit*

in the past two years.

Respondents rated the two items on a five-point scale ranging from 1 (strongly decreased) to 5 (strongly increased). Similar measures for organisational performance have been used in earlier studies (e.g., Oeij et al., 2011, 2012, 2014). Both indicators will be treated as separate indicators in our analyses.

3.2.4 Control variables

Our control variables were measured as follows:

- *company size* (dummy categories, 1 = included):
  1 2–4
  2 5–9
  3 10–49
  4 50–99
  5 100+ employees
- *Industry* (dummy categories, 1 = included):
  1 agriculture, forestry, and fishery
  2 industry
  3 construction
  4 trade – i.e., wholesale and retail
  5 hotel and catering
  6 transport and communication
  7 financial services
  8 commercial services
  9 education
  10 healthcare and welfare
  11 other services – i.e., culture industry
- *Company independence* (0 = branch, 1 = independent company)
- *Gender* (0 = female, 1 = male),
- *Employee age* (percentage categories:
  1 < 24
  2 25–44
  3 45–54
  4 55+ years
- *Higher education level* (percentage of bachelor's degree or higher) of employees.

Table 2 Regression analyses predicting company performance[1]

		Company revenue growth						*Company profit growth*					
		Model 1		*Model 2*		*Model 3*		*Model 1*		*Model 2*		*Model 3*	
Control variables[2]													
1	Company size (2–4)	–0.11	***	–0.12	***	–0.12	***	–0.07	**	–0.07	**	–0.08	***
2	Company size (5–9)	–0.1	***	–0.11	***	–0.11	***	–0.06	*	–0.06	*	–0.07	**
3	Company size (10–49)	–0.09	***	–0.10	***	–0.1	***	–0.1	***	–0.1	***	–0.1	***
4	Company size (50–99)	–0.05	*	–0.05	*	–0.05	*	–0.08	***	–0.08	***	–0.08	***
5	Agriculture, forestry, and fishery	0.01		0.01		0.01		–0.02		–0.02		–0.01	
6	Construction	–0.08	***	–0.08	***	–0.08	***	–0.1	***	–0.1	***	–0.1	***
7	Trade	0.01		0.00		0.00		–0.01		–0.01		–0.01	
8	Hotel and catering	–0.05	*	–0.05	*	–0.05	*	–0.04		–0.04		–0.04	
9	Transport and communication	0.00		0.00		0.00		–0.02		–0.02		–0.03	
10	Financial services	0.01		0.00		0.00		0.01		0.01		0.01	
11	Commercial services	–0.02		–0.03		–0.03		–0.02		–0.02		–0.03	
12	Education	0.03	†	0.03		0.03		0.02		0.02		0.02	
13	Healthcare and welfare	0.00		0.00		0.00		–0.01		–0.01		–0.02	
14	Other services	–0.01		–0.01		–0.01		–0.01		–0.01		–0.01	
15	Company independence	0.00		0.00		–0.01		–0.02		–0.02		–0.02	
16	Gender (% male)	0.06	**	0.05	*	0.05	*	0.01		0.01		0.01	
17	Employee age (% < 24)	0.14	***	0.14	***	0.14	***	0.1	**	0.1	**	0.09	**
18	Employee age (% 25–44)	0.14	***	0.14	***	0.14	***	0.13	***	0.13	***	0.12	***
19	Employee age (% 45–54)	0.02		0.02		0.02		0.02		0.02		0.02	
20	Higher education (%)	0.09	***	0.07	**	0.07	**	0.09	***	0.09	***	0.08	***

Notes: [1]Standardised regression coefficients (β's) are reported for multiple hierarchical regression analyses in which control variables are added in the first step, job autonomy and company maturity in the second step, and the interaction term (Job autonomy * Organisational size) in the third step of the model. Variables 1–15 and 22 are dummy variables.
[2]The reference categories are 100+ for company size and industry for sector. For employee age category 55+ is excluded to avoid multicollinearity.
[3]Job autonomy was centred around its mean (Aiken and West, 1991).
[4]0 = 1–5 years, 1 = >6 years. †p < .10, *p < .05, **p < .01, ***p< .001.

Table 2 Regression analyses predicting company performance (continued)[1]

		Company revenue growth						Company profit growth					
		Model 1		*Model 2*		*Model 3*		*Model 1*		*Model 2*		*Model 3*	
Predictor variables													
21	Job autonomy[3]			0.04	*	0.17	**			0.02		0.14	*
22	Company maturity[4]			–0.10	***	–0.09	***			–0.08	***	–0.08	***
Interaction variable													
23	Job autonomy * Organisational maturity					–0.13	*					–0.13	*
	R^2	.05	***	.06	***	.06	***	.04	***	.05	***	.05	***
	R^2 change	.05	***	.01	***	.001	*	.04	***	.01	***	.001	*
	F	7.59	***	8.60	***	8.41	***	6.81	***	7.28	***	7.16	***
	df	20, 3044		22, 3042		23, 3041		20, 3042		22, 3040		23, 3039	
	N			3065						3063			

Notes: [1]Standardised regression coefficients (β's) are reported for multiple hierarchical regression analyses in which control variables are added in the first step, job autonomy and company maturity in the second step, and the interaction term (Job autonomy * Organisational size) in the third step of the model. Variables 1–15 and 22 are dummy variables.
[2]The reference categories are 100+ for company size and industry for sector. For employee age category 55+ is excluded to avoid multicollinearity.
[3]Job autonomy was centred around its mean (Aiken and West, 1991).
[4]0 = 1–5 years, 1 = >6 years. †p < .10, *p < .05, **p < .01, ***p< .001.

4 Results

4.1 Descriptives and correlations

In Table 1, we provide descriptive statistics (means and standard deviations) and correlation coefficients of all the study variables of our study. Job autonomy was positively related to company revenue ($r = .04$, $p < .05$) and marginally positively related to profit ($r = .03$, $p < .10$). Company maturity was negatively related to both company revenue ($r = –.11$, $p < .01$) and profit ($r = –.10$, $p < .01$).

4.2 Hypotheses testing

We tested our hypotheses through hierarchical moderated multiple regression analyses in which the control variables were added in the first step (Model 1), predictors (job autonomy and company maturity) in the second step (Model 2), and the interaction variable (Job autonomy * Organisational maturity) in the third step of our regression model (Model 3). The results are displayed in Table 2. Together the control variables, job autonomy and company maturity, and the interaction term explained 6% of the variance in company revenue ($R^2 = .06$, $F(23, 3{,}041) = 8.41$, $p < .001$), and 5% in profit ($R^2 = .05$, $F(23, 3{,}039) = 7.16$, $p < .001$).

4.2.1 Control variables

The control variables (Model 1) explained 5% of the variance in revenue ($R^2 = .05$, $F(20, 3{,}044) = 7.59$, $p < .001$), and 4% in profit ($R^2 = .04$, $F(20, 3{,}042) = 3.03$, $p < .001$). One interesting finding worth mentioning is that higher education level was positively related to both company revenue ($\beta = 0.09$, $p < .001$) and profit ($\beta = .009$, $p < .001$). This was also the case in Models 2 and 3 (p's < .05).

4.2.2 Main effects

R^2 change for the addition of job autonomy and company maturity in the regression models (Model 2 over 1) was 1% for revenue (R^2 change = .01, $F(22, 3{,}042) = 8.60$, $p < .001$), and 1% for profit (R^2 change = .01, $F(22, 3{,}040) = 7.28$, $p < .001$).

As can be seen in Table 2 (Model 2) job autonomy was positively related to company revenue ($\beta = 0.04$, $p = .05$) but unrelated to profit ($\beta = 0.02$, n.s.). Hence, Hypothesis 1a is supported but Hypothesis 1b is not. Additionally (non-hypothesised), it was found that company maturity was negatively related to company revenue ($\beta = –0.10$, $p = .001$) and profit ($\beta = –0.08$, $p = .001$).

4.2.3 Interaction effect[1]

R^2 change for the addition of the interaction term of job autonomy and company age in the regression model (Model 2 over 1) was .001% for revenue (R^2 change = .001, $F(23, 3{,}041) = 8.41$, $p < .05$), and .001% for profit (R^2 change = .001, $F(1, 365) = 7.16$, $p < .05$).

Figure 2 Interaction effect of job autonomy and company maturity on company revenue growth (see online version for colours)

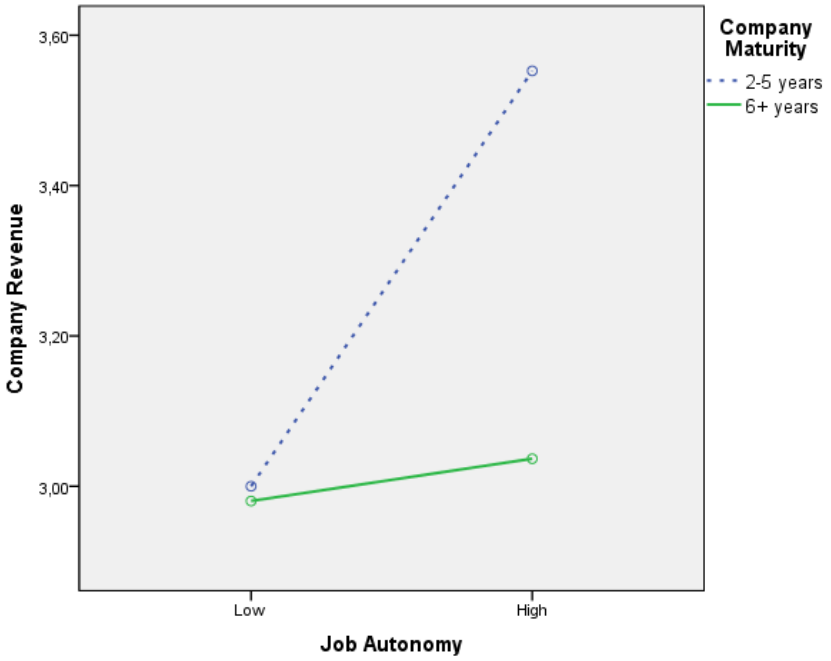
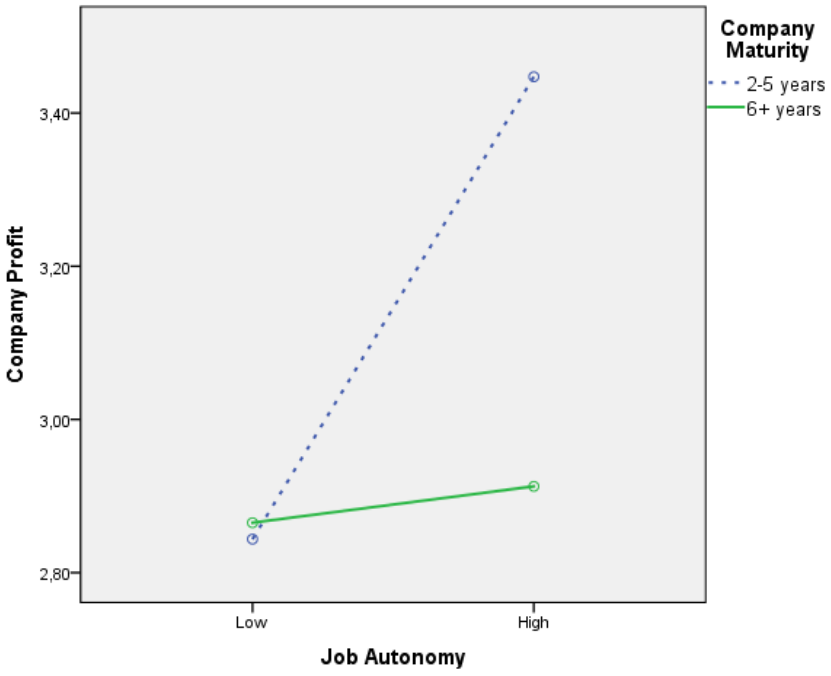


Figure 3 Interaction effect of job autonomy and company maturity on company profit growth (see online version for colours)



The interaction terms were, as expected, significantly related to company revenue (β = –0.13, p < .05) and profit (β = –0.13, p < .05). The interactions are plotted in Figures 2 and 3 with job autonomy plotted with one standard deviation below and above the mean (Aiken and West, 1991). Simple slope (simple effect) analyses for revenue revealed that the slope for young company maturity (1–5 years) was significant (β = 0.21, t = 2.71, p < .01) and the slope for older company maturity (6+ years) was not significant (β = 0.04, t = 1.27, n.s.). Moreover, simple slope analyses for profit showed that the slope for young company maturity (1–5 years) was significant (β = 0.18, t = 2.32, p < .05) and the slope for older company maturity (6+ years) was not significant (β = 0.01, t = 0.32, p < n.s.). This indicates that the positive effect of job autonomy on company revenue and company profit seems only apparent for younger companies. This also indicates that the confirmed positive relationship between job autonomy and company revenue in Model 2 (Hypothesis 1) is qualified by the interaction effect. All in all, research findings did not support our hypothesised main effects but did support our theorised interaction effects. Hence, Hypotheses 2a and 2b are partly supported.

6 Discussion

We investigated the relationship between employees' job autonomy and self-reported company performance (growth of turnover, profit) and the moderating role of company maturity among 3,311 companies in the Netherlands. We found a weak positive relationship between job autonomy and company revenue but no main relationship between job autonomy and company profit. Although unexpected, this seems in line with the current state of research in which to date no direct relationship has been reported between job autonomy and company-level performance measures. An explanation may lie in the notion that, in general, it is hard to relate employee work attitudes with distal (financial) company performance outcomes as they are influenced by many other (external) important factors (Boselie et al., 2005; Guest, 1997; Oeij et al., 2010).

However, we did find, as theorised, that company maturity (young vs. older companies) moderates the relationship between job autonomy and company performance. Specifically, it was found that job autonomy is positively related to subjective growth of company revenue and profit only for young companies (1–5 years old). Apparently, job autonomy matters only for young companies in boosting organisational performance growth. We replicated our interaction effects for three individual-level performance indicators (motivation to learn, commitment, quality of the work). However, we found strong significant main effects of job autonomy on all three indicators, which is consistent with the reported beneficial effects of job autonomy for individual-level job attitudes (for overviews, see Fried and Ferris, 1987; Humphrey et al., 2007). Hence, job autonomy indeed seems to be positively related to employee-level performance, but this is stronger for employees working at young companies.

Interestingly, the percentage of employees with higher education was positively related to both company revenue and profit growth in all our regression models irrespective of company maturity. This finding is in line with earlier human capital research that positively associates education level with company performance outcomes (see Crook et al., 2011). So, it seems that the more highly educated employees are working for a company the better these companies perform.

5.1 Empirical and theoretical contributions

Our study offers several contributions to the organisational-psychological, HRM, and entrepreneurship literature. First, research on job autonomy and company-level performance outcomes is still surprisingly scarce. By showing that job autonomy is indeed also positively associated with company performance, but only for young companies aged two to five years old, we add to empirical knowledge on the organisational outcomes of the popular work construct job autonomy.

Second, we add to theoretical knowledge by proposing explanations for what drives the latter effect. To sum up, we argued that job autonomy matters especially for young companies' performance because

1 young companies in particular operate in dynamic and demanding situations in which job autonomy is highly beneficial
2 autonomy drives innovative behaviour, which is especially important for young, developing companies
3 job autonomy relates to autonomy needs that may be especially high for employees working at young companies.

These theoretical arguments may be further explored to fully understand the mechanisms underlying our findings.

Third, we contribute to the scarce but expanding literature on young high-growth firms often referred to as gazelle companies or gazelles (e.g., Bos and Stam, 2014; Garnsey et al., 2006; Henrekson and Johansson, 2010; Koski and Pajarinen, 2013; Stam and Wennberg, 2009). Despite a lack of consensus on the definition of a gazelle in the literature (Henrekson and Johansson, 2010; Koski and Pajarinen, 2013), the OECD has defined a gazelle as firms less than five years old with ten or more employees at the beginning of the observation period, and average employment growth exceeding 20% over a three-year period (Ahmad, 2006; Henrekson and Johansson, 2010). Evidence suggests that new ventures with the greatest impact on the wider economy are those that achieve high growth and create employment (see Henrekson and Johansson 2010; OECD 2010). Innovative start-ups are an important driver of economic growth in capitalist economies (Baumol, 2002; Stam and Wennberg, 2009). This means that we need to gain insights into which factors contribute to young companies' growth (Koski and Pajarinen, 2013), like we did. Although we did not specifically investigate gazelle companies, we did focus on young companies that survived the first two years, and perhaps a relatively successful group of young companies, given that many start-up companies will not survive their first two years. Hence, our findings may provide new insights for the entrepreneurship literature on gazelle companies.

Fourth, our findings contribute to the (strategic) HRM literature regarding high performance work systems, high commitment work practices, and high road work practices that often contain practices (e.g., active jobs, flexible working, self-organisation) that are meant to enhance or lead to job autonomy and which are linked with company performance, innovation, and R&D investments (e.g., Huselid, 1995; Michie and Sheehan, 1999, 2001, 2005; see Appelbaum, 2000; Osterman, 1999 for discussions of high-performance work organisations). In general, the research that we conducted, in which we combine micro (employee) level HR domains with organisational (meso) outcomes, is scarce but has been encouraged in the past (e.g., Huselid and Becker,

2011; Wright and Boswell, 2002). We positively linked a manageable employee factor, job autonomy, to company performance for young companies. This may indicate that autonomy enhancing HRM work systems and practices are most effective for young companies. Future research could further scrutinise the specific effects of autonomy-enhancing work practices for young companies.

5.2 Limitations

Although the validity and robustness of our findings suffice in rigour, this study is not without limitations. First, our findings are based on self-report data from one source, which may have led to common method bias (Podsakoff et al., 2003). The use of self-reports as indicators of the objective environment may decrease measurement accuracy (Spector and Jex, 1991), which may especially be the case for our performance indicators. However, the variables were retrieved from (managing) directors, owners, HR or establishment managers, who can be expected to properly estimate their companies' performance growth and employees' job autonomy. In addition, the validity of subjective company performance measures and their relationship to objective company performance measures have been found to be good (Wall et al., 2004). Also, there exists considerable evidence showing that perceptual measures do reflect the objective work environment (Spector, 1992). Therefore, we believe that the use of self-report data may not have seriously limited the reliability of our measures and the validity of our findings. Nevertheless, future studies should try to include objective indicators and measures of company performance (Boselie et al., 2005) and, if possible, employee-assessed job autonomy to increase the measurement accuracy and avoid common method bias (Podsakoff et al., 2003).

Second, our data is based on cross-sectional data, which cannot provide conclusive evidence for our proposed causal relationships. It may still be the case that high job autonomy is rather an indicator of young companies that perform well than that job autonomy leads to better company performance, or both. Although the results are supported by theoretical reasoning and previous empirical research findings, additional longitudinal studies and field experiments are needed to provide conclusive evidence.

Third, while company performance and growth was measured over the last two years (2010–2012), we measured for current job autonomy (year 2012). The question then is whether job autonomy has remained stable over the past years in the Netherlands as this may have influenced our results. Although we did not find studies that compared job autonomy over the years in the specific time period between 2010 and 2012,a report on the European Working Conditions Survey (Eurofound, 2013), however, indicates that employee involvement and task discretion (in other words, job autonomy) have, in the Netherlands at least, remained stable across 2005 and 2010. Moreover, we performed robustness tests (see Footnote 1) for our findings for relevant employee outcomes as dependent variables, assessed at the organisational level and in the year 2012, and found similar results. This provides some evidence that job autonomy has remained stable in the Netherlands and that our findings are robust.

Fourth, we conducted our study using data from the Netherlands in one specific period. Hence, this study's single country and time setting could limit the generalisability of the findings to other countries and time periods. Our study could be repeated in samples from other countries and time periods to account for this.

Fifth, not all companies are equally able or willing to allow employee autonomy, regardless of their age. Companies within different sectors may differ in the nature of their structure and need for employee innovation. A more thorough study into which companies within which sectors benefit most from job autonomy may be in order.

Finally, the explained variances that we found were significant but rather small, which indicates that the direct additional impact of job autonomy on our company performance indicators is limited. It is generally very difficult, however, to associate employee work constructs and factors with distal (financial) company performance outcomes because they are influenced by many other (external) important factors (Boselie et al., 2005; Guest, 1997), such as the greater economic and market climate. So, from an empirical and theoretical perspective, establishing a new relationship in which several relevant organisational and employee control variables have been included does matter. It also matters from a practical perspective. First, small effect sizes can be of great practical value (Prentice and Miller, 1992), especially when they concern crucial organisational outcomes such as company revenue and profit growth. Second, job autonomy is something that, to some extent, is under the control of companies and managers. Though other factors influencing company performance may have a higher impact, they are often impossible to control. Notwithstanding, using more proximal outcome indicators like we did in our robustness test (see Results section), particularly those over which employees might exert more influence, might be interesting to include in future research.

5.2 Future research

We would like to address some other venues for future research. First, in the current study, we implicitly assumed a linear relationship between job autonomy and company performance in which job autonomy leads to better performance (i.e., for young companies). However, under certain circumstances job autonomy could have less positive or even negative consequences for employees and companies. For instance, it has been suggested that some employees can either be insensitive or react negatively to too much autonomy (Katz, 1978). Too much freedom may lead to an environment in which employees actually lose control of situations, make wrong decisions due to a lack of guidance, and feel over-challenged and 'self-exploited'. It has been argued that too much job challenge increases incidences of job failure across employees (Preenen et al., 2011), which may lead to several negative psychological and organisational consequences (Taylor, 1981). Hence, future research should scrutinise when job autonomy will elicit negative consequences for employees and their organisations.

Whether job autonomy has negative effects on employees might depend on individual differences in beliefs about their abilities (Bandura, 1997). People tend to set non-challenging, goals in their work tasks when their task self-efficacy is low and generally pursue challenging, difficult goals when their task self-efficacy is high (Bandura, 1986; Wofford et al., 1992). Individuals who have low self-efficacy beliefs may perceive high job autonomy as a threat because they believe they lack the capacity to fulfil their work. Alternatively, team research has found that the performance of teams with high individual autonomy could suffer, if the team is not properly monitored on progress and meeting deadlines (Langfred, 2004). Hence, investigating the interaction between performance monitoring and job autonomy might also be interesting.

Finally, while we used only the self-reported measures of company level outcomes, it may be interesting to differentiate between company-level outcomes (performance, innovation, profit) and employee-level outcomes. It could be that the relationship between autonomy and performance is even stronger at the employee level, given that the relationship would presumably be more direct. It may even be plausible to check if performance at the employee level acts as a partial mediator between job autonomy and company performance. Furthermore, while we limited our research to new companies, it would be reasonable to assume that older companies going through restructuring or being broken up into smaller parts, would also constitute stressful settings in which adaptability and autonomy may be especially important. Research could be done to look into this potential extension of our findings.

5.3 Practical implications

Based on our study findings, as well as the wealth of earlier research showing the positive effects of job autonomy for individuals (for overviews, see Fried and Ferris, 1987; Humphrey et al., 2007; Spector, 1986), we believe it is warranted to urge policy-makers, practitioners, company owners, and managers to create autonomous jobs and challenging work environments for their employees. This call seems especially important because there is a current downward trend of job autonomy among employees in both the Netherlands (Van Zwieten et al., 2014) and the European Union (Lopes et al., 2014).

To create autonomous and active jobs, companies and managers in particular (Preenen et al., 2014a, 2014b) could delegate challenging work assignments, responsibilities and decision latitude, enrich jobs, and increase employees' self-management and self-organisation of work by allowing (more) flexible working hours and working from different places, job rotation (Preenen et al., 2015, in press), and/or installing autonomous work teams. Although the latter may seem more applicable to high-skill jobs, employees in low-skill jobs may also involve themselves in certain extra-role behaviours that are not part of their formal job requirements (Bateman and Organ, 1983). Such challenging activities that go beyond their regular tasks are, for example, helping and coaching co-workers, replacing supervisors if needed, solving problems at work, maintaining the workplace and equipment, protecting and conserving organisational resources or organising social events.

In addition, policymakers could develop rules, policies and infrastructures that stimulate companies to create such autonomous jobs (Dhondt et al., 2014). Finally, employees themselves should also take responsibility for creating their own job autonomy. Indeed, many career literatures emphasise employees' own responsibilities in planning and directing their jobs and careers (e.g., Preenen et al., 2015; Van Vianen et al., 2008). Jobs at young companies may be especially suitable to enlarge one's job autonomy, not only because they might enhance company performance but also because these jobs are often not yet fully standardised nor bounded by limitations and rules.

Acknowledgements

This research was supported by a grant from TNO's Behaviour and Performance Enabling Technology Program (ETP) 2014.

References

Aiken, L.S. and West, S.G. (1991) *Multiple Regression: Testing and Interpreting Interactions*, Newbury Park, London, Sage.

Ahmad, N. (2006) *A proposed Framework for Business Demographic Statistics*, OECD Statistics Working Paper Series, STD/DOC(2006)3, Paris.

Appelbaum, E. (Ed.) (2000) *Manufacturing Advantage: Why High-Performance Work Systems Pay Off*, Cornell University Press, Ithaca, NY.

Arthur, J.B. (1994) 'Effects of human resource systems on manufacturing performance and turnover', *Academy of Management Journal*, Vol. 37, No. 3, pp.670–687.

Axtell, C.M., Holman, D.J., Unsworth, K.L., Wall, T.D., Waterson, P.E. and Harrington, E. (2000) 'Shopfloor innovation: facilitating the suggestion and implementation of ideas', *Journal of Occupational and Organizational Psychology*, Vol. 73, No. 3, pp.265–285.

Bandura, A. (1986) *Social Foundations of Thought and Action*, Prentice-Hall, Englewood Cliffs, NJ.

Bandura, A. (1997) *Self-Efficacy: The Exercise of Control*, Freeman, New York.

Bateman, T.S. and Organ, D.W. (1983) 'Job satisfaction and the good soldier: the relationship between affect and employee citizenship', *Academy of Management Journal*, Vol. 26, No. 4, pp.587–595.

Baumol, W.J. (2002) *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*, Princeton University Press, Princeton, New Jersey.

Bindl, U.K. and Parker, S.K. (2010) 'Proactive work behaviour: forward-thinking and change-oriented action in organizations', in Zedeck, S. (Ed.): *APA Handbook of Industrial and Organizational Psychology*, pp.567–598, American Psychological Association, Washington, USA.

Bos, J.W. and Stam, E. (2014) 'Gazelles and industry growth: a study of young high-growth firms in The Netherlands', *Industrial and Corporate Change*, Vol. 23, No. 1, pp.145–169.

Boselie, P., Dietz, G. and Boon, C. (2005) 'Commonalities and contradictions in HRM and performance research', *Human Resource Management Journal*, Vol. 15, No. 3, pp.67–94.

Boxall, P. and Macky, K. (2014) 'High-involvement work processes, work intensification and employee well-being', *Work, Employment & Society*, Vol. 28, No. 6, pp.963–984.

Brüderl, J., Preisendörfer, P. and Ziegler, R. (1992) 'Survival chances of newly founded business organizations', *American Sociological Review*, Vol. 57, No. 2, pp.227–242.

Cefis, E. and Marsili, O. (2005) 'A matter of life and death: innovation and firm survival', *Industrial and Corporate Change*, Vol. 14, No. 6, pp.1167–1192.

Criscuolo, C., Gal, P.N. and Menon, C. (2014) *The Dynamics of Employment Growth: New Evidence from 18 Countries*, OECD Science, Technology and Industry Policy Papers, No. 14, OECD Publishing, France.

Crook, T.R., Todd, S.Y., Combs, J.G., Woehr, D.J. and Ketchen Jr., D.J. (2011) 'Does human capital matter? A meta-analysis of the relationship between human capital and firm performance', *Journal of Applied Psychology*, Vol. 96, No. 3, p.443.

Damanpour, F. (2010) 'An integration of research findings of effects of firm size and market competition on product and process innovations', *British Journal of Management*, Vol. 21, No. 4, pp.996–1010.

De Jong, J.P. and Den Hartog, D. (2010) 'Measuring innovative work behaviour', *Creativity and Innovation Management*, Vol. 19, No. 1, pp.23–36.

Deci, E.L. and Ryan, R.M. (2000) 'The" what" and" why" of goal pursuits: human needs and the self-determination of behavior', *Psychological Inquiry*, Vol. 11, No. 4, pp.227–268.

Deci, E.L. and Ryan, R.M. (2010) 'Self-determination', in Weiner, I.B. and Craighead, W.E. (Eds.): *Corsini Encyclopedia of Psychology*, 4th ed., John Wiley & Sons, Inc., New York, USA.

Delaney, J.T. and Huselid, M.A. (1996) 'The impact of human resource management practices on perceptions of organizational performance', *Academy of Management Journal*, Vol. 39, No. 4, pp.949–969.

Dess, G.G. and Picken, J.C. (2000) 'Changing roles: leadership in the 21st century', *Organizational Dynamics*, Vol. 28, No. 3, pp.18–34.

Dhondt, S., Pot, F.D. and Kraan, K.O. (2014) 'The importance of organizational level decision latitude for well-being and organizational commitment', *Team Performance Management*, Vol. 20, Nos. 7/8, pp.307–327.

Eurofound (2013) *Work organisation and employee involvement in Europe: A report based on the fifth European Working Conditions Survey*, Publications Office of the European Union, Luxembourg.

Falck, O. (2007) 'Mayflies and long-distance runners: the effects of new business formation on industry growth', *Applied Economics Letters*, Vol. 14, No. 12, pp.919–922.

Frese, M. and Zapf, D. (1994) 'Action as the core of work psychology: a German approach', in Triandis, H.C., Dunnette, M.D. and Hough, J.M. (Eds.): *Handbook of Industrial and Organizational Psychology*, 2nd ed., Vol. 4, pp.271–340, Consulting Psychologists Press, Palo Alto, CA.

Fried, Y. and Ferris, G.R. (1987) 'The validity of the job characteristics model: a review and meta-analysis', *Personnel Psychology*, Vol. 40, No. 2, pp.287–322.

Garnsey, E., Stam, E. and Heffernan, P. (2006) 'New firm growth: exploring processes and paths', *Industry and Innovation*, Vol. 13, No. 1, pp.1–20.

Gelade, G.A. and Ivery, M. (2003) 'The impact of human resource management and work climate on organizational performance', *Personnel Psychology*, Vol. 56, No. 2, pp.383–404.

Greenberger, D.B., Strasser, S., Cummings, L.L. and Dunham, R.B. (1989) 'The impact of personal control on performance and satisfaction', *Organizational Behavior and Human Decision Processes*, Vol. 43, No. 1, pp.29–51.

Guest, D.E. (1997) 'Human resource management and performance: a review and research agenda', *International Journal of Human Resource Management*, Vol. 8, No. 3, pp.263–276.

Hackman, J.R. and Oldham, G.R. (1975) 'Development of the job diagnostic survey', *Journal of Applied Psychology*, Vol. 60, No. 2, p.159.

Harter, J.K., Schmidt, F.L. and Hayes, T.L. (2002) 'Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis', *Journal of Applied Psychology*, Vol. 87, No. 2, p.268.

Henrekson, M. and Johansson, D. (2010) 'Gazelles as job creators: a survey and interpretation of the evidence', *Small Business Economics*, Vol. 35, No. 2, pp.227–244.

Holman, D., Frenkel, S., Sørensen, O. and Wood, S. (2009) 'Work design variation and outcomes in call centers: strategic choice and institutional explanations', *Industrial and Labor Relations Review*, Vol. 62, No. 4, pp.510–532.

Honjo, Y. (2000) 'Business failure of new firms: an empirical analysis using a multiplicative hazards model', *International Journal of Industrial Organization*, Vol. 18, No. 4, pp.557–574.

Howaldt, J., Kopp, R. and Pot, F.D. (2012) 'Workplace innovation for better jobs and performance. The most important developments in modern working environments', in Jeschke, S., Hees, F., Richert, A. and Trantow, S. (Eds.): *Prethinking Work: Insights on the Future of Work*, pp.71–72, LIT-Verlag, Münster.

Humphrey, S.E., Nahrgang, J.D. and Morgeson, F.P. (2007) 'Integrating motivational, social, and contextual work design features: a meta-analytic summary and theoretical extension of the work design literature', *Journal of Applied Psychology*, Vol. 92, No. 5, p.1332.

Huselid, M.A. (1995) 'The impact of human resource management practices on turnover, productivity, and corporate financial performance', *Academy of Management Journal*, Vol. 38, No. 3, pp.635–672.

Huselid, M.A. and Becker, B.E. (2011) 'Bridging micro and macro domains: workforce differentiation and strategic human resource management', *Journal of Management*, Vol. 37, No. 2, pp.421–428.

Karasek Jr., R.A. (1979) 'Job demands, job decision latitude, and mental strain: implications for job redesign', *Administrative Science Quarterly*, Vol. 24, No. 2, pp.285–308.

Karasek, R.A. (1985) *Job Content Questionnaire and User's Guide*, University of Massachusetts, Lowell.

Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P. and Amick, B. (1998) 'The job content questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics', *Journal of Occupational Health Psychology*, Vol. 3, No. 4, p.322.

Katz, R. (1978) 'Job longevity as a situational factor in job satisfaction', *Administrative Science Quarterly*, Vol. 23, No. 2, pp.204–223.

Kim, S. (2005) 'Individual-level factors and organizational performance in government organizations', *Journal of Public Administration Research and Theory*, Vol. 15, No. 2, pp.245–261.

Koski, H. and Pajarinen, M. (2013) 'The role of business subsidies in job creation of start-ups, gazelles and incumbents', *Small Business Economics*, Vol. 41, No. 1, pp.195–214.

Kroon, B., Van De Voorde, K. and Timmers, J. (2013) 'High performance work practices in small firms: a resource-poverty and strategic decision-making perspective', *Small Business Economics*, Vol. 41, No. 1, pp.71–91.

Langfred, C.W. (2004) 'Too much of a good thing? Negative effects of high trust and individual autonomy in self-managing teams', *Academy of Management Journal*, Vol. 47, No. 3, pp.385–399.

Lopes, H., Lagoa, S. and Calapez, T. (2014) 'Work autonomy, work pressure, and job satisfaction: an analysis of European Union countries', *The Economic and Labour Relations Review*, Vol. 25, No. 2, pp.306–326.

Michie, J. and Sheehan, M. (1999) 'HRM practices, R&D expenditure and innovative investment: evidence from the UK's 1990 workplace industrial relations survey (WIRS)', *Industrial and Corporate Change*, Vol. 8, No. 2, pp.211–234.

Michie, J. and Sheehan, M. (2001) 'Labour market flexibility, human resource management and corporate performance', *British Journal of Management*, Vol. 12, No. 4, pp.287–306.

Michie, J. and Sheehan, M. (2005) 'Business strategy, human resources, labor market flexibility and competitive advantage', *The International Journal of Human Resource Management*, Vol. 16, No. 3, pp.445–464.

OECD (2010) 'High-growth enterprises. What governments can do to make a difference', *OECD Studies on SMEs and Entrepreneurship*, OECD, Paris.

Oeij, P.R. (2006) 'Do job autonomy and negotiation self-efficacy improve employment relationships?', *Journal of Industrial Psychology*, Vol. 32, No. 2, pp.74–79.

Oeij, P.R.A., Dhondt, S. and Korver, T. (2011) 'Social innovation, workplace innovation and social quality', *International Journal of Social Quality*, Vol. 1, No. 2, pp.31–49.

Oeij, P.R.A., Dhondt, S., Kraan, K.O., Vergeer, R. and Pot, F.D. (2012) *Workplace Innovation and its Relations with Organisational Performance and Employee Commitment*, LLinE, Lifelong Learning in Europe, 4/2012 [online] http://www.lline.fi/en/issue/42012/issue-42012 (accessed 11 June 2013).

Oeij, P.R.A., de Vroome, E., Bolland, A., Gründemann, R. and van Teeffelen, L. (2014) 'Investing in workplace innovation pays off for SMEs: a regional innovation initiative from the Netherlands', *International Journal of Social Quality*, Vol. 4, No. 2, pp.86–106.

Oeij, P.R.A., de Vroome, E.M.M., Kraan, K.O., Goudswaard, A. and van den Bossche, S.N.J. (2013) *Werkgevers Enquête Arbeid 2012: Methodologie en beschrijvende resultaten*, TNO, Hoofddorp.

Oeij, P., Kraan, K. and Vaas, F. (2010) 'Naar een wetenschappelijke onderbouwing van sociale innovatie', *Tijdschrift voor HRM*, Vol. 13, No. 1, pp.74–100.

Osterman, P. (1999) 'Work reorganization in an era of restructuring: trends in diffusion and effects on employee welfare', *Industrial and Labour Relations Review*, Vol. 53, No. 2, p.179.

Park, H.J., Mitsuhashi, H., Fey, C.F. and Björkman, I. (2003) 'The effect of human resource management practices on Japanese MNC subsidiary performance: a partial mediating model', *The International Journal of Human Resource Management*, Vol. 14, No. 8, pp.1391–1406.

Parker, S.K. (1998) 'Enhancing role breadth self-efficacy: the roles of job enrichment and other organizational interventions', *Journal of Applied Psychology*, Vol. 83, No. 6, p.835.

Parker, S.K., Wall, T.D. and Jackson, P.R. (1997) '"That's not my job": developing flexible employee work orientations', *Academy of Management Journal*, Vol. 40, No. 4, pp.899–929.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003) 'Common method biases in behavioral research: a critical review of the literature and recommended remedies', *Journal of Applied Psychology*, Vol. 88, No. 5, p.879.

Pot, F.D. (2011) 'Workplace innovation for better jobs and performance', *International Journal of Productivity and Performance Management*, Vol. 60, No. 4, pp.404–415.

Pot, F.D. and Koningsveld, E.A. (2009) 'Quality of working life and organizational performance – two sides of the same coin?', *Scandinavian Journal of Work, Environment & Health*, Vol. 35, No. 6, pp.421–428.

Preenen, P.T.Y., De Pater, I.E., Van Vianen, A.E. and Keijzer, L. (2011) 'Managing voluntary turnover through challenging assignments', *Group and Organization Management*, Vol. 36, No. 3, pp.308–344.

Preenen, P.T.Y., Van Vianen, A.E.M. and De Pater, I.E. (2014a) 'Challenging tasks: the role of employees' and supervisors' goal orientations', *European Journal of Work and Organizational Psychology*, Vol. 23, No. 1, pp.48–61.

Preenen, P.T.Y., Van Vianen, A.E.M. and De Pater, I.E. (2014b) 'Challenging assignments and activating mood: The influence of goal orientation', *Journal of Applied Social Psychology*, Vol. 44, No. 10, pp.650–659.

Preenen, P.T.Y., Verbiest, S., Van Vianen, A.E.M. and Van Wijk, E. (in press) *Informal Learning of Temporary Agency Workers in Low-Skill Jobs: The Role of Self-Promotion, Career Planning, and Job Challenge*, Career Development International.

Preenen, P.T.Y., Vergeer, R.A. and Goudswaard, A. (2013) 'Kan arbeidscontractflexibiliteit samengaan met innovatie?', in Van Gaalen, R., Goudswaard, A., Sanders, J. and Smits, W. (Eds.): *Dynamiek Nederlandse Arbeidsmarkt (DNA)*, deel 2; de focus op flexibilisering, pp.83–97, CBS, Den Haag/Heerlen.

Preenen, P.T.Y., Vergeer, R.A., Kraan, K.O. and Dhondt, S. (2015) 'Labour productivity and innovation performance: the importance of internal labor flexibility practices', *Economic and Industrial Democracy*, advance online publication, doi: 10.1177/0143831X15572836 [online] http://eid.sagepub.com/content/early/2015/03/24/0143831X15572836.full.pdf?ijkey=gJ00gGRaL4fDPKd& (accessed 25 March 2015).

Prentice, D.A. and Miller, D.T. (1992) 'When small effects are impressive', *Psychological Bulletin*, Vol. 112, No. 1, p.160.

Ryan, A., Schmit, M.J. and Johnson, R. (1996) 'Attitudes and effectiveness: examining relations at an organizational level', *Personnel Psychology*, Vol. 49, No. 4, pp.853–882.

Schneider, C. and Veugelers, R. (2010) 'On young highly innovative companies: why they matter and how (not) to policy support them', *Industrial and Corporate Change*, Vol. 19, No. 4, pp.969–1007.

Spector, P.E. (1986) 'Perceived control by employees: a meta-analysis of studies concerning autonomy and participation at work', *Human Relations*, Vol. 39, No. 11, pp.1005–1016.

Spector, P.E. (1992) 'A consideration of the validity and meaning of self-report measures for job-conditions', in Cooper, C.L. and Robertson, I.T. (Eds.): *International Review of Industrial and Organizational Psychology*, Vol. 7, pp.123–151, John Wiley, Chichester, UK.

Spector, P.E. and Jex, S.M. (1991) 'Relations of job characteristics from multiple data sources with employee affect, absence, turnover intentions, and health', *Journal of Applied Psychology*, Vol. 76, No. 1, p.46.

Spreitzer, G.M. (1995) 'Psychological empowerment in the workplace: dimensions, measurement, and validation', *Academy of Management Journal*, Vol. 38, No. 5, pp.1442–1465.

Stam, E. and Wennberg, K. (2009) 'The roles of R&D in new firm growth', *Small Business Economics*, Vol. 33, No. 1, pp.77–89.

Taylor, M.S. (1981) 'The motivational effects of task challenge: a laboratory investigation', *Organizational Behavior and Human Performance*, Vol. 27, No. 2, pp.255–278.

Tushman, M. and O'Reilly, C. (1996) 'Ambidextrous organizations: managing evolutionary and revolutionary change', *California Management Review*, Vol. 38, No. 4, pp.8–30.

Vandenberg, R.J., Richardson, H.A. and Eastman, L.J. (1999) 'The impact of high involvement work processes on organizational effectiveness a second-order latent variable approach', *Group & Organization Management*, Vol. 24, No. 3, pp.300–339.

Van Gelderen, M. and Jansen, P. (2006) 'Autonomy as a start-up motive', *Journal of Small Business and Enterprise Development*, Vol. 13, No. 1, pp.23–32.

Van Praag, C.M. (2003) 'Business survival and success of young small business owners', *Small Business Economics*, Vol. 21, No. 1, pp.1–17.

Van Vianen, A.E.M., De Pater, I.E. and Preenen, P.T.Y. (2008) 'Career management: taking control of the quality of work experiences', in Athanasou, J. and Van Esbroeck, R. (Eds.): *International Handbook of Career Guidance*, pp.283–301, Springer Science and Business Media, London.

Van Zwieten, M.H.J., de Vroome, E.M.M., Mol, M.E.M., Mars, M.J., Koppes, L.L.J. and van den Bossche, S.N.J. (2014) *Nationale Enquête Arbeidsomstandigheden 2013. Methodologie en globale resultaten*, TNO/CBS, Hoofddorp/Heerlen.

Vivarelli, M. and Audretsch, D.B. (1998) 'The link between the entry decision and post-entry performance: evidence from Italy', *Industrial and Corporate Change*, Vol. 7, No. 3, pp.485–500.

Wall, T.D., Jackson, P.R., Mullarkey, S. and Parker, S.K. (1996) 'The demands-control model of job strain: a more specific test', *Journal of Occupational and Organizational Psychology*, Vol. 69, No. 2, pp.153–166.

Wall, T.D., Michie, J., Patterson, M., Wood, S.J., Sheehan, M., Clegg, C.W. and West, M. (2004) 'On the validity of subjective measures of company performance', *Personnel Psychology*, Vol. 57, No. 1, pp.95–118.

Wofford, J.C., Goodwin, V.L. and Premack, S. (1992) 'Meta-analysis of the antecedents of personal goal level and of the antecedents and consequences of goal commitment', *Journal of Management*, Vol. 18, No. 3, pp.595–615.

Wright, P.M. and Boswell, W.R. (2002) 'Desegregating HRM: a review and synthesis of micro and macro human resource management research', *Journal of Management*, Vol. 28, No. 3, pp.247–276.

Zhou, H., Dekker, R. and Kleinknecht, A. (2011) 'Flexible labor and innovation performance: evidence from longitudinal firm-level data', *Industrial and Corporate Change*, Vol. 20, No. 3, pp.941–968.

Notes

1 *Robustness test with employee level outcomes*

By means of a robustness test for our findings and employee outcomes (assessed at the organisational level), we also investigated the same interaction models but with three employee performance indicators, namely, commitment, the motivation to learn new things, and the perceived quality of the work of employees as de-pendent variables. The main results for the interaction effects were also significant and in the same directions for all three indicators, with all p's $< .05$. However, we found strong significant main effects of job autonomy on all three indicators (p's $< .001$).

Effect of workplace innovation on organisational performance and sickness absence

Peter R.A. Oeij* and Fietje Vaas

TNO, Netherlands Organisation for Applied Scientific Research,
Department Healthy Living,
Business Unit Sustainable Productivity and Employability
P.O. Box 3005, 2301 DA Leiden, The Netherlands
Email: peter.oeij@tno.nl
Email: fietje.vaas@tno.nl
*Corresponding author

Abstract: Workplace innovation is an organisational capability, defined as a strategic renewal in organising and organisational behaviour. This capability may consist of four resources: strategic orientation, product-market improvement, flexible work and organising smarter. Workplace innovation is theoretically rooted in the resource-based view of the firm. Analysis of the NEWS 2008 survey shows that Dutch organisations are 'rather' active with workplace innovation, with profit organisations being more active than non-profit organisations. Social innovative organisations are mostly active with product-market improvement, while least with flexible work. Organisations being more active with workplace innovation more often report an improved organisational performance. Conversely, workplace innovation has no significant effect on sickness absence rates. The first conclusion is that the theoretical construct of workplace innovation is an appropriate measure for monitoring among organisations. The second conclusion is that the effect of workplace innovation on organisational performance is strongest if organisations are active on more than one resource simultaneously. Interventions in flexible work and organising smarter are assumed to be most promising, since these resources may realise a relatively substantial gain in the effect of organisational performance.

Keywords: workplace innovation; social innovation; resource-based view; RBV; dynamic capabilities; DC; high performance work systems; HPWS; organisational performance; sickness absence.

Reference to this paper should be made as follows: Oeij, P.R.A. and Vaas, F. (2016) 'Effect of workplace innovation on organisational performance and sickness absence', *World Review of Entrepreneurship, Management and Sustainable Development*, Vol. 12, No. 1, pp.101–129.

Biographical notes: Peter R.A. Oeij (work and organisation scientist) is a Senior Research Scientist at TNO. He is a PhD candidate at the Open University of the Netherlands. Currently, he is working on workplace innovation, social innovation, innovation management and project-based team dynamics. His expertise encompasses research and consultancy for individual firms, sectors and policy, including the European Commission. He was Project Manager of the recently published *Workplace Innovation in European Companies*, a 51-company case study research commissioned by Eurofound.

Fietje Vaas is a self-employed Research Scientist and a Fellow at TNO. Together with TNO colleagues she maintains a knowledge base about workplace innovation (WPI) both in Dutch and in English (http://www.kennisbanksocialeinnovatie.nl; //www.workplaceinnovation.org). She is active in seeking best case of WPI and documenting and describing them. Through her long career at TNO and the former Dutch National Centre for Social Innovation (NCSI) she has a comprehensive network that helps her finding these best practices. As an independent evaluator she is involved in the EU financed project WORKAGE executed by the Nottingham Trent University and Workplace Innovation Limited in the UK, researching the relation between WPI and retirement intentions.

This paper is a revised and expanded version of a paper entitled 'Impact of social innovation on organisational performance and sickness absence' presented at the ISA XVII ISA World Congress of Sociology, Gothenburg, Sweden, 11–17 July 2010.

1 Introduction

One of the ways to become the 'world's most competitive region' is by enhancing the capacity to innovate, according to the Lisbon Agenda of the European Community [http://ec.europa.eu/growthandjobs, for an outline see Korver and Oeij, (2008, pp.143–145)]. Competitiveness and productivity growth should benefit from a well-developed capacity to innovate. For the Dutch economy recent developments are not rosy. Productivity growth and R&D investments are lagging behind compared to other industrial nations. At the time, in 2008, the Netherlands declined from position eighth to ten on the Global Competitive Index of the World Economic Forum. A possible explanation for this development is the lack of workplace innovation, i.e., various non-technical innovations which are regarded as complementary to technological innovation. Research among Dutch firms indicates a positive relation between non-technical innovations and organisational performance (Volberda et al., 2006; Van der Hauw et al., 2009).

The terms 'social innovation' and 'workplace innovation' need to be clarified, as there is no consensus regarding their meaning. Among management and organisation science researchers these terms are used as both a dependent and an independent variable. The terms are also applied in the discourses in at least two fields, namely in the realm of societal renewal and organisational or workplace renewal. In this paper we aim to define social innovation as workplace innovation, and as an independent variable; and we contribute to operationalise a measurable construct. In order to perform a first validity test of our construct, we will present the outcomes of the empirical analyses on the effects of workplace innovation on organisational performance and sickness absence, as dependent variables.

This contribution is organised as follows. In Section 2, we discuss several definitions of social and workplace innovation. We substantiate the definition of workplace innovation proposed here. Section 3 presents the hypotheses that will be investigated. Section 4 describes the research method and Section 5 the results. The final Section 6 presents conclusions, discussion and recommendations.

2 Theory

2.1 Social innovation: its societal application

Social innovation[1] can be distinguished as innovation related to business and related to society (Pol and Ville, 2009). First, we look into societal definitions of social innovation. Pol and Ville (2009, pp.879–881) sum up five conceptions of the term:

1 Social innovation as the prime mover of institutional change. The focus in this conception is on what role institutions play in the production of new ideas and new kind of social structures. Renewal in this sense can be related to technological, economic, regulative (law), normative (social norms) and cultural innovations (Heiscala, 2007).

2 Social innovation for social purposes. This conception considers social innovation as new ideas and activities of meeting social needs in a broad way, namely improving either the quality or the quantity of life.

3 Social innovation for the benefit of 'public goods'. In this conception the definition refers to new ideas that resolve existing social, cultural, economic and environmental challenges for the benefit of people and planet. In short, innovations which benefit the public good.

4 Social innovation and needs not taking on by the market. Social innovation deals here with improving the welfare of individuals and community through employment, consumption or participation, thus providing solutions for individual and community problems: quality of life. Social innovation is distinct from business innovation because it is concerned with satisfying new needs not provided by the market.

5 Social innovation to improve either the quality or quantity of life. Unsatisfied with the term's several overlapping meanings, Pol and Ville use its main characteristic, namely new ideas conducive to human welfare enhancement, and define social innovation as new ideas with the potential to improve either the quality or quantity of life. This view unites social and business innovations as long as they benefit social goals. The qualitative goals are, e.g., better education and better environmental quality, and the quantitative goals are, e.g., longer life expectancy.

Business innovation mainly deals with profitable new ideas or ideas that lower costs. Phills et al. (2008) employ a somewhat similar definition as Pol and Ville. These authors define social innovation as a novel solution to a social problem that is more effective, efficient, sustainable, or just, than existing solutions, and for which the value created accrues primarily to society as a whole rather than private individuals [Phills et al., (2008), p.36]. In their view a social innovation can be a product, production process, or technology, but it can also be a principle, an idea, a piece of legislation, a social movement, an intervention, or a combination of these. Two examples are fair trade and microfinance. Both examples help weaker groups (local producers), while benefiting the whole of society at the same time (reducing social inequality).

2.2 Social innovation: its organisational application, namely workplace innovation

Social innovation at societal level in the last two definitions does not strictly distinguish between the social and the business element. By 'business' we mean to refer to the commercial aspect, the profit-orientation. But another distinction than profit or non-profit is relevant as well, namely societal versus organisational innovation. The type of innovation that we will discuss concerns organisational innovation and we name it workplace innovation. Workplace innovation, then, deals with renewal in organisations – profit or non-profit. The goal of workplace innovation is to – preferably simultaneously – improve employer and employee interests. Productivity, competitive advantage, profit and costs, and the capability to change are examples of employer interests, whereas employability, empowerment, quality of work and working life, and balancing job demands and demands from private life exemplify employee interests. The term social innovation has come to dominate the present discourse on workplace innovation in the Netherlands (and Belgium – see endnote 1). The term refers to organisational innovation in three related domains, 'dynamic management', 'flexible organisations' and 'working smarter'. This demarcation includes the utilisation and development of skills, talents and competencies and networking and cooperation among organisations (Pot and Vaas, 2008). It is important to notice that workplace innovation does not include technological innovation, since workplace innovation is a reaction to the 'productivity paradox' and the 'innovation paradox', and should therefore be seen as complementary to technological innovation. The productivity paradox states that investments in ICT have not led to significant productivity growth. Or, as Solow stated: "we see computers everywhere except in the productivity statistics" [Brynjolfsson, (1993), p.67]. The innovation paradox describes that the utilisation and application of new knowledge for product, service and process innovations is poor, despite the high level of scientific knowledge on technology available, indicating that the transfer from knowledge from universities and knowledge institutes to firms is weak. A substantial lack of 'valorisation' of knowledge is observed due to this 'technology transfer gap', since making profitable business out of knowledge is heavily underused (Pot and Vaas, 2008; Pot and Koningsveld, 2009). In many cases stand-alone technological innovation is, therefore, not very successful. From this perspective, research findings among industrial firms are relevant which indicate that organisational performance depends more strongly on social innovation measures than on technological innovation: 75% to 25% (Volberda et al., 2006).

2.3 Workplace innovation delineated

A clear theoretical construct is needed in order to measure and monitor workplace innovation. Such a construct should be based on sound theoretical ground and it must be feasible to develop a candid operationalisation. In defining social innovation more clearly, we first describe 'innovation' and subsequently investigate 'social'. Innovation can be distinguished between innovation as a process and innovation as an outcome. As a process, innovation at organisational level implies that organisations have the capability to innovate – here, it is an independent variable. Organisations may produce profits and desired outcomes and are able to adapt to changing circumstances, because they can dispose of 'resources' and 'capabilities' that enable them to do so. Innovation as an outcome at organisational level becomes manifest in new products and services, new

product features and production methods. In this case the innovation itself is an 'end product' – a dependent variable. We will focus on the first description, innovation as a process, because we consider innovation to be a means instead of a goal, namely a means to improve performance.

In order to be considered an innovation, innovation as a process should meet several criteria. Innovations do not necessarily need be original, such as 'inventions', but they have to be new to the organisation (as the user) in how it is applied or combined with other organisational adaptations – i.e., Schumpeter's 'Neue Kombinationen'. Innovations should also preferably combine economic and social goals: economic in the sense that it is an improvement in effectiveness or efficiency, and social in the sense that the innovation is sustainable or beneficial for the organisation and the employees.

The term 'social' (in the Dutch translation of workplace innovation), as applied here, is different from most definitions of social innovation which aim at the improvement of the quality and quantity of life, and often see it as distinct from financial, commercial and economic values. This is congruent with definitions at societal level, where the aim is to address social needs and problems. In our focus on the organisation we consider 'social' as complementary to 'technological' and, therefore, refer to all non-technical innovations within organisations. Such innovations are often termed 'organisational' or 'workplace' innovations [e.g., Hage, 1999; Lam, 2004; Armbruster et al., 2006, 2008; Van der Hauw et al., (2009), p.5, p.23].

2.4 Resource-based view, dynamic capabilities and high performance work systems

Our conception of workplace innovation fits well within the 'Resource-based view (RBV) of the firm' (Wernerfelt, 1984; Barney, 1991). The RBV deals with the strategic resources available to a firm. A firm's basis for competitive advantage lies primarily in the unique application of the bundle of valuable resources at the firm's disposal. A competitive advantage can be transformed into a sustained competitive advantage if it carries unique characteristics of the firm if the advantages are heterogeneous in nature and hard to copy: they are neither perfectly imitable nor substitutable, unless with great effort. Two related variants of the RBV, which are relevant for our conception of workplace innovation, are the theory of dynamic capabilities (DC) and the theory of high performance work systems (HPWS). DC stresses the importance of strategic, external effects stemming from environmental demands, whereas HPWS underscores the importance of organisational embeddedness in transforming environmental demands into well performing work systems. The basic assumption of DC is that today's fast changing environmental demands (i.e., markets, technology, legislation, etc.) force firms to respond quickly and to be innovative. DC can be defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997). Three DC are crucial: the capability

1 to learn quickly and to build strategic assets
2 to absorb new strategic assets, such as knowledge, technology and customer feedback
3 to transform or reconfigure existing strategic assets (Teece et al., 1997; Eisenhardt and Martin, 2000).

The central idea behind HPWS is that HR can have a significant impact on the firm's performance when it is strategically applied as a unique 'bundle' of HR practices, namely, a scarce set of practices offering competitive advantage to a firm (Becker and Huselid, 1998; Appelbaum et al., 2000; Boxall and Purcel, 2003). According to Huselid (1995), such systems include rigorous recruiting and selection protocols, performance systems and incentive compensations systems on the one hand; and employee training and development systems on the other hand, that are designed to acquire, refine and reinforce employee skills and behaviours, necessary to implement the firm's competitive strategy. DC is a theory about economic strategic management, while HPWS is a theory about organisational processes acknowledging people as a strategic factor. Both variants of the RBV can be linked with the socio-technical systems theory, which stated that changes in the technical system must be aligned with changes in the social system, to not only improve organisational performance, but to also simultaneously guarantee an acceptable quality of work (for an overview see, e.g., Cummings and Srivastva, 1977; Trist and Murray, 1993). Therefore, the roots of workplace innovation can be traced back to the socio-technical systems theory, as it underscores the urgency in aligning technological and workplace innovation. Finally, it can be observed that technology is not a specific area of attention in the RBV. Therefore, the RBV and workplace innovation seem to match well.

2.5 Workplace innovation defined

Based on the RBV we distinguish four 'resources' that form ingredients for workplace innovation: strategic orientation, product-market improvement, flexible work, organising smarter. Volberda et al. (2006) used a comparable but not similar approach, because the resources they have selected theoretically overlap with each other. By *strategic orientation* we mean being focused on environmental factors raising urgency for responsiveness (Levinthal and March, 1993; Brown and Eisenhardt, 1998; Van den Bosch et al., 1999), knowledge absorptive capacity (Cohen and Levinthal, 1990) and external cooperation and networking (Dyer and Singh, 1998; Pettigrew et al., 2003; Nooteboom, 2004; Miles et al., 2006; Wua and Cavusgil, 2006). *Product-market improvement* refers to improving products and services, and finding new markets and clients or customers (Day, 1994; Jansen et al., 2006). *Flexible work* and *organising smarter* constitute the necessary internal variability, i.e., the capability to respond to environmental dynamics with internal variety options, as in Ashby's 'law of requisite variety' (Ashby, 1958). Organisations should, on the one hand, be able to alter the deployment of personnel by flexibility of work and tailor-made employment relations (Rousseau, 2005; Oeij, 2006; Oeij et al., 2006; De Leede et al., 2007; Goudswaard et al., 2009). On the other hand, organisations must be able to redesign their structure, by new ways of combining people, ICT and production methods (Zuboff, 1988; Ciborra, 1996), and be capable of renewing work processes and production methods (Browne et al., 1996; De Sitter et al., 1997; Womack and Jones, 2003; Jongkind et al., 2004). Thus, organisations should be both flexible and adaptive [Volberda, (1998), pp.89–96].

The resources *strategic orientation* and *product-market improvement orientation* seem to reflect an external oriented focus (related to strategy, business and sales), kindred to DC, whereas the resources *flexible work* and *organising smarter* seem to be more connected with an internally oriented focus (related to HR and operational management), as reflected in HPWS. Summarising, workplace innovation is defined as a strategic

renewal in organising and organisational behaviour; it is an organisational capability. This capability may consist of four resources: strategic orientation, product-market improvement, flexible work and organising smarter. Workplace innovation is regarded as an independent variable possibly influencing organisational performance and sickness absence as dependent variables.

3 Hypotheses

3.1 Organisational performance and sickness absence

If organisations dispose of more workplace innovation resources, it is expected that their organisational performance will improve and that their sickness absence rate will decrease.

Hypothesis 1 The more organisations dispose of workplace innovation resources, the higher their increase of organisational performance and the lower their sickness absence rate.

3.2 Use of ICT

The productivity paradox predicts that ICT use – as an indicator of technology use – does not significantly contribute to organisational performances according to the statistics. We assume, nonetheless, that ICT use can moderate the relation between workplace innovation and organisational performance, because ICT frontrunners may be better in anticipating environmental turbulence. Therefore, organisations that are both social innovative and ICT frontrunners will report better organisational performance, and lower rates of sickness absence.

Hypothesis 2 The more organisations dispose of workplace innovation resources, and if they are ICT frontrunners, the higher their increase of organisational performance.

Hypothesis 3 The more organisations dispose of workplace innovation resources, and if they are ICT frontrunners, the lower their sickness absence rate.

3.3 Industrial sector and organisational size

We expect that profit organisations will perform better on both workplace innovation resources as on organisational performance, due to a stronger external pressure to perform and innovate. We do not expect that organisational size will make a difference.

The 'external oriented' resources of workplace innovation, *strategic orientation* and *product-market improvement*, may have a more direct relationship with organisational performance compared to *flexible work* and *organising smarter*, because the effect on organisational performance of the latter two is subject to a time-lag. It takes time for such 'internal oriented' interventions to show visible effects. We do not have clear assumptions about the relationship between workplace innovation, sector and size, and sickness absence, simply because there are so many factors that influence sickness absence, which are largely situated outside the firms. Examples of such factors are an

influenza epidemic, sports injuries and individual dispositions. Therefore, we hypothesise:

Hypothesis 4 Profit organisations, as compared to non-profit organisations, will dispose of more workplace innovation resources and show a higher organisational performance.

Hypothesis 5 Organisational size will not show significant differences in workplace innovation nor in organisational performance.

Hypothesis 6 The effect of the workplace innovation resources strategic orientation and product-market improvement on organisational performance is stronger than the effect of workplace innovation resources flexible work and organising smarter.

4 Method

4.1 Data: organisations

The hypotheses were tested with data from the Netherlands Employers Work Survey (NEWS, in Dutch Werkgevers Enquête Arbeid, WEA 2008) gathered late 2008 – beginning 2009. A survey was carried out among a sample of Dutch profit and non-profit organisations. Respondents, first screened by telephone, received an internet link or postal questionnaire, upon declaring their commitment to cooperate. Organisations under study are 'establishments'. Respondents could be (managing) directors/owners or HR-managers. A cross-sectional random sample of Dutch establishments, stratified on branch and establishment size, was taken from the LISA database (a database with Dutch establishments). The response rate was 35% (5.387 cases). The sample has been weighted by branch and size (Oeij et al., 2009).[2]

The analyses were performed on a sub-sample, because the questionnaire items on workplace innovation were exclusively addressed to organisations with ten or more employees, for the reason that smaller firms normally do not have formalised organisational policies of this kind. At best these firms have ad-hoc policies. After listwise deletion of missing values 2.263 valid cases remained for the analyses.

Of the establishments in the sub-sample (referred to as organisations) 45% employs 10–49 employees, 20% 50–99 employees and 35% more than 100 employees. As a consequence of the selection criterion of a minimum of 10 employees, rather large shares of the sample come from Industry (19%), Commercial Services (16%), Healthcare and Welfare (11%), Trade (11%), and Education (10%). Smaller portions stem from the Construction Industry and Transport and Communication (each 7%), 'other' Services (such as the culture industry) (6%), Hotel and Catering (5%), Public Sector (4%), Financial Services (3%) and Agriculture, Forestry and Fishery (1%).

4.2 Measuring instruments

The NEWS data contain questions to enable the measurement of 'workplace innovation resources' with four subscales. The first, *strategic orientation on the environment*, is operationalised with three items: 'Our organisation responds immediately towards

emerging developments'; 'Our organisation absorbs external knowledge purposefully'; and 'Our organisation cooperates with third parties and / or participates in networks'. The items were measured on five-point Likert scales (response categories ranging from 1 = 'not at all' to 5 = 'to a very strong extent'). The reliability of this subscale (Cronbachs α) was .63. The subscale score was computed as the mean of the three items.

A second dimension of workplace innovation was flexible work directed at optimising personnel availability with appropriate terms of employment, operationalised with items on flexibilisation of work and tailor-made employment relations (idiosyncratic, individualised terms of employment) (eight items). Flexibilisation of work was measured with a four-item question: 'Does your organisation apply the following forms of flexible work to a large or to a small extent?': 'multi-functional use of personnel', 'flexible working times', 'flexible contracts', 'self-rostering (letting employees determine their own working times)' (response categories ranging from 1 = 'to a very large extent' – 5 = 'not at all'). The four items on tailor-made employment relations pertain the room experienced by supervisors in making tailor-made arrangements with employees with reference to four terms of employment. 'To what extent in your situation is there much or little room for individual, tailor-made arrangements concerning the following terms of employment? (Tailor-made means being able to make different arrangements with different employees)': 'working times of employees', 'work performance of employees', 'development/training of employees', and 'flexible availability of employees' (1 = very little/no room – 5 = very much room).[3] Cronbachs α of this eight-item subscale was .75.

The third workplace innovation resource, *organising smarter*, was measured by two items: 'Our organisation continuously finds new ways to combine elements to (re)organise the working process (e.g., simultaneously combining flexible availability of personnel with new ICT applications)'; 'Our organisation regularly innovates the working process' (1 = 'not at all' – 5 = 'to a very large extent'). The correlation between the items (Pearsons *r*) was .37.

Finally, *product-market improvement*, or in full 'searching for new markets and product improvement', was investigated using two statements about the extent to which the organisation 'regularly seeks new markets/customers' and 'is regularly improving ad/or refining existing products/services (1 = 'not at all' – 5 = 'to a very large extent'). The inter-item correlation was .49.

ICT-use, considered as the application of advanced technology, was measured in various ways. The NEWS data contain three items on the percentage of employees using, at least weekly, a

1 'personal computer'

2 'computer controlled or computer supporting technology (scanners, robots)'

3 'assembly line'.

The items are based on the Canadian *Workplace and Employee Survey* (WES) (Statistics Canada, 2004). Moreover, the NEWS investigated whether 'the organisation regularly applies computer programs/software for the following purposes?':

4 'controlling information and document flows' (response categories: 'yes', 'no')

5 'supporting communication between people (other than e-mail)' ('yes', 'no')

6 'supporting collaboration between people ('yes', 'no').

'Controlling information and document flows' 4 was labelled *Process control directed IT* (0 = absent; 1 = present). Items 5 and 6 are not only connected as regards content, they correlated statistically too (Pearsons r=.63). Therefore, we combined them into one measure, labelled *Collaboration/communication directed IT* (range: 0 = (both) absent; 0.5 = one of both is present; 1 = (both) present).

The effect variables (independent, output variables) *organisational performance* and *sickness absence* were measured as follows. The NEWS data encompass three scalable items on organisational performance, for example: 'To which extent do you agree or disagree on the following statements on organisational performance in de last two years?' – 'the labour productivity in our organisation has improved' (1 = 'completely disagree' – 5 = 'completely agree'). Likewise, the 'growth in turnover' and 'growth in profit' (or 'financial results' for not for profit organisations) were investigated. Cronbachs α of this three-item scale was .70. Finally, sickness absence rate was measured with one question: 'What was the percentage of sickness absence in your organisation in 2007, excluding (absence due to) maternity leave?' The reason of the selection of these effect variables, organisational performance and sickness absence, from the NEWS survey, is the assumption that these are plausible outcomes of an innovation process. Both variables are, therefore, helpful in assessing the external validity of workplace innovation as a theoretical construct.

4.3 Data analysis

Factor analysis was performed to test the internal validity of workplace innovation as a theoretical construct and to distinguish four workplace innovation resources into four subscales (see above). Descriptive analyses were executed to study the prevalence of workplace innovation, organisational performance and sickness absence among organisations, divided by industrial sector and organisational size (number of employees). Hierarchical multiple linear regression analyses were carried out on the two effect variables, entering the independent variables stepwise. In order to enhance the robustness findings were controlled for branch (sector, industry) and company size, as well as for 'social demographic' characteristics of the organisations' workforce. Model 0 (M0), therefore, solely contained the following background variables: branch (11 branches); size (three categories), sex (percentage of women); proportional distribution of the workforce in 6 age groups: younger than 25 years, 25–34 years, 35–44 years, 45–54 years, 55–64 years, and 65 years and older; proportional distribution of the following educational levels: 'unskilled' defined as maximum primary (elementary) education; low skilled as maximum lower vocational education; medium skilled as maximum secondary education and high skilled (higher vocational and professional and academic/university education). In model 1 (M1), the ICT/technology variables were entered into the regression analysis. Next, in M2, the workplace innovation resources variables were entered. Finally, in order to test for moderation effects, interaction terms were computed according to the guidelines of Aiken and West (1991). In a third model we evaluated the

interaction terms of ICT/technology variables and workplace innovation variables, and present a visualisation if significant. The predicting variables were assigned the value of 1 standard deviation above (+) and one standard deviation (–) below the mean. Subsequently, regressions lines were generated by entering the values into the equation.

5 Results

Generally speaking, organisations are 'rather active' with workplace innovation, with an average score of 3.5, computed as the total mean score based on all four workplace innovation resources (ranging from 1 = 'not at all' to 5 = 'to a very large extent'). Table 1 contains descriptive analyses of the workplace innovation resources variables and the ICT/technology variables, showing that especially Commercial Services are active with the four resources of workplace innovation. *Flexible work* (multi-functional availability, flexible working times, self-rostering and flexible contracts, and tailor-made arrangements about these terms) can be found to a large extent in the Hotel and Catering branch and in healthcare and welfare. Relatively low scores on this aspect are found in the branches Education, Construction and Industry. Concerning *organising smarter* relatively low scores are seen among organisations from the Public sector and Construction. Significant differences were not found when comparing organisations on their company size.

Organisations have applied new ICTs and technologies to a large extent these days. Table 1 shows that digitalisation has found its way in today's information society: employers estimate that on average 68% of their employees work with computers at least once a week. Nonetheless, branches vary considerably. It is primarily in the Educational, Financial, Public and Commercial branches where many employees work with computers: about 90% on average. Computer controlled or computer supported technology, such as scanners and robots, was used, on average, by 27% of all employees. In this perspective, striking branches are Trade and Commercial Services. Not surprisingly, the use of assembly lines appears to be relatively abundant in the Industrial sector (on average 11% of employees in 10+ organisations). However, only 1.3% of an organisation's workforce (on average per employer) performs assembly line work. It further seems that almost every organisation in Agriculture and Financial Services applies ICT directed at process control. Collaboration and/or communication directed ICT is relatively often applied in Financial Services as well, and in Commercial Services, the Public and the Educational sector. Broken down into size, the analysis shows that organisations with 50 and more employees, compared to organisations with 10 to 49 employees, have significantly larger shares of assembly line usage and, both process control directed ICT and collaboration/communication support directed-ICT.

The univariate correlations, presented in Table 2, further indicate that especially the organisations with a higher extent of *strategic orientation* on the environment and/or a higher extent of *organising smarter* apply more often collaboration/communication directed ICT (Table A1 in Appendix shows all univariate correlations between the variables entered in the regression analyses, including the correlations between the control variables).

Table 1 Analysis of the relation of sector and size with workplace innovation and ICT/ technology variables

	Agriculture	*Industry*	*Construction*	*Trade*	*Hotel/catering*	*Transport*	*Financial services*	*Commercial services*	*Public sector*	*Education*	*Healthcare and welfare*	*Services 'other'*	*10–49 employees*	*50–99*	*100+*	*Tot.*
Strategic orientation (1 = not at all – 5 = to a very large extent)	3.6$^{\downarrow}$	3.7	3.6	3.6$^{\triangledown}$	3.5$^{\blacktriangledown}$	3.6	3.6	3.8$^{\blacktriangle\blacktriangle\blacktriangle}$	3.5$^{\downarrow}$	3.7	3.7	3.7	3.7	3.7	3.8	3.7
Flexible work (1 = not at all – 5 = to a very large extent) (mean)	3.0	2.9$^{\blacktriangledown\blacktriangledown}$	2.8$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	3.0	3.3$^{\blacktriangle\blacktriangle\blacktriangle}$	3.0	3.2$^{\uparrow}$	3.2$^{\blacktriangle\blacktriangle\blacktriangle}$	3.1$^{\uparrow}$	2.6$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	3.1$^{\blacktriangle}$	3.1	3.00	3.02	3.10	3.0
Organising smarter (1 = not at all – 5 = to a very large extent)	3.3	3.3	3.2$^{\blacktriangledown}$	3.3	3.1$^{\downarrow}$	3.2	3.3	3.5$^{\blacktriangle\blacktriangle\blacktriangle}$	3.1$^{\blacktriangledown}$	3.4	3.4	3.3	3.3	3.3	3.4	3.3
Product-market improvement (1 = not at all – 5 = to a very large extent)	3.7	3.8	3.7	3.9$^{\Delta\Delta}$	3.9	3.8	3.7	4.0$^{\blacktriangle\blacktriangle\blacktriangle}$	3.1$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	3.5$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	3.7$^{\triangledown}$	3.8	3.8	3.7	3.7	3.8
PCs (% users, at least weekly)	15$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	51$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	33$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	68	37$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	53$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	90$^{\blacktriangle\blacktriangle\blacktriangle}$	87$^{\blacktriangle\blacktriangle\blacktriangle}$	89$^{\blacktriangle\blacktriangle}$	95$^{\blacktriangle\blacktriangle\blacktriangle}$	73	75$^{\uparrow}$	67	69	75$^{\blacktriangle}$	68
Computer controlled/supporting technology (% users, at least weekly)	6.1$^{\downarrow}$	29	11$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	37$^{\blacktriangle\blacktriangle\blacktriangle}$	17$^{\downarrow}$	22	38$^{\uparrow}$	32.5$^{\blacktriangle}$	17$^{\downarrow}$	23	18$^{\blacktriangledown\blacktriangledown}$	22	27	24	26	27
Assembly line (% users, at least weekly)	.03$^{\downarrow}$	11$^{\blacktriangle\blacktriangle\blacktriangle}$	.29$^{\blacktriangledown}$	3.7	.45$^{\downarrow}$	2.6	.02$^{\downarrow}$	1.5	.60	.08$^{\blacktriangledown}$	.14$^{\blacktriangledown\blacktriangledown}$	1.3	2.1$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	4.9$^{\blacktriangle}$	5.6$^{\blacktriangle\blacktriangle}$	2.7
Process control directed ICT (% present)	100%$^{\uparrow}$	86%	80%$^{\blacktriangledown}$	86%	65%$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	86%	98%$^{\blacktriangle}$	87%	96%$^{\uparrow}$	91%	92%	91%	85$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	93$^{\blacktriangle}$	94$^{\blacktriangle}$	86.9
Collaboration/communication directed ICT (0 = absent – 1 = both present)	.54$^{\downarrow}$	.54$^{\blacktriangledown\blacktriangledown}$	.52$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	.65	.43$^{\blacktriangledown\blacktriangledown}$	.62	.75$^{\uparrow}$	.72$^{\blacktriangle\blacktriangle}$	.76$^{\uparrow}$	.73$^{\blacktriangle}$	.65	.54$^{\downarrow}$	.60$^{\blacktriangledown\blacktriangledown\blacktriangledown}$	.76$^{\blacktriangle\blacktriangle}$	.79$^{\blacktriangle\blacktriangle\blacktriangle}$	.63

Notes: Percentages are column-percentages, tested with Pearson chi-square test. Means are tested with t-test. Contrast used is: 'subgroup' vs. 'other cases'.
$\blacktriangle$: $p < 0.05$, $\blacktriangle\blacktriangle$: $p < 0.01$, $\blacktriangle\blacktriangle\blacktriangle$: $p < 0.001$ (and $\blacktriangledown$): significant high (low) percentages and/or means, and Cohen's d effect size (Cohen, 1988) is at least 0.20.
Open triangles Δ: significant, but Cohen's d effect size is smaller than 0.20. Symbols ↑ and ↓: NOT significant but effect size ≥ 0.20. Test and symbols relate to horizontal comparisons.

Table 2 Means, standard deviations and Pearson correlations between central variables

		M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1	Strategic orientation (1 = not at all – 5 = to a very large extent)	3.7	0.6	1									
2	Flexible work (1 = not at all – 5 = to a very large extent)	3.1	0.6	.24	1								
3	Organising smarter (1 = not at all – 5 = to a very large extent)	3.4	0.7	.54	.29	1							
4	Product-market improvement (1 = not at all – 5 = to a very large extent)	3.8	0.7	.45	.21	.49	1						
5	PCs (% users, at least weekly)	69	35	.17	.16	.15	.04	1					
6	Computer controlled/-supporting technology (% users, at least weekly)	26	33	.07	.06	.09	.11	.26	1				
7	Assembly line (% users, at least weekly)	4	14	–.06	–.07	.01	.06	–.18	.09	1			
8	Process control directed ICT (% present)	.90	.30	.14	.10	.13	.07	.19	.09	.03	1		
9	Collaboration/communication directed ICT (0 = absent – 1 = both present)	.69	.42	.21	.17	.23	.16	.26	.16	.02	.32	1	
10	Improved organisational performance (1 = completely disagree – 5 = completely agree)	3.7	0.7	.24	.17	.24	.33	–.09	.02	.03	.01	.02	1
11	Sickness absence rate	4.4	3.3	–.06	–.09	–.07	–.11	–.06	-.03	.10	–.00	–.01	–.08

Note: Correlations > |.041| are significant at $p < .05$.

Table 3 Results of the hierarchical linear regression analyses

	Organisational performance (improvement in the last two years)				*Sickness absence rate*			
	M1		*M2*		*0*		*M2*	
	β	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Organisation size								
• 10–49 employees	Ref.		Ref.					
• 50–99 employees	.00		.01		.06	**	.06	**
• 100+ employees	–.02		–.01		.10	***	.10	***
Branch								
• Agriculture, forestry and fishery	–.02		–.02		.02		.02	
• Industry	Ref.		Ref.		Ref.		Ref.	
• Construction	–.04		–.03		,03		.03	
• Trade	–.01		–.01		–.02		–.02	
• Hotel and catering	–.03		–.04		–.04		–.04	
• Transport and communication	–.05	*	–.04		–.03		–.03	
• Financial services	–.04		–.03		–.03		–.03	
• Commercial services	–.01		–.02		–.03		–.03	
• Public sector	–.10	***	–.04		.06	*	.04	
• Education	–.09	**	–.06	*	.11	***	.10	***
• Healthcare and welfare	.00		.01		.05		.05	
• Services ‘other’	–.04		–.03		.00		.00	
• Characteristics personnel:								
• Sex: % women	–.09	**	–.08	**	.07	*	.07	*
Age								
• % < 25 year	.09	*	.07	*	–.11	**	–.11	**
• % 25–34 year	Ref.		Ref.		Ref.		Ref.	
• % 35–44 year	–.01		–.02		–.05		–.05	
• % 45–54 year	–.09	***	–.06	*	–.02		–.02	
• % 55–64 jaar	–.11	***	–.08	***	–.01		–.01	
• % 65 jaar or older	.01		.01		–.02		–.02	

Note: *p < .05; **p < .01, ***p <.001.

Table 3 Results of the hierarchical linear regression analyses (continued)

	Organisational performance (improvement in the last two years)				*Sickness absence rate*			
	M1		*M2*		*0*		*M2*	
	β	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Education								
• % Unskilled	Ref.		Ref.		Ref.		Ref.	
• % Low skilled	–.12	*	–.10		–.09		–.10	
• % Medium skilled	–.10	*	–.09	*	–.14	**	–.14	**
• % High skilled	–.09		–.10		–.26	***	–.26	***
ICT/technology:								
PCs (% users, at least weakly)	–.03		–.07	*	–.01		.00	
Computer controlled/ supporting technology (% users, at least weakly)	.00		–.01		.00		.00	
Assembly line (% users, at least weakly)	–.01		–.01		.07	**	.07	**
Process control directed ICT (0 = absent; 1 = present)	.01		–.01		.00		.00	
Collaboration/communication directed ICT (0 = absent – 1=both present)	.04		–.03		–.01		.01	
Workplace innovation:								
Strategic orientation (1 = not at all – 5 = to a very large extent)			.10	***			.00	
Flexible work (1 = not at all – 5 = to a very large extent)			.09	***			–.03	
Organising smarter (1 = not at all – 5 = to a very large extent)			.06	**			–.01	
Product-market improvement (1 = not at all – 5 = to a very large extent)			.20	***			–.06	*
F	7.68	***	16.10	***	6.33	***	5,98	***
df	27, 2,235		31, 2,231		27, 2,235		31, 2,231	
R-square	.085		.183		.071		.077	
Increasing *R*-square	.002	n.s.	.098	***	.004	n.s.	.006	**

Note: *p < .05; **p < .01, ***p <.001.

5.1 Relation between ICT/technology use and workplace innovation with organisational performance

A relation with any of the ICT/technology variables and – self reported – improvement of organisational performance (labour productivity, turnover, and profit) proved to be absent in the regression-analysis in model 1 (Table 3). Entering workplace innovation resources variables in model 2 showed a relation of, primarily, the workplace innovation resource *product-market improvement* with an enhanced growth of organisational performance. The other three workplace innovation resources related statistically significant with organisational performance too (which is consistent with the univariate correlations in Table 2). It is striking from M2 that a higher percentage of PC-users correlates negatively with organisational performance, while there was no correlation at all between ICT/technology use and organisational performance in model 1. It appears that the organisations with relatively high numbers of computer use, less often report improved organisational performance, when controlled for workplace innovation resources – that is, irrespective of the extent to which these organisations are active with workplace innovation. The fact that the β of PC usage becomes significant in M2 may refer to a suppressor effect, since PC usage hardly correlates with organisational performance (–.09), whereas it does correlate moderately with the workplace innovation resources (about .16 with three of the four resources). By entering the four resources in M2, the effect of PC usages suddenly becomes significant, possibly indicating that workplace innovation is confounded with PC usage, meaning that social innovative organisations have many PC users as well.

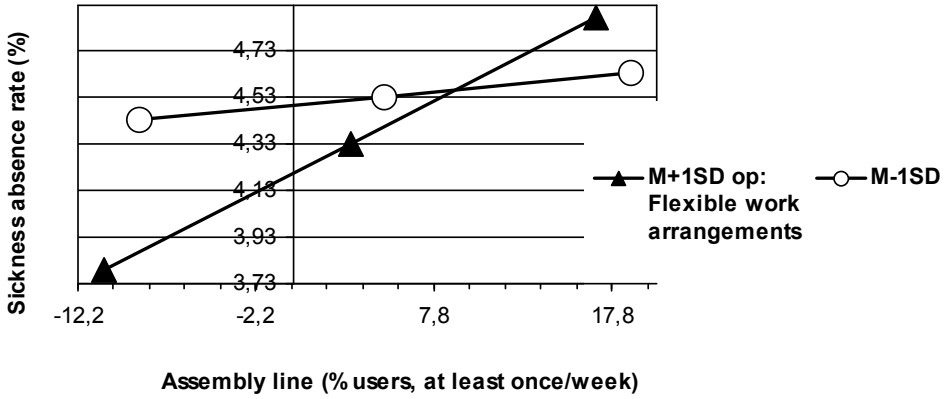
However, it should be mentioned that the operationalisation of the workplace innovation resource *organising smarter* contains also an item that measures the joint optimisation of the organisation (work process) and technology: 'Our organisation continuously finds new ways to combine the elements to (re)organise the working process (e.g., simultaneously combining flexible availability of personnel with new ICT applications)'. This resource of workplace innovation (actually an interaction of the technical and social aspect, theoretically at least) was controlled for as well during the evaluation of the correlation between computer use and organisational performance. There were no significant relations between the interaction terms of the ICT/technology variables and the workplace innovation resources variables with changes in organisational performance (therefore, no results are presented for M3 in Table 3).

5.2 Relation between ICT/technology use and workplace innovation with sickness absence

The regression analyses on sickness absence as dependent variable showed that higher shares of assembly line work associate with higher rates of sickness absence – both in M1 as in M2 (Table 3). Moreover, analyses of M2 revealed that the workplace innovation resource *product-market improvement* was related to a lower sickness absence rate. Finally, there was a significant interaction effect, namely the moderation by flexible work in the relation between assembly line use and sickness absence (Beta = .06; $p < .01$). Figure 1 shows that *flexible work*, on the one hand, as applied by organisations with higher shares of assembly line work, associates with a higher sickness absence rate, compared to organisations with *flexible work*, but without assembly line work. On the

other hand, when the deployment of *flexible work* is low, it is shown that a higher share of assembly line work is not associated with a higher sickness absence rate.

Figure 1 Interaction-effect of assembly line use and flexible work on sickness absence rate



Note: With linear regression; multivariate controlled means for sickness absence percentage.

6 Conclusions and discussion

6.1 Conclusions

The first hypothesis, stating that organisations which are active with workplace innovation more often report an improved organisational performance and lower sickness absence rate compared to organisations that are not active, is partly confirmed. The analyses show that organisations being active with workplace innovation have, indeed, improved their performance more often, whereas such a relation between workplace innovation and sickness absence could not be found. Out of all four workplace innovation resources only *product-market improvement* associates with a lower sickness absence rate, but the effect size is small.

Of the four workplace innovation resources, an improved organisational performance can be attributed to *product-market improvement*, to a limited extent to *strategic orientation* and *flexible work*, and to a very limited extent to *organising smarter*. These findings correspond with Hypothesis 6, predicting that the contribution of workplace innovation resources is stronger by *strategic orientation* and *product-market improvement* (external orientation) than by *flexible work* and *organising smarter* (internal orientation). Perhaps the reason why the externally oriented resources have a larger effect than the internally oriented resources is their earlier visibility, due to a time lag effect and to their self evidence. *Strategic orientation* and *product-market improvement* are directly linked to strategy and market choices: performance results may be attributed to these activities as self evident. *Flexible work* and *organising smarter* might have, in the perception of respondents, a merely indirect effect on performance results. Simply because effects of organisational and personnel choices are not obvious, are not visible in an easy way and may take an indeterminable period of time. And even then, it may be

difficult for respondents to ascribe performance effects to factors of which the relations are not obvious to them.

Another reason why *product-market improvement* showed the strongest effect, might be a consequence of successfully exploiting a certain product or service as a 'cash cow'; this success could have been an impetus to organise the work process around such products and services. In this case 'cash cows' would trigger workplace innovation instead of the other way around.

The effect size of each of the four workplace innovation resources separately is rather modest, but together they present a significant additive effect size. This finding underscores the notion that innovations will only be effective when organisational aspects are adjusted, improved or renewed in a coherent fashion. This is a central assumption in, not only, the theory of the RBV (Barney, 1991; Wang and Ahmed, 2007), but also in systems thinking on organisational change (Senge, 1990) and organisational design (De Sitter, 1995; De Sitter et al., 1997; MacIntosh et al., 2006; Wheatley, 2006).

Contrary to the prediction that social innovative organisations with an improved organisational performance have a relation with ICT/technology use (Hypotheses 3 and 4 on ICT/technology use), firstly there was no such relation between workplace innovation and ICT/technology use; and secondly, in those situations where relatively many PC-users were present in organisations that really are active with workplace innovation, an improvement of performance of the organisation did not occur. This finding might underline the productivity paradox, namely the fact that computer use does not find its expression in productivity statistics, as Solow stated two decennia ago (Section 2).

The relation between workplace innovation, ICT/technology use and sickness absence is somewhat ambiguous. Organisations reporting relatively many assembly line workers also report higher sickness absence rates; and even more so when simultaneously active with the workplace innovation resource *flexible work* (interaction effect). The first finding corresponds with the well-known thought that working on the assembly line is paired with limited challenging work, avail of one's talents and quality of work (Braverman, 1974), albeit that such far-stretching inferences cannot be drawn from the NEWS data. There were no effects observed from workplace innovation on sickness absence, except for those organisations active with *product-market improvement*: their sickness absence rates are slightly lower. We do not have a solid explanation for this result. Perhaps, successful commercial activities may explain favourable sickness behaviour – although people's absent rates tend to decline in economically adverse periods (Stegeman, 2005) – but at the turn of the year 2008–2009 – the period of the survey – the financial crisis started to affect unemployment.

Two final hypotheses predicted more workplace innovation activities and a higher improved organisational performance among private organisations than among public organisations (Hypothesis 4). Besides, it was predicted that organisational size has no impact on organisational performance (Hypothesis 5). Both hypotheses were supported by the findings, except for the result that both private and public organisations are to the same extent active with the workplace innovation resource *strategic orientation*. It seems plausible that profit organisations encounter stronger economic incentives due to competitive pressures, and, as a consequence, become more socially innovative – mainly concerning *product-market improvement* – to actually improve their performance more of strongly than not-for-profit organisations.

It can be concluded that workplace innovation resources can better explain improved organisational performance than sickness absence rates: the explained variance was

respectively 18% and 8%. That latter result is not surprising, given the common knowledge that many – also non-work related – factors determine sickness absence behaviour. At the same time we draw the conclusion that ICT/technology use does not, or hardly, contribute in explaining workplace innovation resources or sickness absence. Even prior to entering the workplace innovation variables in the regression models, there was no significant relation. Based on the findings, it may be assumed that workplace innovation is relevant for productivity growth. Besides, it is primarily workplace innovation that associates with organisational performance, not technology. From a theoretical point of view, we should remark, however, that the applied operationalisations not always clearly distinct the social from the technological. Nonetheless, in order to improve organisational performance merely investing in technology will not suffice; investing simultaneously in technology and in workplace innovation is an imperative and indispensable condition, as many other researchers concluded earlier. Related to studies in the realm of the RBV, DC and HPWS, our findings do not conflict with research findings which concluded that, instead of singular measures, particularly a 'bundle', 'system', or 'cluster' of measures brings about significant effects on the performance of organisations (Appelbaum et al., 2000; Becker and Huselid, 1998; Boxall and Purcell, 2003; Gu and Gera, 2004; Jacobs and Snijders, 2008; Paauwe, 2007; Boxall and Macky, 2009; Kauhanen, 2009; Subramony, 2009; Volberda et al., 2006).

The theoretical and empirical analyses have resulted in the development of a construct for workplace innovation resources that is rather 'methodologically robust' and 'plausible in content'. Methodologically robust because four moderately discriminating sub-constructs emerged from the data; and plausible in content because the construct is a defendable operationalisation of the RBV. From the perspective of the main purpose of the NEWS, monitoring developments in Dutch organisations, this implies that we have arrived at a workable construct for measuring workplace innovation for two reasons: we can now describe the aspects of workplace innovation in which organisations unfold activities, and we can interpret the data in a sense-making manner, i.e., relevant in relation to organisational interventions in practice.

6.2 Discussion

6.2.1 Results

The finding that ICT/technology use only weakly associates with the central effect variables in our study, illustrates the theoretical appropriateness of both the RBV and workplace innovation to exclude technology as a variable. However, it is reasonable to assume that the effect of technology on organisational performance (and sickness absence) follows an indirect route. Namely in the sense that technology is a crucial element in the organisation and division of work (*flexible work* and *organising smarter*). At least in two ways there is a clear relationship between the organisation of work and workplace innovation. The first concerns the autonomy or decision latitude of employees, which is an important aspect of job design. The second way refers to the design of the organisation itself, of which the job design is a derivative. It can be argued that the so called 'flow structure' of organisational design offers promising opportunities for workplace innovation. In a flow structure orders are being organised around teams in such a manner that all team members participate in all tasks that teams must manage, execute and decide upon, both in the production of goods and services, both in profit and

non-profit organisations (Christis, 2009; De Sitter, 1995; De Sitter et al., 1997; MacDuffie, 1997; Sabel, 2006; Simon, 1997; Womack and Jones, 2003). Flow structures invoke the optimised use of human talents to maximise collaboration, communication and exchange of knowledge, minimise the division of labour and maximise 'complete' functions and 'autonomous' teamwork. In our opinion, therefore, the issue of organisational and job design are essential for workplace innovation. Despite the modest effect of the sub-construct *organising smarter* – theoretically connected with this topic – on organisational performance, its indirect effect might be substantial.

6.2.2 Limitations

The research offers a building block for theory and practice of workplace innovation, but since it is performed only within one sample, replication is needed with other samples, preferably in an international context. Although it is valuable that a workplace innovation construct is developed which is based on broadly accepted theorising within the research community of management science and organisational studies, there is still much work to be done.

First, we stipulate that RBV theory could take into account the notion of organisational structure much more thoroughly than its representatives have done so far. The indirect effect of *organising smarter* on organisational performance might be much more substantial. If it could be demonstrated that technology has an indirect effect on organisational performance, namely via the organisational structure or the organisation/division of work, this would imply a nullification of the productivity paradox. Consequently, the theory of RBV could consider a modification as well. Since it has a strong focus on strategy and processes, it seems to ignore the importance of organisational structure – organisational and job design – as a relevant 'dynamic capability' or 'resource'.

Second, there is a strong need for consensus about the definition of workplace innovation, not only in the Netherlands, but in the whole of Europe [Pot and Koningsveld, (2009), p.426] and probably beyond. Much applied research lacks a sound theoretical basis, which hampers solid descriptive and explanatory knowledge building and, as such, a solid basis for practical organisational interventions. Generally speaking, there is a gap between academic treatise, management practices and policy making in organisation and management science (Schwarz et al., 2007). Our purpose has been to perform organisational research that is related to all three fields, and we hope that we made a modest contribution.

Our sample contains some limitations. First, we focused on organisations with 10 or more employees. While this is a defendable approach for an exploratory study into a theoretical construct, it is not self-evident if one considers that organisations with two to ten employees constitute about 76% of our gross sample framework. The first implication is that our findings may be less relevant to a large proportion of Dutch organisations. The second implication is the well-known fact that research among SMEs demands a practical approach, avoiding academic jargon. The challenge is to develop scientific knowledge and practical workplace innovation interventions for a large group of organisations to whom these kinds of innovations may matter most.

There are two final methodological remarks on limitation. The study was cross-sectional, which does not allow inferences on causality, at best on relations. Besides, the results are based on self-reports for which we cannot exclude biases;

particularly with regard to measuring organisational performance, we could not make use of the organisation's own registration systems on administrative and production statistics.

6.2.3 Recommendations

The scientific recommendations follow from the discussion on limitations: replicatory research among other samples is necessary to validate the findings. The Lisbon Agenda makes a plea for innovation in order for European organisations to become more competitive. Economic analyses and productivity statistics focus on directly measurable indicators, such as R&D expenditures and (macro) productivity growth indicators. Output measures may be easier to grasp and 'irrefutable', whereas throughput measures may be hard to pin down and quantify. Maybe that is why self-reporting respondents are reporting that they are more active with *strategic orientation* and *product-market improvement* and that these two resources contribute more to organisational performance, than *flexible work* and *organising smarter*. If this reasoning is valid, there is much to be gained by workplace innovation interventions in the realm of *flexible work* and *organising smarter*. Today's 'knowledge economy' seems to become ever more dependent on 'people issues' (Boxall and Purcell, 2003) for success. Their quality of meaningful work, motivation, collaboration, talents, communication, and productivity may be best served by *flexible work* and *organising smarter* for which flow structures seem suitable.

Balancing the interests of both organisations and employees may not only help Europe to reach its economic targets, it may also benefit 'societal' goals, giving workplace innovation that broader tinge that we started with (as social innovation in Phills et al, 2008; Pol and Ville, 2009). Three innovations could coalesce:

1 focusing on flexible work and organising smarter seems less radical but it might become 'disruptive', in the words of Christensen et al. (2006), as it sets in motion a rather fundamental change with potential major impacts. Even a small shift away from 'structure follows strategy' to 'structure enables strategy' would be significant

2 focusing on 'people issues' and planet care brings a sustainability perspective within reach. This broader societal goal ('societal innovation') aligns environmental issues, quality of work issues and business issues (Brödner and Latniak, 2003; Brödner, 2008; Nidumolu et al., 2009; see also Karasek, 2004)

3 providing the RBV with an injection with insights from the fields of organisational (re)design could help to stimulate the convergence of strategy and business research with research on the process of producing goods and services.

Acknowledgements

The authors would like to thank our colleague Karolus Kraan for his contribution to the analysis of the data. We are grateful for the comments made on earlier drafts presented at the Second Annual Inscope Research Workshop in 2009 (Netherlands) and the ISA2010 World Sociology Conference (Sweden).

References

Aiken, L.S. and West, S.G. (1991) *Multiple Regression: Testing And Interpreting Interactions*, Sage Publications, Newbury Park.

Appelbaum, E., Bailey, T., Berg, P. and Kalleberg, A.L. (2000) *Manufacturing Advantage: Why High-Performance Work Systems Pay Off*, Cornell University Press, Ithaca, NY, and London.

Armbruster, H., Bikfalvi, A., Kinkel, S. and Lay, G. (2008) 'Organizational innovation: the challenge of measuring non-technical innovation in large scale surveys', *Technovation*, Vol. 28, No. 10, pp.644–657.

Armbruster, H., Kirner, E. and Lay, G. et al. (2006) *Patterns of Organisational Change in European Industry (PORCH): Ways to Strengthen the Empirical Basis of Research and Policy*, Fraunhofer Institute Systems and Innovation Research, Karlsruhe.

Ashby, W.R. (1958) 'Requisite variety and its implications for the control of complex systems', *Cybernetica*, Vol. 1, No. 2, pp.83–99.

Barney, J. (1991) 'Firm resources and sustained competitive advantage', *Journal of Management*, Vol. 17, No. 1, pp.99–120.

Becker, B.E. and Huselid, M.A. (1998) 'High performance work systems and firm performance: a synthesis of research and managerial implications', in G.R. Ferris (Ed.): *Research in Personnel and Human Resources Management*, Vol. 16, pp.53–101, JAI Press, Greenwich, Conn., Emerald.

Boxall, P. and Macky, K. (2008) 'Research and theory on high-performance work systems: progressing the high-involvement stream', *Human Resource Management Journal*, Vol. 19, No. 1, pp.3–23.

Boxall, P. and Purcell, J. (2003) *Strategy and Human Resource Management*, Houndmills, Basingstoke, Hampshire, Palgrave McMillan, New York.

Braverman, H. (1974) *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*, Monthly Review Press, New York, London.

Brödner, P. (2008) 'Sustainability in knowledge-based companies', in Docherty, P., Kira, M. and Shari, A.B. (Eds.): *Creating Sustainable Work Systems, Developing Social Sustainability*, pp.54-69, Taylor & Francis, London.

Brödner, P. and Latniak, E. (2003) 'Sources of innovation and competitiveness: national programmes supporting the development of work organisation', *Concepts and Transformations*, Vol. 8, No. 2, pp.179–211.

Brown, S.H. and Eisenhardt, K.M. (1998) *Competing on the Edge: Strategy as Structured Chaos*, Harvard Business School Press, Boston, Mass.

Browne, J., Harhen, J. and Shivnan, J. (1988, 1996) *Production Management Systems: An Integrated Perspective*, 1st and 2nd eds., Prentice Hall, Harlow, etc.

Brynjolfsson, E. (1993) 'The productivity paradox of information technology', *Communications of the ACM*, Vol. 36, No. 12 pp.67–77.

Christensen, C.M., Baumann, H., Ruggles, R. and Sadtler, T.M. (2006) 'Disruptive innovation for social change', *Harvard Business Review*, December, Vol. 84, No. 12, pp.94–101.

Christis, J.H.P. (2009) Wat is slim organiseren? Rede bij installatie als lector Arbeidsorganisatie en –productiviteit, Hanzehogeschool Groningen, in Dutch, 3 juni, Hanzehogeschool Groningen, Groningen.

Ciborra, C.U. (1996) 'The platform organization: recombining strategies, structures, and surprises', *Organization Science*, Vol. 7, No. 2, pp.103–118.

Cohen, J (1969, 1988) *Statistical power analysis for the behavioral sciences*, 1st and 2nd ed., Lawrence Erlbaum Associates, Hilsdale, NJ.

Cohen, W.M. and Levinthal, D.A. (1990) ‚Absorptive capacity: a new perspective on learning and innovation', *Administrative Science Quarterly*, Vol. 35, No. 1, pp.128–152.

Cummings, T.G. and Srivastva, S. (1977) *Management of work: A Sociotechnical System Approach. Kent*, Kent State University Press, OH.

Day, G.S. (1994) 'The capabilities of market-driven organizations', *Journal of Marketing*, Vol. 58, No. 4, pp.37–52.

De Leede, J., Huiskamp, R., Oeij, P., Nauta, A., Goudswaard, A. and Kwakkelstein, T. (2007). 'Negotiating individual employment relations: evidence from four Dutch organizations', *Interventions Économiques*, Vol. 35, No. 1, [online] http://www.teluq.uquebec.ca/pls/inteco/rie.entree?vno_revue=1 or http://www.teluq.uquebec.ca/interventionseconomiques (accessed 10 July 2010).

De Sitter, L.U., Den Hertog, J.F. and Dankbaar, B. (1997) 'From complex organizations with simple jobs to simple organisations with complex jobs', *Human Relations*, Vol. 50, No. 5, pp.497–534.

De Sitter, U. (1995) 'Human resources mobilisation: setting the stage for organisational innovation', in Andreasen, L.E., Coriat, B., den Hertog, F. and Kaplinsky, R. (Eds.): *Europe's Next Step: Organisational Innovation, Competition and Employment*, pp.243–249, Ilford (Essex)/Portland: Frank Cass.

Dyer, J.H. and Singh, H. (1998) 'The relational view: cooperative strategy and sources of interorganizational competitive advantage', *Academy of Management Review*, Vol. 23, No. 4, pp.660–679.

Eisenhardt, K.M. and Martin, J.A. (2000) 'Dynamic capabilities: what are they?', *Strategic Management Journal*, October/November, Vol. 21, Nos. 10/11, pp.1105–1121.

Goudswaard, A., Oeij, P., Brugman, T. and De Jong, T. (2009) *Good Practice Guide to Internal Flexibility Policies in Companies*, European Foundation for the Improvement of Living and Working Conditions, Dublin.

Gu, W. and Gera, S. (2004) *The Effect of Organizational Innovation and Information Technology on Firm Performance*, Ministry of Industry, Ottawa, Canada.

Hage, J.T. (1999) 'Organizational innovation and organizational change', *Annual Review of Sociology*, August, Vol. 25, pp.597–622, DOI: 10.1146/annurev.soc.25.1.597.

Heiscala, R. (2007) 'Social innovations: structural and power perspectives', in Hamalainen, T.J. and Heiscala, R. (Eds.): *Social Innovations, Institutional Change and Economic Performance*, pp.52–79, Edward Elgar, Cheltenham.

Huselid, M.A. (1995) 'The impact of human resource management practices on turnover, productivity, and corporate financial performance', *Academy of Management Journal*, Vol. 38, No. 3, pp.635–672.

Innovatieplatform (2009) *Slimmer werken werkt!*, in Dutch, Innovatieplatform, Den Haag.

Jacobs, D. and Snijders, H. (2008) *Innovatieroutine. Hoe managers herhaalde innovatie kunnen stimuleren*, in Dutch, Koninklijke Van Gorcum/Stichting Management Studies (SMS), Assen.

Jansen, J.J.P., van den Bosch, A.J. and Volberda, H.W. (2006) 'Exploratory innovation, exploitative innovation, and performance: effects of organizational antecedents and environmental moderators', *Management Science*, Vol. 52, No. 11, pp.1661–1674.

Jongkind, R., Korver, T., Oeij, P. and Vaas, F. (2004) 'Organisational perspective on market driven efficiency improvement', in Reitsma, A., Raes, S., Schmieman, E. and van Winden, P. (Eds.): *Market Regulation: Lessons from Other Disciplines*, pp.139–169, Research Series, 04AEP06, Ministry of Economic Affairs, The Hague, The Netherlands.

Karasek, R.A. (2004) 'A vacuum in political and economic labor policy?', *Bulletin of Science, Technology & Society*, Vol. 24, No. 4, pp.353–365.

Kauhanen, A. (2009) 'The incidence of high-performance work systems: evidence from a nationally representative employee survey', *Economic and Industrial Democracy*, Vol. 30, No. 3, pp.454–480.

Korver, T. and Oeij, P.R.A. (2008) 'Employability through covenants: taking external effects seriously', in Rogowski, R. (Ed.): *The European Social Model and Transitional Labour Markets: Law and Policy*, pp.143–169, Ashgate, Farnham and Burlington, VT.

Lam, A. (2004) 'Organizational innovation', in Fagerberg, J., Mowery, D.C. and Nelson, R.R. (Eds.): *The Oxford Handbook of Innovation*, pp.115–147, Oxford University Press, Oxford.

Levinthal, D.A. and March, J.G. (1993) 'The myopia of learning', *Strategic Management Journal*, Special Issue, Vol. 14, No. S2, pp.95–112.

MacDuffie, J.P. (1997) 'The road to root cause: shop-floor problem-solving at three automotive assembly plants', *Management Science*, Vol. 43, No. 4, pp.479–502.

MacIntosh, R., MacLean, D., Stacey, R. and Griffin, D. (Eds.) (2006) *Complexity and Organization: Readings and Conversations*, Routledge, London and New York.

Miles, R.E., Miles, G. and Snow, C.C. (2006) 'Collaborative entrepreneurship: a business model for continuous innovation', *Organizational Dynamics*, Vol. 35, No. 1, pp.1–11.

Nidumolu, R., Prahalad, C.K. and Rangaswami, M.R. (2009) 'Why sustainability is now the key driver of innovation', *Harvard Business Review*, September, pp.57–64.

Nooteboom, B. (2004) *Inter-Firm Collaboration, Learning and Networks: An Integrated Approach*, Routledge, London and New York.

Oeij, P.R.A. (2006) 'Do job autonomy and negotiation self-efficacy improve employment relationships?', *South African Journal of Industrial Psychology/Tydskrif vir Bedryfsielkunde*, Vol. 32, No. 2, pp.74–79.

Oeij, P.R.A., De Vroome, E.M.M., Sanders, J.M.A.F. and Vanden Bossche, S.N.J. (2009) *Netherlands Employers Work Survey (Werkgevers Enquête Arbeid) 2008: Methodology and Descriptive Results*, in Dutch, TNO, Hoofddorp.

Oeij, P.R.A., Dhondt, S. and Wiezer, N.M. (2006) 'Organisational conditions for low stress-risk jobs: Europe's case', *European Journal of Social Quality*, Vol. 6, No. 2, pp.81–108.

Oeij, P.R.A., Kraan, K.O. and Vaas, F. (2009) *Social Innovation Defined and Measured: A Theoretical Construct for Monitoring Social Innovation in Organizations and the Empirical Relation with Organizational Performance and Sickness Absence*, in Dutch, October, TNO, Hoofddorp.

Oeij, P.R.A., Kraan, K.O. and Vaas, F. (2010) 'Towards a scientific basis for social innovation', *Tijdschrift voor HRM*, in Dutch. Vol. 13, No. 1, pp.74–100.

Paauwe, J. (2007) *HRM and Performance: In Search of Balance*, Inaugural address Universiteit van Tilburg, 13 September, Universiteit van Tilburg, Tilburg.

Pettigrew, A.M., Whittington, R., Melin, L., Sanchez-Runde, C., Van den Bosch, F.A.J., Ruigrok, W. and Numagami, T. (2003) *Innovative Forms or Organizing: International Perspectives*, Sage Publications, London.

Phills, J.A., Deiglmeier, K. and Miller, D.T. (2008) 'Rediscovering social innovation', *Stanford Social Innovation Review*, Fall, Vol. 6, No. 4, pp.34–43.

Pol, E. and Ville, S. (2009) 'Social innovation: buzz word or enduring term?', *The Journal of Socio-Economics*, Vol. 38, pp.878–885.

Pot, F.D. and Koningsveld, E.A.P. (2009) 'Quality of working life and organizational performance: two sides of the same coin?', *Scandinavian Journal of Work and Environmental Health*, Vol. 35, No. 6, pp.421–428.

Pot, F.D. and Vaas, F. (2008) 'Social innovation: the Dutch experience: integrating productivity, innovation, employment and flexibility', *Personalführung*, Vol. 7, pp.40–46.

Rousseau, D.M. (2005) *I-deals: Idiosyncratic Deals Employees Bargain for Themselves*, M.E. Sharpe, Armonk, NY and London.

Sabel, C. (2006) 'A real-time revolution in routines', in Heckscher, C. and Adler, P. (Eds.): *The Firm as a Collaborative Community: Reconstructing Trust in the Knowledge Economy*, pp.106–156, Oxford University Press, Oxford and New York.

Schwarz, G., Clegg, S., Cummings, T.G., Donaldson, L. and Miner, J.B. (2007) 'We see dead people? The state of organization science', *Journal of Management Inquiry*, Vol. 16, No. 4, pp.300–317.

Senge, P. (1990) *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday/Currency, New York.

Simon, H.A. (1945, 1997) *Administrative Behaviour: A Study of Decision-Making Processes in Administrative Organizations*, 1st and 4th eds., The Free Press, New York, NY.

Simon, H.A. (1969, 1996) 'The architecture of complexity: hierarchic systems', in Simon, H.A. (Ed.): *The sciences of the artificial*, 1st and 3rd eds., pp.183–216, MIT Press, Cambridge, Mass., London.

Statistics Canada (2004) *2004 Workplace and Employee Survey: Survey Questionnaire*, Statistics Canada, Business and Labour Market Analysis Division & Labour Statistics Division, Ottawa.

Stegeman, H. (2005) *De conjunctuurgevoeligheid van ziekteverzuim*, in Dutch, CPB Document No. 99, Oktober, CPB, Den Haag.

Subramony, M. (2009) 'A meta-analytic investigation of the relationship between HRM bundles and firm performance', *Human Resource Management*, Vol. 48, No. 5, pp.745–768.

Taskforce Sociale Innovatie (2005) *Sociale Innovatie, de andere dimensie*, in Dutch, Eindrapport, 4 juli 2005, Ministerie van Economische Zaken, Den Haag.

Teece, D.J., Pisano, G. and Shuen, A. (1997) 'Dynamic capabilities and strategic management', *Strategic Management Journal*, Vol. 18, No. 7, pp.509–533.

Trist, E. and Murray, H. (1993) *The Social Engagement of Social Science: A Tavistock Anthology*, University of Pennsylvania Press, Philadelphia, PA.

Van den Bosch, F.A.J., Volberda, H.W. and De Boer, M. (1999) 'Co-evolution of firm absorptive capacity and knowledge environment: organisation forms and combinative capabilities', *Organization Science*, Vol. 10, No. 5, pp.551–568.

Van der Hauw, P.A., Pasaribu, M.N. and Van der Zeijden, P.T. (2009) *Slimmer werken: gebruik, mogelijkheden en opbrengsten in de praktijk*, in Dutch, Juli, Eindrapportage, EIM, Zoetermeer.

Volberda, H.W. (1998) *Building the Flexible Firm: How to Remain Competitive*, Oxford University Press, Oxford.

Volberda, H.W., van den Bosch, F.A.J. and Jansen, J.J.P. (2006) *Slim managen en innovatief organiseren*, in Dutch, Onderzoeksverslag, Congresbundel Slim Managen en innovatief organiseren, pp.23–69, ERIM, Erasmus Universiteit/Eiffel, ZP.

Wang, C.L. and Ahmed, P.K. (2007) 'Dynamic capabilities: a review and a research agenda', *International Journal of Management Reviews*, Vol. 9, No. 1, pp.31–51.

Wernerfelt, B. (1984) 'A resource-based view of the firm', *Strategic Management Journal*, Vol. 5, pp.171–180.

Wheatley, M.J. (1992, 2006) *Leadership and the New Science: Discovering Order in a Chaotic World*, 1st and 3rd eds., Berrett-Koehler Publishers, San Francisco, CA.

Womack, J.P. and Jones, D.T. (1996, 2003) *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, 1st and 2nd eds., The Free Press, New York, NY.

Wua, F. and Cavusgil, S.T. (2006) 'Organizational learning, commitment, and joint value creation in interfirm relationships', *Journal of Business Research*, Vol. 59, No. 1, pp.81–89.

Zuboff, S. (1998) *In the Age of the Smart Machine: The Future of Work and Power*, Basic Books, New York.

Notes

1 In the Netherlands and Belgium social innovation was initially used in a more limited scope, namely as workplace innovation; social innovation (or: social innovation of the workplace or organisational innovation) was applied as complementary to technical (or technological) and economical (or business) innovation, indicating that socio-organisational innovations were required to make technical and economical innovations really work. The reason why so many 'innovations fail', so it was assumed, is due to the lack of social innovation that accompanied the technical and economical innovations.

2 The WEA (Werkgevers Enquête Arbeid, in English: NEWS, Netherlands Employers Work Survey) systematically collects data on work and employment in establishments of profit as well as non profit organizations in the Netherlands (Oeij et al., 2009). The WEA is a two-yearly representative survey among 5000 establishments counting two or more employees. The aim is to monitor the employer policy developments in work and employment issues. The first survey took place at the turn of the year 2008/2009. The WEA uses a cross-sectional random sample of Dutch establishments, stratified on branch and establishment size. The respondents are either the director-owner or the HR-manager of an establishment. The WEA addresses the following themes:

- organisational characteristics
- working conditions
- employment and industrial relations
- social security
- organisational developments (social innovation, hierarchy, flexibilisation, ICT)
- personnel and HR-policy (social employment, integral health management)
- performance and output (productivity, turnover/profit, sickness absence).

3 It can be debated that combining aspects of numerical flexibility and functional flexibility into one construct is problematic as both may point to diverging aspects of quality of work, namely 'decreasing' and 'increasing' from the viewpoint of worker autonomy and learning options. In the new era, however, this viewpoint is changing as especially new enterers to the labour market regard numerical flexibility not always as disadvantageous. They may reward the possibility to balance work with private life and weigh the possibilities for learning opportunities higher than job security.

Appendix

Table A1 Means standard deviations and Pearson-correlations between the variables

		M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1	Size: 10–49 employees (%)	45	50	1																
2	Size: 50–99 employees (%)	20	40	–.46	1															
3	Size: 100+ employees (%)	35	48	–.66	–.37	1														
4	Agriculture, forestry and fishery (%)	1	10	.02	–.01	–.01	1													
5	Industry (%)	19	39	.04	.03	–.07	–.05	1												
6	Construction (%)	7	25	.00	.03	–.03	–.03	–.13	1											
7	Trade (%)	11	31	.01	–.03	.02	–.04	–.17	–.09	1										
8	Hotel and catering (%)	5	21	.01	.01	–.02	–.02	–.11	–.06	–.08	1									
9	Transport and communication (%)	7	26	.00	.00	.00	–.03	–.14	–.08	–.10	–.06	1								
10	Financial services (%)	3	18	–.03	.01	.03	–.02	–.09	–.05	–.07	–.04	–.05	1							
11	Commercial services (%)	16	36	–.01	.03	–.02	–.05	–.21	–.12	–.15	–.09	–.12	–.08	1						
12	Public sector (%)	4	20	–.10	.01	.10	–.02	–.10	–.06	–.07	–.05	–.06	–.04	–.09	1					
13	Education (%)	10	30	.07	–.02	–.05	–.04	–.16	–.09	–.12	–.07	–.10	–.06	–.15	–.07	1				
14	Healthcare and Welfare (%)	11	31	–.04	–.05	.09	–.04	–.17	–.09	–.12	–.08	–.10	–.07	–.15	–.07	–.12	1			
15	Services 'other' (%)	6	24	–.01	–.01	.02	–.03	–.12	–.07	–.09	–.05	–.07	–.05	–.11	–.05	–.08	–.09	1		
16	1% Women	42	29	.06	–.09	.02	–.11	–.27	–.30	–.01	.11	–.17	.02	–.06	–.01	.21	.45	.14	1	
17	% Employees < 25 year	13	16	.07	–.04	–.04	.02	–.11	–.01	.29	.34	.00	–.07	–.09	–.12	–.08	–.08	–.01	.10	1
18	% Employees 25–34 year	24	15	.06	.00	–.06	.00	–.11	.00	.00	–.01	.00	.04	.24	–.11	–.07	.00	–.04	.02	.00
19	% Employees 35–44 year	28	14	–.02	.02	.01	.03	.13	.00	–.06	–.15	.03	.11	.06	–.01	–.12	–.02	–.07	–.12	–.44
20	% Employees 45–54 year	24	14	–.05	.03	.02	–.04	.08	.00	–.18	–.16	–.03	–.03	–.12	.18	.16	.07	.04	–.01	–.47
21	% Employees 55–64 year	11	10	–.09	.00	.10	–.01	.05	.02	–.13	–.12	–.01	–.05	–.12	.11	.16	.04	.09	–.02	–.34
22	% Employees 65 year or older	1	4	–.01	–.03	.03	–.02	–.03	–.02	–.01	.01	.05	–.01	–.03	.01	.00	.02	.05	.01	–.02
23	% Unskilled	5	12	–.10	.06	.05	.01	.11	.09	.02	.08	.06	–.06	–.07	–.05	–.11	–.05	–.03	–.10	.02
24	% Low skilled	28	27	.05	.03	–.08	.07	.22	.22	.13	.04	.15	–.09	–.24	–.04	–.23	–.15	–.03	–.30	.17
25	% Medium skilled	37	26	.08	–.05	–.04	.01	–.03	–.07	.08	.05	–.02	.06	–.03	.01	–.19	.13	.04	.11	.08
26	% High skilled	29	30	–.07	–.01	.08	–.07	–.22	–.18	–.19	–.11	–.14	.05	.27	.05	.41	.05	.01	.22	–.23

Note: Correlations > |.041| are significant at $p < .05$.

Table A1 Means standard deviations and Pearson-correlations between the variables (continued)

		M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
27	Strategic orientation (1 = not at all – 5 = to a very large extent)	3.7	0.6	–.04	.01	.03	–.02	–.03	–.04	–.04	–.04	–.03	.01	.09	–.07	.08	.03	–.02	.04	.00
28	Flexible work (1 = not at all –5 = to a very large extent)	3.1	0.6	–.05	–.02	.07	.01	–.14	–.13	.02	.13	–.03	.04	.16	.01	–.11	.06	.03	.09	.08
29	Organising smarter (1 = not at all – 5 = to a very large extent)	3.4	0.7	–.02	–.01	.03	.01	–.02	–.07	.04	–.02	–.04	.01	.10	–.10	.03	.01	–.02	.05	.04
30	Product-market improvement (1 = not at all – 5 = to a very large extent)	3.8	0.7	.06	–.01	–.06	.00	.07	–.02	.07	.05	.00	.00	.12	–.24	–.07	–.09	–.01	–.05	.10
31	PCs (% users. at least weekly)	69	35	–.03	–.04	.06	–.13	–.20	–.26	–.04	–.17	–.13	.13	.25	.12	.23	.06	.05	.22	–.26
32	Computer controlled/supporting technology (% users at least weekly)	26	33	.01	–.03	.02	–.04	.07	–.09	.10	–.07	.01	.04	.07	–.04	–.01	–.11	–.03	–.05	–.02
33	Assembly line (% users at least weekly)	4	14	–.10	.06	.06	–.03	.38	–.07	–.01	–.05	.00	–.06	–.08	–.05	–.09	–.09	–.04	–.13	–.06
34	Process control directed ICT (0 = absent; 1 = present)	.90	.30	–.11	.03	.09	.03	–.01	–.07	.02	–.09	–.02	.05	.02	.04	.01	.02	.03	.00	–.08
35	Collaboration/communication directed ICT (0 = absent – 1 = both present)	.69	.42	–.19	.06	.15	.01	–.07	–.05	.01	–.07	–.03	.06	.09	.03	.05	.01	–.02	.00	–.08
36	Improvement organisational performance (1 = completely disagree – 5 = completely agree)	3.7	0.7	.02	.01	–.03	.01	.05	.02	.08	.05	–.01	–.02	.06	–.12	–.11	–.02	–.04	–.08	.17
37	Sickness absence rate	4.4	3.3	–.10	.03	.08	.01	.03	.04	–.04	–.06	–.03	–.05	–.10	.06	.07	.07	.00	.04	–.08

Note: Correlations > |.041| are significant at $p < .05$.

Table A1 Means standard deviations and Pearson-correlations between the variables (continued)

		18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
19	% Employees 35–44 year	–.16	1																	
20	% Employees 45–54 year	–.56	–.12	1																
21	% Employees 55–64 year	–.43	–.20	.33	1															
22	% Employees 65 year or older	–.10	–.10	–.05	.02	1														
23	% Unskilled	-.09	.00	.02	.07	.04	1													
24	% Low skilled	–.14	–.03	–.03	.00	.00	.09	1												
25	% Medium skilled	.01	.04	–.05	–.09	–.06	–.23	–.38	1											
26	% High skilled	.15	–.01	.07	.05	.04	–.27	–.62	–.41	1										
27	Strategic orientation (1 = not at all – 5 = to a very large extent)	.11	.04	–.09	–.10	.01	–.06	–.17	–.01	.18	1									
28	Flexible work (1 = not at all –5 = to a very large extent)	.07	–.01	–.10	–.08	.00	–.08	–.14	.04	.13	.24	1								
29	Organising smarter (1 = not at all – 5 = to a very large extent)	.11	.01	–.09	–.10	.00	–.03	–.12	.01	.11	.54	.29	1							
30	Product-market improvement (1 = not at all – 5 = to a very large extent)	.14	.05	–.18	–.18	–.02	.00	–.01	.03	–.02	.45	.21	.49	1						
31	PCs (% users. at least weekly)	.13	.06	.08	.04	–.04	–.32	–.55	.09	.54	.17	.16	.15	.04	1					
32	Computer controlled/supporting technology (% users at least weekly)	.03	.02	–.02	–.03	–.01	–.02	–.08	.03	.05	.07	.06	.09	.11	.26	1				
33	Assembly line (% users at least weekly)	–.05	.07	.06	.01	–.02	.25	.15	–.10	–.15	–.06	–.07	.01	.06	–.18	.09	1			
34	Process control directed ICT (0 = absent; 1 = present)	.06	.06	–.03	.00	–.02	–.03	–.13	.04	.10	.14	.10	.13	.07	.19	.09	.03	1		
35	Collaboration/communication directed ICT (0 = absent – 1 = both present)	.07	.06	–.03	–.02	–.01	–.07	–.16	.02	.16	.21	.17	.23	.16	.26	.16	.02	.32	1	
36	Improvement organisational performance (1 = completely disagree – 5 = completely agree)	.11	.00	–.19	–.18	.01	.05	.05	.00	–.07	.24	.17	.24	.33	–.09	.02	.03	.01	.02	1
37	Sickness absence rate	–.04	–.01	.09	.09	–.02	.10	.07	–.04	–.07	–.06	–.09	–.07	–.11	–.06	–.03	.10	–.00	–.01	–.08

Note: Correlations > \|.041\| are significant at $p < .05$.