

## HIGH PERFORMANCE WORK SYSTEMS AND PRODUCTIVE AGEING

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**Abstract.** Manufacturing companies face multiple challenges when maintaining production sites in western high wage countries. High Road to Innovation approaches in general and High Performance Work Systems (HPWSs) in particular are considered to have great potential to generate sufficient competitive advantage to keep manufacturing domestic. Another challenge in many European countries is an ageing workforce, which raises specific issues at the company level. During a research project in two major Austrian companies we investigate the applicability and effects of HPWSs when dealing with issues of Productive Ageing. In this contribution we present preliminary findings discussing the theoretical approach and early empirical findings of an exploratory nature.

**Keywords:** high performance work systems, productive ageing, high road to innovation, demography, manufacturing.

**Jel classification:** J24

### 1. Introduction

In a global environment companies have to cope with complexity and volatility and it is essential to be highly adaptable and innovative in order to be successful. All around the world, the dynamic development in emerging economies is accompanied by a massive expansion of infrastructure and large-scale educational projects. “A pair of skilled hands” can nowadays be found anywhere in this world, and many companies move their manufacturing sites or outsource production to regions where labour costs per unit are the lowest. (Examples like the Inditex Group by contrast demonstrate that production in Europe is feasible even for industries which typically manufacture in Asia.) For economic regions in developed countries this has dramatic consequences. Industrial production creates an overproportionally high number of jobs. E.g. Hon Hai Precision Industry Company Ltd. (also known as “Foxconn”), Apples primary manufacturer, achieved a turnover of almost 60 billion USD while employing a staff of 920.000 in the year 2010 (Liang-Chih, Huang 2010; CNN Money 2010). In the same year, Apple’s turnover amounted to 65 billion USD with a staff of 49.400 (United States Securities and Exchange Commission 2010). 5 million job losses were recorded in the USA over the last decade, which resulted from neglecting industrial production (Gertner 2011).

But outsourcing of industrial production has additional far-reaching consequences: The migra-

tion of know-how and eventually the loss of innovation capabilities. There are only few high-tech industries where the production process during a product development is irrelevant (especially when developing fundamentally new products). As product and process innovation are in most cases inseparably connected, outsourcing of industrial production divisions initiates a chain reaction. As procedural know-how highly depends on the interaction with the whole production process, it would consequently be enormously difficult to engage in research and development activities for groundbreaking process technologies if procedural know-how is not available at all production sites (Pisano, Shih 2009). In a long term perspective, production companies in industrialized countries are in fact bound to keep their production sites within the country although the prevailing social and environmental standards might be higher than in other regions. Innovative potential would otherwise be inevitably lost.

In scientific and practical discussions about how companies can maintain or gain competitive advantage in the future and at the same time manage to keep production domestic, “High Road”-strategies that focus on innovation, and in particular “High Performance Work Systems” (HPWSs) are considered to have great potential (Nolte, Haschen 2010).

Another challenge in many European countries and in Austria as well results from demographic changes, indicating an ageing workforce

on one hand and a scarce supply of new talent on the other. Both trends raise specific issues at the company level, which can be addressed in part by concepts of life-stage-oriented work organisation. Productive Ageing is a widely used key term in this context.

In an extensive research project in two Austrian companies we try to find empirical evidence that confirms our initial assumption: that what we have learned so far from investigating companies that adopt innovative approaches concerning the work organisation subsequently helps to address aforementioned challenges. The object of our research therefore is to extend our current focus from investigating the applicability and the effects of HPWSs in general towards the assumed strong connection between concept elements we got to witness so far in our field research (including self-managed teamwork, flat hierarchical structures, job rotation) and dealing with issues of life-stage-oriented work organisation / Productive Ageing.

Applying a range of empirical social research methods that have proven to be suitable so far we expect to gain insight into the how and why High Performance Work Systems may aid workers to ensure productive ageing within the firm.

## 2. What are high performance work systems?

In opposition to “Low Road” strategies which focus on cost leadership and standardization, HPWSs are assigned to “High Road” (to innovation) strategies. The latter focus on on-going reinvention processes of products and services, whereas creativity, experience and implicit knowledge of employees at all levels are vital for the outcome (Totterdill 2008; Brödner 2000). This “High Road” alternative is often referred to as the “knowledge economy, the paradigm which has underpinned the EU’s Lisbon Strategy” (Totterdill 2008).

As opposed to Tayloristic principles, HPWSs lead to a fundamental reorientation in operational rationalisation efforts resulting in a new and increased appreciation of human work. In this context, the aspects “self-control” and “self-organisation” are of particular importance. HPWSs, which are also known as high commitment or high involvement organisations, realise a managerial approach that facilitates high performance of employees and thus illustrates the amended character of work and the options of work sharing and knowledge sharing in today’s knowledge-based economy (Brödner 2000). HPWSs fundamentally differentiate themselves from traditional hierarchical or bureaucratic approaches which are basically command- and control-oriented (Lawler 1992) starting “(...) at the lowest level in an organisation.

Companies using the control-oriented approach assume that work should be simplified, standardized and specialized and that supervision and pay incentives should be used to motivate individuals to perform their tasks well. In essence, the thinking and controlling part of work is separated from the doing of the work” (Lawler 1992). Research on motivation has produced ample evidence that this approach does not work on an individual level (Pink 2011).

The original definition of HPWSs has been strongly influenced by Nadler *et al.* (1992) and reads as follows: “The High performance Work System is an organisational architecture, that brings together work, people, technology and information in a manner, that optimizes the congruence of fit among them in order to produce high performance in terms of effective response to customer requirements and other environmental demands and opportunities.”

Although the concrete forms of HPWSs vary enormously in the literature, Jeffrey Pfeffer identified the following seven dimensions which can be regarded as basic characteristics of HPWSs:

- Employment security
- Selective hiring of new personnel
- Self-managed work-teams and decentralization of decision making as the basic principle of organisational design
- Comparatively high compensation contingent on organisational performance
- Extensive training and education
- Few status distinctions and barriers like clothing, language, office arrangements and wage differences across levels
- Extensive sharing of financial and performance information throughout the organisation (Pfeffer 1998).

For our research project we are cooperating with scientific peers from the German SOFI “Soziologischen Forschungsinstitut Göttingen”, who have many years of research experience in the field of HPWSs. In the course of this cooperation we have adopted the conceptual framework of “innovative work policies” (we prefer to use in the Austrian debate the term “High Performance Work Systems” and we will use these terms synonymously in this paper), which had been developed by SOFI. Thus, “innovative employment policies” can be regarded as a ‘search term’ to identify post-Tayloristic organisational concepts concentrating on increased demands of companies due to innovation. This not only concerns the area of process design and work organisation in a narrow sense, but also includes the development of solutions in other organisational structures (Kuhlmann *et al.* 2004).

Another important principle of “Innovative work policies” takes into account the humane and social criteria that are considered to be on an equal basis with business parameters. “Innovative work policies” require companies to establish a potential-oriented working environment and organisational design leading to positive effects on the working situation (Kuhlmann *et al.* 2004). Not only the organisation as such, but also employees must be positively affected by such reorganisation measures and should benefit from these changes. Thus, the increase of efficiency and competitiveness should be combined with an improved working situation and enhanced cooperative structures in order to reinforce the utilization and further development of skills within the organisation. The concept of “innovative work policies” is therefore fundamentally based on the consensus of all parties involved (Kuhlmann *et al.* 2004). By establishing a win-win situation, which is recognized and acknowledged as such by both, the employer and the employees, the implementation process can be fostered and the potential of such forms of working organisations can be fully utilized.

This means by the same token, that reorgani-

sation measures which result in the implementation of so-called centers (cost-center or profit-center) through strategic decentralization and permanent self-organisation and self-optimization are not included in SOFI’s approach of “Innovative Work Policies”. Although several aspects of HPWSs such as flat organisational structures or increased responsibilities and decision-making on lower hierarchical levels are realised (Kirchner, Oppen 2007), the marketisation of the affected organisational units is not compatible with the mentioned social and humane criteria. It is not enough when employees solely have a higher degree of knowledge, are highly involved and committed, contribute actively to the company’s success and feel responsible for the latter (Lawler 1992). Totterdill shares the same view when he demands “win-win-outcomes” that strive for a convergence between enhanced productivity and quality of working life (Totterdill *et al.* 2009).

For the implementation of HPWSs six key areas can be identified and for each of them specific characteristics are described in the table below in comparison to the tayloristic and neo-tayloristic concepts.

**Table 1.** Characteristics of “Innovative Work Policies” (Source: Kuhlmann *et al.* 2004)

	<b>Innovative work policies / HPWSs</b>	<b>Taylorism and neo-tayloristic concepts</b>	<b>Not included in Innovative work policies / HPWSs</b>
<b>Work Organization</b>	Extended Group work (self-managed work-teams, integration of tasks and functions); flexible standardization	Enforced division of labour; hierarchical structures; rigid standardization	
<b>Process Improvement</b>	Close-to-process involvement of employees regarding process design and improvement	Detached, expert-based, centralized, selective process design and improvement activities	
<b>Company organisation</b>	Process-oriented decentralization; reduction of hierarchical structures	Centralized, bureaucratic, functions-oriented organisation	
<b>Management</b>	Extended competencies for low-level management; reduction of hierarchical structures; development-oriented approach	Hierarchical; command-and-control oriented management approach	
<b>Coordination and Controlling</b>	Process-oriented, negotiated coordination and controlling systems	Top-down or target-oriented coordination and controlling systems	Marketisation
<b>Wage systems and performance policies</b>	Broad mix of various remuneration components; integrated, negotiated and regulated wage and performance policy	Tayloristic-bureaucratic concepts of performance policies	Market based only

Self-managed teamwork based on the principle of self-organisation and integrating a wide range of tasks and functions is a key strategy of “Innovative work policies”. However, there is more to HPWSs than various forms of teamwork, and research shows an interactive effect with other “High Performance Work Practices” (HPWPs). Other HPWPs will not develop their full potential without the effective implementation of group work; they will in

turn positively affect group work when they are well-established (Kuhlmann *et al.* 2004).

A key element to higher productivity and stronger financial performance lies in the systematic implementation of HPWPs throughout a company by means of reorganizing the entire work system and not only applying individual practices (‘bundling of work practices’) (Kuhlmann *et al.* 2004). There is also evidence though that many

firms still take a 'piecemeal approach' in using such work practices rather than trying to employ a more innovative way (Denton 2006) thus narrowing the possible gain of such a systematic approach (Boxall, Macky 2009).

### 3. Productive ageing

“Each year as thousands of people are encouraged or forced to retire, their skills, knowledge and wisdom are lost and their opportunities to instruct, teach, consult or advise, listen and reflect, as well as to work, are cut off” (Butler 2002).

The issue of the ageing workforce is more important than ever before. However, this does not apply to people of age alone (as the term “ageing” would imply), it is becoming more and more evident that it concerns people of all ages. We need to define the role we want to play in regards to our own but even more the well-being of our society as a whole.

#### 3.1. Demographic change

As a consequence of demographic change the population of the EU-27 (consisting of the 27 member states as of 2011) – comprising 499,7 million inhabitants as of 2009 (Eurostat 2011) – will decrease slightly in the future while getting increasingly older. “Population ageing is a generalised process across EU Member States, and it is expected to continue in future decades” (Corsini *et al.* 2011). We have to take into account the decreasing birth rates and the resulting population decline, a minimal but steady increase in life expectancy and a shift in the age pyramid throughout Europe (Buck 2007). In economic terms the most important shift concerning the populace will be a decrease within the working age group (15 to 64 years) to around 40 million people by the year 2050. The *dependency ratio* (representing the number of people 65 years and older in relation to aforementioned group of *working age*) is presumed to double by the year 2050 and reach about 51%. This implies that prospectively there will be only two persons of working age for every person aged 65 and above – less than the current ratio of approximately four by one (Buck 2007; Corsini *et al.* 2011).

The demographic change – even though occurring in variable intensity (Corsini *et al.* 2011) – is the central challenge in Europe that needs to be addressed by members of all parts of society. It is not simply a question of how to finance social security systems but we have to come up with solutions on how to win and retain skilled work force (Behrens 2009). “The likely change in age structure is of more concern than the change in popula-

tion size. The median age is projected to rise to 47.9 years by 2060. The population of working age is expected to decline steadily. Older people would account for an increasing proportion of the population according to the same projections. The share of the population aged 65 and over is projected to increase from 17.4 % in 2010 to 30.0 % in 2060” (Corsini *et al.* 2011).

To what extent organisations in Europe will be affected by the demographic change depends on several factors: these include the specific field of activity, the size and the regional economic and labour market structures (Buck 2007). As an example one can see that in those branches of industry that handle reduction in staff through stopping new recruitment (or young and aspiring companies that depend little on reinforcement through new employees) a phenomenon called “Concerted Ageing” can be detected – over time the internal age pyramid turns upside down (Augusta 2007).

It is a central task of personnel policy to guarantee an age structure within the organisation that is as balanced as possible. They need to prevent any age group from becoming too dominant in order to avoid ageing gaps within the staff and therefore avoiding new recruitment and retirement happening in large waves. One key task can be found in strategic planning of personnel decisions by building up equilibrium of young and experienced employees – although this may be extremely difficult if one takes into account the remarks about the demographic shift (Buck 2007). Especially the development of employees’ knowledge and skills will become increasingly important insofar as organisations will be less and less capable of obtaining them by falling back on to recruitment of young employees. It will be necessary to integrate ageing employees into continuing training and innovation processes (Buck 2007).

In an effort to brace for these challenges scholars and practitioners talk about the importance of age- and requirement-appropriate work organisation. When including employees into the discussion it is necessary to analyse the working place concerning their potential strain, to develop alternative models of organising these working places and to think about and plan possibilities to reduce strain. Working places that require mainly intellectual effort are less critical in terms of the age of the workers. Diminishing performance of the employees is for the most part associated with working places that have high physical demands (Gasteiger *et al.* 2008). Essentially it is a question to provide people with the right education, good health as well as support from their workplace and – following our argument about High Performance Work Systems – the ability and opportunity to af-

fect one's work in collaboration with good leadership (Ilmarinen 2006).

Still answering this question is not easy, because: “[o]ne of the myths about older people is that they have similar needs and wants. In reality the individual differences found in any human group appear to increase with chronological age. So the oldest population segment is in fact the least homogeneous” (World Health Organization 1998).

“The right to work is basic to the right to survive. Work, denied to older people by practice and by attitudes, is often needed to earn a living and provide personal satisfaction” (Butler 2002).

Work can be considered as a fundamental right to every human being. If there is an involuntary long period without having the opportunity to work – always with the provision that the individual views labour as a worthwhile institution – people tend to experience this time as a reduction of their quality of life. Still one has to take into account that “the prospect of continued productivity in later life is premised on the observation that rather than a steady slide into increasing incapacity, most people are healthy and active for most of the adult life course and then decline very quickly before death, a phenomenon described as a compression of morbidity” (Tulle 2004).

Today it is evident, that older people have equal capacity to perform all tasks equally as good as younger employees – only the most physically demanding work operations may still indicate a “threshold” albeit that technological progress further lessens the strain on even the most physically demanding tasks so that all employees can perform them. Concerning the ability to learn new skills or adapt to new work environments (Bass, Caro 2001) and with respect to cognition (Skirbekk *et al.* 2011) there is evidence that old workers perform equally well. Even an often cited argument, that older workers are more expensive and therefore younger workers should be hired is not in accordance with the facts: “While it is true that wages and fringe benefits often rise with age, there is no reason to believe that performance and accumulated knowledge and skill of older workers does not compensate for the higher cost” (Donatti *et al.* 2005). Moreover: “In any case, older workers who are interested and available to work become a possible labour force in times of high demand and low unemployment” (Bass 2011).

### 3.2. What is there to do?

Many companies therefore need to rethink their personnel- and qualification policies. A promising approach may be following two strands of action:

proactive measures that put the focus on the various stages of the employees' lives and provide means to lifelong learning to ensure lasting employability as well as reactive “age-related” measures that take into account the balance between learning and performing (Gasteiger *et al.* 2008).

The German term “*lebenphasengerechtes Arbeiten*” (best translated as *lifephase-oriented working* but closely linked to the concept of *Productive Ageing*) describes the requirements of individuals during certain phases of their working life within an organisation: it refers to “(...) any activity by an older individual that contributes to producing goods or services, or develops the capacity to produce them (whether or not the individual is paid for this activity). (...) Productive aging, under this definition, is restricted to activities that can be quantified as to some form of economic value. (...) The term excludes activities that are simply enriching to the older person who performs them. Physical exercise and intellectual and spiritual activities, for example, are excluded” (Bass, Caro 2001). It is quite striking that the term is closely associated and widely used in health care – especially in context of geriatric care – as the effects we described earlier are especially relevant in this field of work as physical wear is dominant because of a large proportion of routine tasks and monotonous working (Gasteiger *et al.* 2008). Similar conditions can be found in demanding production work and the service sector where ageing employees face limits in their employability.

Still it remains to be seen how the warning signs will be perceived by relevant stakeholders throughout societies: “The gravest threat to a favorable change in worklife from the point of view of ageing is posed by the global economy and its harsh rules. The hard-core and softer values of worklife compete. The basic challenge is whether work and worklife will be developed according to the needs of people or to the terms of corporate economy” (Ilmarinen 2006).

### 4. Context and conditions of our research project

We are conducting a combined research project in the Austrian manufacturing plant of a global player in the automotive industries (company A, approx. 2000 employees) and in the Austrian production site of an international high tech company in the metal industries (company B, approx. 1.000 employees) to determine the impact of HPWSs on the adaptivity of organisations to volatile environmental conditions such as turbulent markets. In this context we have developed the concept of organisational agility and we have introduced this to

the scientific discussion in the field of Operations Management in July 2011.

In company A the main scope is the scientific accompaniment of the implementation of various HPWSs on the shop floor. Various sub-projects are being realised and are therefore in different developmental stages. For example a pilot area has been selected in 2011 to test company-specific forms of teamwork in manufacturing. We were monitoring the process of implementation, evaluated the effects and will again do the accompanying research, when the measures are rolled out on the entire shop floor, which will happen in 2012. Further activities include a complete reorganisation of operational management towards flat hierarchies and innovative approaches of integrating relevant areas on the shop floor into process-oriented structures. Thus, various HPWSs are being implemented in a systematic way and the bigger part of the plant will be involved in this project; in total 1.200 employees will be included in the project.

In company B we evaluate already existing forms of HPWSs, which are there organised in a company-specific production system.

Furthermore we are investigating in both companies whether HPWSs and organisational concepts like Productive Ageing are compatible and of mutual benefit. In addition we are also performing explorative research about the applicability of HPWSs in other areas besides production such as production logistics and R&D departments.

We have set up a multistage research process that relies on a combination of various sociological data collection analysis and methods. We tie this selection to the requirements of the case study method associated with industrial sociology to make sure that we fully understand the differences between the social processes and the company context it is embedded into. We understand that this approach is especially applicable when researching and evaluating the implementation and the effects of new forms of labour organisation.

### **5. Initial Findings about the applicability and the effects of HPWSs when dealing with issues of productive ageing**

Research of literature and best practices show that HPWSs and the concepts of Productive Ageing both share the same basic principle of reconciling the interests of the company and of the employees. This is done by establishing a win-win situation in creating a working environment and organisational design which lead to positive effects on the working situation and a high quality of working life

while at the same time utilizing the full potential of the employees. In fact one could argue that HPWSs can serve as the larger conceptual framework to integrate measurements of Productive Ageing into the organisation of work; or to describe it from the other perspective: Productive Ageing can serve as a guiding principle when setting up HPWSs in designing the work organisation to allow for taking into account the individual life-stage related requirements.

In company B formerly initiated efforts aiming at the implementation of Productive Ageing were integrated in our project. In the course of these internal actions a series of 9 group interviews including a total of 50 employees had been performed to determine the needs, requirements and expectations of the employees with regards to Productive Ageing. These interviews had been conducted according to the requirements of scientific data collection with regards to sample compilation and data evaluation and documentation of the results with the support of an international consulting company.

Thus, the findings derived from these data can serve for our explorative work to set up the broader empirical research in both companies and can be summed up as follows: The employees of company B at this stage demand improvements with regards to:

- Workplace health promotion
- Flexibility and range of the flextime models
- Flexibility and range of the part-time models
- Re-entry barriers after maternal and paternal leave
- Participation and communication during maternal or paternal leave
- Support for going abroad and for reintegration after return

The focus is primarily on flexibility with regards to working time models and the possibility, to temporarily leave the company and to return according to life stage requirements and/or career opportunities within the corporate group.

As already stated, research has shown, that HPWSs have a positive effect on the flexibility of an organisation in general (Kuhlmann *et.al.* 2004).

Analyzing the key characteristics of HPWSs there is more specific evidence, that they can contribute to meet the requirements which are attributed to Productive Ageing in various ways. We want to briefly illustrate this by means of self organised teamwork, decentralized decision-making and job rotation.

In the group interviews problems were reported regarding the managerial decision making about the compatibility of shift- and part-time-working as well as about the reintegration of em-

ployees returning from maternal or paternal leave. In both cases often rather specific individual and flexible solutions have to be found, which affect more than one member of the work team. These kinds of solutions are particularly suitable to be developed within the work team with the respective decision making taking place there as well. Regular job rotation increases the flexibility of the work team even more and opens opportunities to even better solutions.

## 6. Outlook and conclusions

With regards to the Productive Ageing focus of our research project we have finished the first phase covering literature research and collecting initial empirical findings of an exploratory nature. Our preliminary conclusion is, that HPWSs and measures to actualize Productive Ageing are compatible and show connecting factors and a potential for mutual benefits. Productive Ageing may contribute as a guiding principle when particular High Performance Work Practices are set up. For specific issues we assume synergetic effects. There is, for example, some evidence, that the concept of self-organized group work is well suited to solve the integration of individual flexibility requirements. With regards to knowledge transfer from retiring employees we believe, that specific High Performance Work Practices (e.g. job rotation) support the transfer and the preservation of tacit knowledge in the organization. These topics will be included in our future studies. During 2012 we will conduct extensive empirical research in company A as to evaluate the roll-out of HPWSs on the shop floor and in company B as to analyse the already implemented production system as a model of good practice for HPWSs. In both companies the requirements and expectations of the employees with regards to Productive Ageing and their appraisal of the current situation will be included in the investigation.

The data collection will start in March 2012. To gather necessary data we are performing the following methods at various points in the progression of our research:

- Cross-Examination to systematically survey the perspectives of various relevant stakeholders or groups thereof within the companies
- Expert interviews in the form of individual interviews and group discussions
- Quantitative Surveys focusing on employees
- Workplace observations (shadowing) and observation-interviews
- Document analysis techniques (including documents of completed and ongoing projects within the firm)

In summer 2012 we will be able to start presenting our findings in company B and by September 2012 in company A. Subsequently a comparative analysis for both companies will be completed in Winter 2012/13.

## References

- Augusta, R. 2007. Das Potential der Generationen, *Personal: Zeitschrift für Human Resource Management* 4: 46–48.
- Bass, S. A. 2011. *From Retirement to “Productive Aging” and Back to Work Again*. Gerontology in the Era of the Third Age: Implications and Next Steps, eds D.C. Carr, K.S. Komp. 169–188. New York, NY: Springer Publishing Company.
- Bass, S.; Caro, F. C. 2001. *Productive Aging: A Conceptual Framework*. Productive aging: concepts and challenges, eds N. Morrow-Howell, J. Hinterlong, M. Sherraden. 37–78. Baltimore, MD: Johns Hopkins University Press.
- Behrens, B. 2009. *Lebensphasenorientiertes Personalmanagement: Leistungs- und Beschäftigungsfähigkeit nachhaltig sichern*. Strategisches Management von Personalrisiken. Konzepte, Instrumente, Best Practices, ed M. Klaffke. 117–138. Wiesbaden, Germany: Gabler Verlag/GWV Fachverlage GmbH.
- Boxall, P.; Macky, K. 2009. Research and theory on high-performance work systems: progressing the high-involvement stream, *Human Resource Management Journal* 19(1): 3–23.
- Brödner, P. 2000. The Future of Work in a Knowledge-Based Economy. *ICT/CIREM Int. Seminar on “Economy and Work in the Knowledge Society”*. Barcelona 24–25 February 2000.
- Buck, H. 2007. Demografischer Wandel und öffentlicher Dienst. *Dokumentation der Europäischen Expertenkonferenz*. Brühl, Germany 2 May 2007.
- Butler, R. N. 2002. *Why survive? Being old in America*. Baltimore, MD: Johns Hopkins University Press.
- CNN Money. 2010. Global 500: *Our annual ranking of the world's largest corporations 2010* [online] [accessed 26 July 2010]. Available from Internet: <http://money.cnn.com/magazines/fortune/global500/2010/snapshots/11204.html>
- Corsini, V.; Gourdol, A.; Juchno P.; Kraszewska, K.; Marcu, M.; Oblak Flander, A.; Vasileva, K. 2011. *Demography Report 2010: Older, more numerous and diverse Europeans*. Commission Staff Working Document, European Commission. Luxembourg: Publications Office of the European Union.
- Denton, K. 2006. High performance work systems: the sum really is greater than its parts, *Measuring Business Excellence* 10(4): 4–7.
- Donatti, C.; Moorfoot, L.; Deans, D. 2005. *Defining Productive Ageing: Engaging Consumers*. Discussion Paper, National Seniors Productive Ageing Centre [online] [accessed 14 December 2011]. Available from Internet:

- <http://www.productiveageing.com.au/PDFs/Discussion%20Paper%20PA.PDF>
- Eurostat. 2011. *Eurostat regional yearbook 2011*. Eurostat European Commission. Luxembourg: Publications Office of the European Union.
- Gasteiger, R. M.; Lorson, H.; Leckebusch, H. 2008. *Pro 50 – Arbeit mit Zukunft: Ist Ihr Unternehmen fit für den demografischen Wandel?* First edition. Frankfurt am Main, Germany: PricewaterhouseCoopers AG.
- Gertner, J. 2011. Make or Break, *New York Times Magazine* 28 (August): 42.
- Ilmarinen, J. 2006. *Towards a longer worklife! Ageing and the quality of worklife in the European Union*. Finnish Institute of Occupational Health, Ministry of Social Affairs and Health, Helsinki [online] [accessed 14 December 2011]. Available from Internet: [http://www.stm.fi/c/document\\_library/get\\_file?folderId=39503&name=DLFE-8602.pdf](http://www.stm.fi/c/document_library/get_file?folderId=39503&name=DLFE-8602.pdf)
- Kirchner, S.; Oppen, M. 2007. *Das Ende der Reorganisationsdynamik? High Performance Work Practices als Muster der Reorganisation in Deutschland*. Discussion Paper SP III 2007–103: Wissenschaftszentrum Berlin für Sozialforschung.
- Kuhlmann, M.; Sperling, H. J.; Balzert, S. 2004. *Konzepte innovativer Arbeitspolitik: Good-practice-Beispiele aus dem Maschinenbau, der Automobil-, Elektro- und Chemischen Industrie*. Berlin: Edition Sigma.
- Lawler, E. E. 1992. *The ultimate advantage: Creating the high-involvement organization*. San Francisco, CA: Jossey-Bass.
- Liang-Chih, C.; Huang, F. 2010. *Foxconn plans to increase China workforce to 1.3 million*. Focus Taiwan News Channel [online] [accessed 15 September 2011]. Available from Internet [http://focustaiwan.tw/ShowNews/WebNews\\_Detail.aspx?ID=201008190012&Type=aECO](http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201008190012&Type=aECO)
- Nadler, D. A.; Gerstein, M. S.; Shaw, R. B. 1992. *Organizational architecture: Designs for changing organizations*. First edition. San Francisco, CA: Jossey-Bass.
- Nolte, H.; Haschen, S. 2010. *High Performance Work Systems: Overview and Discussion* [online] [accessed 5 October 2011]. Available from Internet: [www.odww.net/artikel.php?id=475](http://www.odww.net/artikel.php?id=475)
- Pfeffer, J. 1998. *The human equation: Building profits by putting people first*. Boston, MA: Harvard Business School Press.
- Pink, D. H. 2011. *Drive: The Surprising Truth About What Motivates Us*. First Riverhead trade pbk. edition. New York, NY: Riverhead Books.
- Pisano, G.; Shih, W. 2009. Restoring American Competitiveness. *Harvard Business Review* 87(7-8): 114-125.
- Skirbekk, V.; Loichinger, E.; Weber, D. 2011. Variation in cognitive functioning as a refined approach to comparing aging across countries. *Proceedings of the National Academy of Sciences of the United States of America*. doi:10.1073/pnas.1112173109
- Totterdill, P. 2008. New forms of work organisation: the high road to innovation. *Enterprise for Health Management Conference*. London 30–31 October 2008.
- Totterdill, P.; Exton, O.; Exton, R.; Sherrin, J. 2009. *Workplace Innovation Policies in European Countries*. A Report to KOWIN. Nottingham: UK Work Organisation Network.
- Tulle, E. 2004. *Old age and agency*. New York, NY: Nova Science Publishers.
- United States Securities and Exchange Commission. 2010. Apple Inc, Form 10-K for the fiscal year ended September 25, 2010 [online] [accessed 15 September 2011]. Available from Internet: [http://www.sec.gov/Archives/edgar/data/320193/000119312510238044/d10k.htm#tx37397\\_7](http://www.sec.gov/Archives/edgar/data/320193/000119312510238044/d10k.htm#tx37397_7)
- World Health Organization .1998. The “new” old age: Challenging the myths of aging. *Report of Sixth Annual Conference of the Regions for Health Network*. Katowice, Poland 2-3 October 1998.