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Human capital and knowledge development connection to productivity

Introduction

This paper aim is to describe plausible theoretical explanation for human resource development link to business performance. Action research case studies indicate that organization knowledge improvement seems to increase organization performance and human capital productivity. These findings are analyzed at this paper for finding the explanation why the organization knowledge development can derive better business performance and productivity.

Theoretical background

The paper tries to explain the phenomen why human resource development may contribute better performance in business scorecards. It has been argued that strategic human resource management research lacks a strong theory that integrates the mechanism through which the HR practices influences firm performance [see Guest 1997; Becker & Huselid 2006; Fleetwood & Hesketh 2010]. One of the most important functions for human resource management (HRM) is to add competitive business value to the organization [e.g. Pfeffer 1994; Ulrich 1997; Guest 1997; Becker & Huselid 2006]. The interest at human resource management connection to business performance (HRM-P) have increased along with the research on business scorecards metrics and their linkages to HR scorecards [e.g. Business Score Card and Strategy Maps of Kaplan and Norton 1996 and 2004; HR scorecard of Becker et al. 2001; HCROI of Fitz-Enz 2000; IIP of Cascio & Boudreau 2008].

There are multitudes HR-practices which have shown to support positive correlation with business performance, for example:

– Ichniowsky et al. [1997]: innovative HRM practices raised worker productivity,

- Huselid [1995] and Becker & Huselid [1998]: High Performance Work Practices improved employee performance
- Guest [1997]: HR practices which have good fit with strategy, policy and context, seem to be associated with superior performance,
- Kesti and Syväjärvi [2010]: Systematic tacit signal development process helps implementing optimal workplace innovations, which contribute better business performance.

However there are found positive correlation with the HR practices and business performance there is lacking the ultimate theory that explains the phenomen. Researchers should attempt to open up the 'black box' of the causal relationship between HR components (X) and unit of organizational performance (y) [Becker et al. 2001, Fleetwood & Hesketh 2010]. Indeed there is obvious need for managers and executives to know whether the HR development in question will produce a change in employee performance and, if so, by how much? [Becker et al. 2001]. Although configuration of certain buddle of HR-practices seem to promote better performance [see e.g. Lumijärvi 2009] there remain several open questions to succeed in explaining and further utilizing the research outcomes.

Organizational development seems to be complex and the attempt to increase performance by copying other organizations' best practices will usually cause major failures [Totterdill et al. 2002]. There seems to be too little effort in solving the mechanism of how HRM actually influences organization performance [Guest 2001; Paauwe 2004; Becker & Huselid 2006; Lumijärvi 2009; Fleetwood & Hesketh 2010]. There have also been problems in generalizing the HRM-P research outcomes because situations, organizations and their people are so different [see Ramsay et al. 2000; Guest 2001; Sila 2006; Fleetwood & Hesketh 2010]. For example Ramsay et al. [2000] tested three models from High Performance Work System (the High-Commitment Model, the High Involvement Model and the Labour Process Model) and found no adequate account of the outcomes. Thus there is needed more research to find theoretical explanation why certain HR-practice may create better organization performance. When this ground phenomen is better understood it should be possible to create generalisable organization development practices.

Investments are sacrifices that decrease the existing consumption possibilities but are supposed to give earnings and consumption possibilities in the future [Corrado et al. 2005. For example if organization invests in staff training it will decrease the staff available time for actual work in short notice, but may improve the work processes lead time in the future. This investment phenomen in human capital productivity can be studied by using the production function.

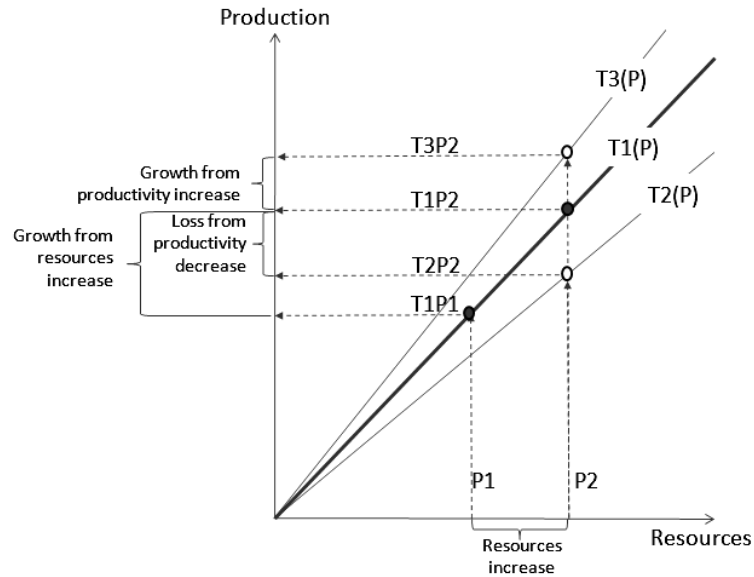

Figure 1
Production function principle

At the figure the company increases production resources from P1 to P2. If the productivity remains at the same level the company would improve production from T1P1 to T1P2. However, in case of human resources the work orientation will take so long that the productivity will decrease, at least in short notice. Therefore the production is T2P2 and company will suffer certain loss from productivity decrease. After the new resources are properly trained the productivity will improve to T1P1. Maliranta and Asplund [2007] found out that higher education employees recruit will decrease the company productivity for average as long as two years.

Several empirical case studies indicate that organization is able to increase the productivity, which in productivity function means that the company will gain additional growth to production level T3P2. This phenomen applies for technology investments as well as organization human resources development. Daveri and Maliranta [2007] noticed at case studies that personnel training will contribute to higher productivity after two years time. R&D investments give best productivity raise after four years when production quality and capital deepening is considered [Rantala 2008].

Human capital productivity

Production function describes the production performance by the function between input and output (Saari 2006). Production function measures the Gross Value Added (GVA) that is created by the investment on labour and production capital. Gross Value Added is production value deducted by intermediate costs such as raw-materials, energy, components and outsourcing services and supplies that are needed for production [Camus 2007]. Finnish National Account Statistics specify Gross Value Added as the value generated by any unit engaged in a production activity.

$$\text{Production function} = \frac{\text{Gross Value Added}}{\text{Production input}} = \frac{\text{Production output - Intermediate costs}}{\text{Labor + Capital}}$$

In microeconomics business account the intermediate costs can be seen as variable costs that are depended on the revenue created. Investments on labor intangible assets reduce production function value in short term, but after improved productivity the production value will improve. Same phenomen is at the production capital – when company invests on technology the better gross value added will follow, assuming that technology is utilized effectively at the organization.

Efficiency is general term of economic activity that describes a value created by the sacrifices [Saari 2006]. Thus improving efficiency is done either creating same value by minimizing the sacrifices or increasing the value with the same sacrifices. Productivity and profitability are specified concepts of efficiency. Saari [2000] point out that at efficiency improvement should include both quantity and quality meaning that efficiency may improve by creating better quality with the same output and input quantity.

In microeconomic business account the equation leads to HCROI, that Fitz-Enz [2000] introduced for human capital productivity metrics. Fitz-Enz [2000] describes HCROI as revenue reduced by expenses that does not include staff costs and then the numerator is divided by staff costs. Kesti [2009] specify human capital ROI as Gross margin divided by staff costs. Kesti [2009] wants to increase the meaning of human capital and therefore he deducts only variable costs from the revenue (or sales). This is due to the fact that variable costs include human based quality costs that the organization cause when there are mistakes and poor work quality. For example if organization tries to increase production volume it may in haste create more quality errors [Kesti 2010]. Variable costs are related to the revenue (production volume). Gross margin describes the organization contribution and it is therefore called also the contribution margin.

Therefore labour productivity, as partial productivity measure, can be specified by following equation

$$\frac{\text{Sales - Variable costs}}{\text{Labour costs}} = \frac{\text{Gross margin}}{\text{Labour costs}} = \text{HCROI}$$

HCROI indicate the human capital ROI by showing how much Gross Value Added is made through money invested on employees. Instead of dividing the equation by labour cost there can also be used FTE or hours worked. HCROI value varies at different business branch depending on required tangible capital among other things [Kesti 2007].

Most business areas the capacity of personnel determines the possibilities to make revenue. In municipal organization the personnel is the most important factor determining the volume to produce services. Therefore it is interesting to measure the human capital revenue factor (HCRF), which is the revenue divided by number of employees [Fitz-Enz 2000]. Number of employee should be calculated at full-time equivalent (FTE) – it is the number of labour input calculated in yearly working time. Labour input capacity grows when total hours worked increase or if the quality of labour work increases [Bell et al. 2004]. Labour is the single most important factor in organization productivity and therefore it is needed to measurement the hours worked for analyzing labour productivity [OECD 2001].

Lönnqvist [2007] studied eleven business branch companies' (micro-enterprises not included) investments on intellectual capital (IC) and its correlation to productivity. The study, based on business scorecards from the years 2001 to 2003, discovered that relationship between IC investments and productivity are negative on a short range, but seem to be turning positive later on. It seems that in the entire case sample, the investments in IC do not correlate clearly with the efficiency of IC. It seems that in general the IC investments are not effective for improving productivity. Lönnqvist suggests further research studies to be conducted in individual organizations using action research to indentify components of intellectual capital and productivity. Daveri and Maliranta [2007] made the observation in their case studies that personnel training will contribute to higher productivity after two years' time.

According to the Finnish working time statistics the average time spent for actual work is around 81% of the theoretical regular yearly working time [Elinkeinoelämän Keskusliitto 2008]. Statistics do not separate the time required for orientating new workers or for time spend for workplace development, therefore they are included in the 81%. In a single organization it is possible to get quite accurate data on the distribution of working hours. The time for actual work can be

calculated by deducting vacancies, absence and other non-working hours from the total working time. I propose that working time distribution statistics should recognize orientation time and organizational development time. Furthermore, to explain theoretical connection in HRM-P the effective working time and other working time need to be identified.

The other working time includes PAF or PAFF classification for quality work (BS6143-2) that is not actual operative work. The abbreviation PAF comes from the classification of work and expenses into Preventive actions, Appraisal work, handling of internal Failures and external Failures:

a. The cost of preventive actions (Prevention costs)
– Training, guiding, instructing, quality system, preventive maintenance, auditing, cleaning, alarm systems, maintaining order.

b. Appraisal costs
– Checking, testing, measuring, quality control, piloting, sample taking and analyzing.

c. Internal failure costs (Failure)
– Waste, scrap, redoing, fixing, rechecking, defects finding, correction, repairing.

d. External failure costs (Failure)
– Customer reclaims corrections, returned products, guarantee costs.

Labor input capacity grows when the amount of total hours worked increase or if the quality of labour work increases [Bell et al. 2005]. Labor is the single most important factor in organization's productivity and therefore measurement of the hours worked is needed for analyzing labor productivity [OECD 2001]. The European Commission's employment report for the year 2002 indicates that better job quality should lead to significantly higher labor productivity.

Organization performance improvement empirical case studies

In longitudinal research case study, the effect of the human resources knowledge development was observed during two years using action research. In this research the part of organization knowledge was identified by competencies of leadership and culture, which were measured using tacit signals competence measurement [see Kesti et al 2008, Kesti & Syväjärvi 2010]. In the whole sample of 19 business units, the competence improvement correlation with average HCROI and revenue growth was 0.59 indicating a somewhat considerable correlation. It should be noticed that staff competence improvement had greater meaning than the staff number increase that had correlation 0.46.

The next figure illustrates that higher competence increase seems to correlate with business improvement. The figure demonstrates that staff increase is nearly the same in both sorting under examination. Although the better half has increased revenue about 10% more than what the staff increase is. This means that the revenue increase does not come solely from increased number of staff but from other phenomena as well. These phenomena need to be discovered in order to create a mathematical model for human intangible capital productivity increase. It seems that competencies increase could be the cause for better performance, since the competencies have improved about 10% [(81 – 74)/74 = 9.5 %]. Furthermore, the other case sample where revenue has dropped 5% compared to the staff increase, the competence decrease seems to be in line with the revenue change [(84 – 79)/84 = 5.9 %)].

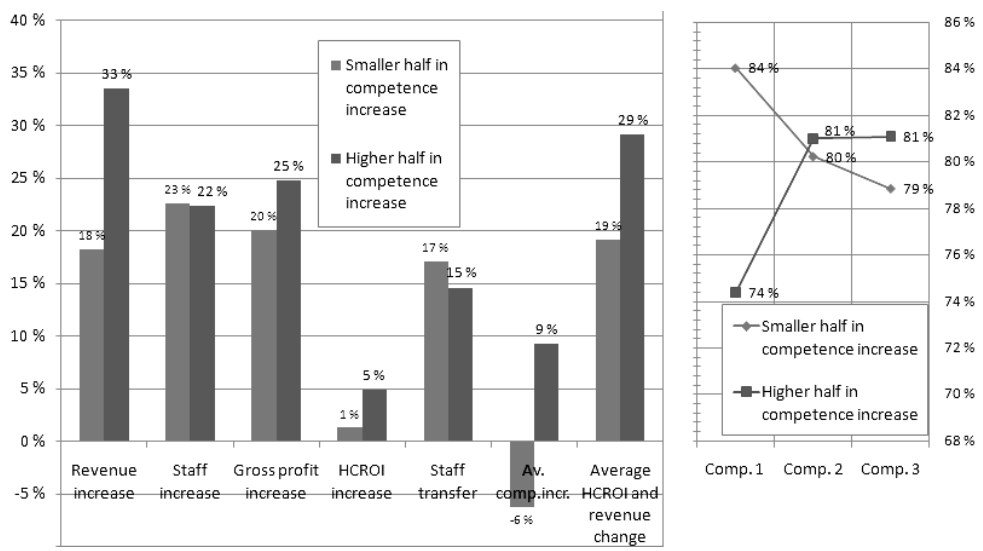

Figure 2
Competence improvement correlation to business improvement in two chosen sample groups [Kesti 2011]

It is logical that the staff increase reduces the HCROI at least at the beginning, since the new staff tends to cause more costs than gain profits. It has been argued that highly educated workers need as long as two years of orientation to be able to increase the productivity of a company [Maliranta & Asplund 2007].

Theoretical explanation for HRM-P connection

The study on the quality of Finnish companies indicated that wasted working time was the biggest single reason for quality costs [Andersson et al. 2004]. Liuk-

konen [2008] argues that as motivation weakens the quality mistakes and costs increase. This lead to the thought, that if the competencies (indicating the quality of working life) are improved it will derive more time for effective work.

The HRM-Performance improvement phenomen could go as follows: workers feel development needs because they feel their contribution gets somewhat wasted. Tacit signal development process will help them to implement bundle of optimal improvements which increase the competencies (decrease development needs). These improvements will reduce the wasted working time, thus increasing the effective working time. However abovementioned only if workplace development was effective enough to contribute excess. Increasing effective working time makes it possible to produce more revenue with the same cost construction, leading to improved productivity. The phenomenon is logical and sensible and seems to explain the empirically grounded findings.

In most production processes the labor is the most important input factor and therefore should be evaluated more thoroughly. The staff size is not an adequate factor since many workers are working different hours per year. It is possible to calculate the full-time-equivalent (FTE) from the staff accounts by dividing the total working hours with the nominal working hours per year. This FTE is the total labor resource pool and should be used when calculating, for example, the revenue per employee. The quantity of labor can be measured from the hours worked and the labor cost by multiplying the total hours with the average compensation per hour.

For productivity measurement purposes the total working hours or FTE is not nearly enough. Firstly, the total working hours (paid hours) are different from the hours spent for actual work contribution. Secondly, each employee has a different contribution to the organization value-adding process. In addition to the physical presence (hours for actual work), the contribution also includes the value of personal human capital – meaning that one hour's input from one person is not necessarily the same as one hour's input from another [OECD 2001]. In macroeconomics there are several attempts to solve this problem of quality effecting labor input. Jorgenson et al. [1987] have used age, education, class of workers, occupation and gender as characteristics describing the workers' quality contribution. Lavoie and Roy [1998] have used a classification based on skill intensity and occupational distribution of working hours.

Certainly, the hours used for actual work is a significant factor in measuring total capacity and productivity compared to costs. Measuring only the total actual working time does not take into account the deepening of human capital. Considering the PAFF work quality distribution principle the actual time for work can be divided in effective working time and other working time (PAFF). In this approach the total capacity is achieved in the total effective working time. The

problem lies in the measuring of the division between other working time and effective working time. Accurate measurement is not possible in real life, since measuring it will change the distribution because only the workers themselves know the actual time consumed and time registration would increase the other working time (Appraisal part in PAFF).

The example calculation explains best how productivity is derived from human resource knowledge development. Studying the example company that makes 100 M€ revenue and its average competencies are at level of 70%. Company have variable costs are 60 M€, staff costs 15 M€ and other fixed costs 15 M€. We will simplify the example so that the company has 0% staff turnover and 0% staff growth. As in the research case higher half (Figure 2), the company manages to improve its competencies from 74 to 81%. In illustrative case example the company will improve competencies from 70 to 75%. Obviously this requires some additional working time investment at staff training and workplace development. Two situations are calculated keeping the company cost structure unchanged, meaning that fixed costs remain the same and variable costs depend on the revenue change. In this simplified analysis the competence improvement reduces absence and thus also staff costs. Absolute variable costs do also change because they are dependent on the revenue (material and other purchase increase with the revenue). With this in mind, it is simple to calculate the meaning of the changed situation for the business in EBITDA (earnings before interests, taxes, depreciation and amortization).

The example company improves its competence with 7% (percentual increase) which reduces the same percentual amount of sickness absences and accident absences. As a result the company gained 5.5 M€ more revenue and 2.8 M€ more EBITDA. This is possible in case that the market is growing and so the company can utilize additional working time in making more revenue.

In this phenomenon, implementing optimal workplace innovations will improve competencies by releasing hidden powers for removing obstacles that are preventing the effective work, thus increasing the effective working time in case that there is excess for that after the workplace development.

Discussions

Boudreau and Ramstad [1999] point out that measurement framework is needed for developing theoretical logic to support the inference that investments on human resource strategies lead to organizational success. The research results indicate that initially the group implements the optimal workplace innovations, which will then improve the competencies and organization knowledge. If the op-

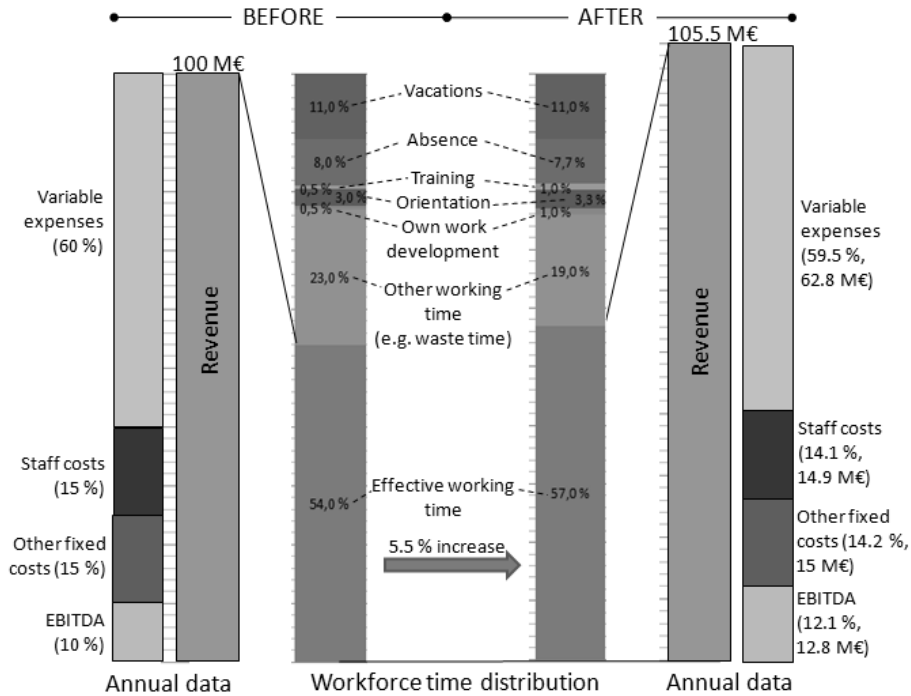

Figure 3
Figure illustrates an example company's competence improvement's effect on revenue (REV) and gross margin (EBITDA)

timal improvement actions are conducted effectively there will be improvement in the actual effective working time's share from the theoretical working time. In this case, the workplace innovations will improve the human competencies and business performance simultaneously. This is in line with the understanding that collectively agreed upon improvements (workplace innovations) can be linked to the organization's collective knowledge sharing, work well-being, values and beliefs and organization performance which are characteristic of competence management and thus corporate governance [e.g. Syväjärvi 2005; Cameron & Quinn 2006; Kets de Vries 2006; Harisalo & Miettinen 2010].

This research assumption is that organization's operative business capacity and productivity are derived from effective working time. According the empirical findings it seems that effective organization development have tendency to improve the competencies contributing to the organization's human capital productivity increase. Several cross-studies also indicate a positive effect on job quality as the employees' absence from work statistics has decreased significantly (e.g. Telma 2010). It is clear that this research is only the beginning of a new era in organization performance development research. Certainly when the

methods and theories are implemented in organizations with different cultural backgrounds there will be new interesting findings. Hopefully this paper will encourage further research and practical case studies in the field of human resource development affect to business performance (HRM-P).

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Rozwój kapitału ludzkiego oraz wiedzy w relacji do produktywności

Streszczenie

W artykule przedstawiono zagadnienie zarządzania produktywnością kapitału ludzkiego oraz rozwoju działalności gospodarczej. Postawiono przypuszczenie, iż operacyjna pojemność działalności gospodarczej pochodzi z efektywnie wykorzystywanego czasu pracy. Badania empiryczne wspiera konkluzja, iż efektywny rozwój organizacji poprawia kompetencje pracowników, przyczyniając się tym samym do wzrostu produktywności kapitału ludzkiego w organizacji. Poprawnie i efektywnie przeprowadzony rozwój organizacji powinien kreować optymalne i innowacyjne miejsce pracy, które pozwoli na zwiększenie udziału efektywnie wykorzystanego czasu pracy w czasie pracy ogółem. Wynika to z optymalnego podejścia do innowacyjnego miejsca pracy, które podnosi jednocześnie kompetencje pracowników oraz usprawnia prowadzoną działalność. W artykule udowodniono wiarygodne teoretyczne wytłumaczenie powiązania źródeł kapitału ludzkiego w odniesieniu do prowadzonej działalności gospodarczej. Naukowa wartość przedstawionych badań jest ważna z uwagi na objaśnienie zjawiska tworzenia wartości w odniesieniu do rozwoju działalności gospodarczej. Artykuł powstał na podstawie badań przeprowadzonych w ramach dysertacji, która będzie opublikowana w 2012 roku przez Marko Kesti.