Making the Difference: The Organization Capital

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Abstract
Organization capital is embedded in the firm in its running business and marketing. As instrument to this we use employee compensations in marketing, administration and management using Finnish LEED data encompassing all firms listed in the Helsinki stock market 1995-2006. Organization capital is shown to explain earnings evolvement and the accrual of book values and notable share of the variation in the market value, especially so in the service-sector firms. Organization capital is concentrated in high market value firms having global operations, and is tied up with IT assets and human resource management. Large Finnish firms that have expanded abroad have twice more organizational capital than comparable domestic firms.

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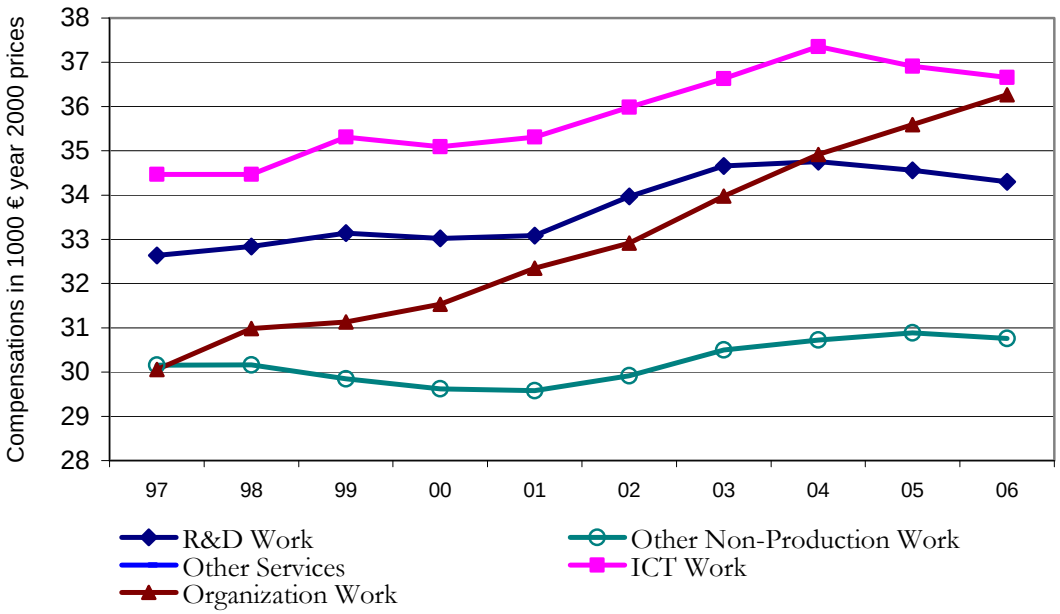
1. Introduction

The economies are facing a second wave of globalization, characterized by specialization in tasks and inter-industry trade (Baldwin, 2006). The binding factor for maintaining the global network of production and marketing is organization capital. Organization capital codified in the firm's operations and distribution of tasks improves productivity of other factors, perhaps even more so in times of recession. Organization-work related to top management, marketing and administration has become the most rewarded work, but influence book values predominantly only in mergers. Figure below shows annual compensations (salaries + 30% social security payments) per capita for skill-intensive (non-production) work in manufacturing.

Figure 1. Annual Compensations for Organization and other Non-Production Work in Private Sector in Finland 1997-2006



(i) In 2000 prices with the deflator capital investment and wage indices with equal weight.
(ii) Organization Work includes top management, marketing, administration.
(iii) Other Non-Production Work includes supply, transport, maintenance, finance administration.
(iv) Other Services Work includes sales contract work, warehouse, transport services, maintenance, forest services, hotel and restaurant-related, health sector, cleaning, forwarders services, insurance, teaching.
Source: Data from The Confederation of Finnish Industry and Employers.

It is seen that in mid 1990's compensations for organization work per capita were roughly equal to compensations for other non-production work. Since then the compensations for organization work have increased beyond that for R&D work and in last two years matching the level of compensations for ICT work.[1]

Organization capital is interlinked with managerial resources. Prescott and Visscher (1980) first introduced "organization capital" as management-related abilities of measuring

[1] The OC figures exclude top management and hence most of the option incomes.

performance of its personnel in improving matches between employees and jobs, working in teams, and the human capital of the firm's employees. This broad definition emphasizes organization capital in people. Harvey and Novisevic (2005) also emphasized managerial competencies appropriate for competing in a global context. Employees in the marketing are also at the core of organization capital as evidenced by Miyagawa and Kim (2008). Marketing can be divided to that provided by the firm and that purchased from advertising agencies, where internal marketing can be more strategic.[2]

Lev and Radhakrishnan (2003; 2005) were the first to use an instrument proxying for organization capital. Their preferred estimate relies on using the firm's sales, general, and administrative expenses (SGA). They find annual measure of organization capital to predict market values of the firm well in advance. This information of SGA is typically available in Anglo-Saxon firms reporting operation-based financial accounting. We find the growth of SGA to be tightly correlated to sales growth and, as Solow residual, capturing many other features not related to organization capital. We use as our preferred instrument to measure organization capital the employee compensations in organization occupations such as in managerial work, marketing and selling. We also find organization capital to be closely tied up with the evolution of the market value of the firm and, particularly, in excess of that explained by analysts' forecast.[3]

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[2] At national level

[3] Miyagawa and Kim (2008) instead find that the contribution of organization capital to firm-level TFP growth is not significant.

Besides measuring organization capital as one input, it is also relevant to assess the skill content of labor input in general. Jorgenson and Fraumeni (1992) found that the stock of human capital in the U.S. economy outweighs that of physical capital and has grown markedly over time. Griffith, Redding et al. (2004) find in their cross-country study that human capital is important for both the innovations and the catching-up processes. These spillovers take place in excess of the private returns.

Section 2 of the paper discusses concepts of organization capital and methodology, while Section 3 presents the data before the estimation in Section 4. In Section 5 organization capital is calculated and Section 6 incorporates organizational capital in a valuation model with evidence on its usefulness in the industries examined. Section 7 concludes the paper.

2. Measurement of Organization Capital

Organization capital is part of intangible capital or, more generally, part of intellectual assets that also include human capital. Organization capital is defined roughly as economic competence in Corrado et al. (2006), which also includes firm-specific capital: training provided by employer. In their terminology the organization structure of own account is measured by a predetermined share of management expenditures in the business sector. Thus part of management is not considered as investment in the future, whereas consumption. In training provided by employer the separation between organization capital and human capital to be excluded from intangible capital, is also not clear-cut. It is well known that training creates better incentives to the employee when it increases the

competencies and hence the human capital, and therefore also has market value and can be traded in the market.

Organization capital is here constructed from information of employees' characteristics such as occupations. We know from intangible capital at national level mainly from the industry classification such as information from industries providing financial services, entertainment industry or computer software. Intermediate output or consumption such as management expenditures or scientific R&D can be taken into account as an investment is addition to this. In firm-level approach only the latter can be considered, whereas aggregate level of art, entertainment and software can only be an externality to the firms in other sectors. National level measurement of tangible capital has so far being done assuming constant returns to scale and thus ignoring these spillovers. Using firm-level reported data, consistency requires the calculation of the firm's own intangible capital and ignoring any spillovers. This follows most closely the classification by Van Ark (2004). He has been influential in constructing industry-based EU-Klems data, where the problems how to aggregate national level intangible capital at industry-level are equally puzzling as when disaggregating at firm-level. The classification is shown in the first column in Table 1. The right column shows our adjusted version of these categories.

Table 1. Intellectual Capital in the Knowledge Economy

Intellectual Capital Categories	
Van Ark (2004)	Own categories
Organization capital	
1) Engineering design	1) Managerial competence
2) Organization design	2) Human Resource Management
3) Construction and use of databases	3) Remuneration of innovative ideas
4) Remuneration of innovative ideas	4) Marketing, Selling
5) Marketing of new products	
6) Social capital	
Innovation (Knowledge) capital	
1) Research & development and patents	1) Research & development assets
2) Licenses, brands, copyrights	2) Patents
3) Other technological innovations	
4) Mineral exploration	
ICT capital	
1) Hardware	1) ICT personnel assets
2) Telecommunication infrastructure	
3) Software	
Human capital	
1) Formal education	1) Formal education
2) Company training	2) Experience
3) Experience	

Organization capital is at the core of intellectual capital including competence of top and human resource management and marketing and selling effort, which is sometimes referred to as customer capital. It can be viewed to include codified code, which makes it tacit and not directly transferable to other firms (Evenson, Westphal, Behrman, & Srinivasan, 1995). Such organization capital should include human resource management and perhaps also the cost of incentive-pay schemes such as performance-related pay. Organization capital is not necessarily scientific and *should* not be tied to scientific innovation capital. When defined as economic competence as in Corrado et al. it should also increase total factor productivity, i.e. improve the use of *all* other factor inputs. Finally, ICT capital is appropriate category of its

own, where complementarity to organization capital can be more grounded. Ito (1996) and Bresnahan (1999) even suggest that organizational capital complements ICT investments and typically exceed the direct financial costs of the ICT investments themselves. Brynjolfson et al. (2002) argue that their reported large returns on ICT investment are largely explained by a relationship between the use of IT and skilled workers and human resource management (greater decentralization of certain decision rights and team-oriented production).

It has been claimed that organization capital cannot be considered as a single factor input, whereas as "networking" to improve the productivity of all other factors of input. Organizational work can link to firm-performance through many channels and should be separated from scientific effort such as R&D. The way to link organization capital to total factor productivity is to use compensations in work related to organizational work (OC) as an instrument for measuring organization capital. It can lead to increasing returns to other factors of production or not. We follow Lev and Radhakrishnan (hereon LR) and use firm's sales, general, and administrative expenses (SGA) as an alternative instrument in a limited sample, where operation-based balance accounting is available. Our contribution is to substitute this instrument for employee compensations in organization work. The estimation proceeds as follows

1. Model the firm's output as a function of physical capital, skill-weighted labor input, R&D assets (representing innovative activities).

2. Apply the instruments (organizational compensations OC or for comparison SGA expenditures) in a pooled data or through industry-specific two-stage-least squares 2SLS in explaining asset (resource) productivities.
3. Assess the organization capital as the difference between expected sales with the organization capital and without it.
4. Explain organization capital using variables that are known to be correlated with it: proxies for globalization (activity abroad, multiplant, listed in Finland or not), ICT assets and human resource management.
5. Evaluate how measured organization capital explains market value over book value of the firms listed in stock exchange.

It is clear that total factor productivity differs across sectors and there is no reason to expect that returns to organization capital to be the same across sectors.

3. The Data

We use linked employer-employee data, extensively used in the study of human capital formation, starting with Abowd, Kramarz and Margolis (1999). Data are convenient in the analysis relying on the operation of different tasks and occupations emerged in the new wave of globalization. The labor data are from the Confederation of Finnish Industry and Employers with 7.2 million person-year and 44816 firm-year observations in years 1996-2006. Data include a rich set of variables covering compensation, education and profession. The non-production employees receive salaries and the production workers, 42% of all, receive an hourly wage. There are 41 non-production worker occupations, which are listed in

Appendix B. Employee data are linked to financial statistics data provided by the Suomen Asiakastieto, to include information on profits, value added and capital intensity (fixed assets). Nearly two-third of firms in the employee data can be matched to these financial balance sheets. In order to eliminate firms with unreliable balance sheets we include in the analysis only firms that have on average sales and total assets exceeding 5 million Euros in 2000 prices (deflated by consumer price index). The final linked employer-employee data of 4.19 million person-year observations cover 6194 firm-year observations after dropping years 1996-1997 (used to build up R&D assets). The employee data in the sample cover annually on average 307,000 employees (original employee data cover 465,000 employees) and hence almost one-fifth of the entire workforce in the private sector. This data over 1049 firms also include the relatively low share of 85 firms (429 firm-year observations) that report operation-based balance sheets.

Employee compensations are evaluated from monthly salaries multiplied by 12.5 and using the average figure for social security taxes over the years 30%. The occupation classification is specific to the data by Confederation of Finnish Employers, see Appendix B. The occupational codes are transformable to ISCO88 using additional information of educational-level (for qualifications) and industrial codes since some occupations are industry-specific. Most importantly, the occupations in manufacturing and services are separated. The occupational codes are available for all employees in the firms considered (6139 firm-year observations). Organization compensations (OC) are from occupations classified to relate to organization work (marketing, selling and upper administration).

Appendix B shows that in services the marketing staff is restricted to those with tertiary education.

Appendix A shows the summary of the rest of the variables in the estimation sample. Average sales are 62 million (in €2000 prices) and average sales growth has been rapid 4.3% but varying between up to 9.7% in 2000 and moderate growth 1.8% in 2002. Firms with operation-based accounting are an average two times bigger in sales. In these firms, selling, general and administration expenses SGA are on average 15% of sales (in contrast to 17.5% in LR). Two-thirds of this relates to selling. It is seen from Appendix A that organization compensations (OC) twice to R&D compensations and fourfold to ICT compensations. Marketing are one third of organization compensations. Here management compensations are half of all.

Following table summarizes the annual organization compensations per worker, used also to calculate the annual figures in figure 1. The annual wages per worker in various occupation categories relate to organization work, R&D and ICT. The lower part of the table shows the SGA expenses per worker (in thousand euros in 2000 prices). Table also includes standard deviation and the average firm-level shares of the workers in each occupation category.

Table 2. Summary of Organization Capital Instruments per Capita

Occupation	All firms			Operation-Based Balance Sheets		
	Mean Annual Wages	Standard Deviation	Share of Workforce	Mean Annual Wages	Standard Deviation	Share of Workforce
Organization compensation	31.3	9.7	18.7 %	34.5	6.1	11.4 %
Managers	63.0	86.4	7.3 %	47.1	33.1	9.2 %
Marketing	46.5	94.3	5.0 %	58.3	76.3	5.9 %
General and Administration	27.9	31.2	6.4 %	30.9	24.4	4.6 %
Research and Development	34.0	7.4	9.6 %	36.2	6.1	11.4 %
ICT related work	36.1	8.8	3.0 %	38.6	8.7	4.7 %
Turnover per capita				18.4	21.6	
SGA expenditure per capita				24.5	33.9	
Selling				15.3	25.1	
General and Administration				9.1	14.8	

It is seen that on average total workforce engaged in organization capital-related occupations are 18.7% of total workforce (11.4% in firms with operation-based balance accounts). Management, marketing and administration work are the main categories. Research and development is also fairly large share of total workforce being 9.6%. In research and development the non-production worker category is broad (coding matched to architects, engineers (214), life science and health professionals (221, 222), physical and engineering science professional (311) in ISCO88 codes). Half of all R&D workers do not have tertiary education. The share of those with tertiary education would be fairly close to official statistics figure 3.1% in the same period. It is also seen that around 3.0% of workers are engaged in ICT related work. It finally seen that SGA expenditures may exceed turnover in many firms and thus SGA expenditures are too broadly defined in order to capture appropriately organization capital. We instead use administration expenditures as the alternative proxy for organization capital.

4. Estimation

We apply constant returns to scale production function (see LR (2003) and Hall (2000)):[4]

$$SALE_{it} = b_{0it} PPE_{it}^{b1} RND_{it}^{b2} EMP_{it}^{*b3} e_{it} \quad (1)$$

where $SALE_{it}$ is the revenues of firm i in year t, PPE_{it} is net plant, property, and equipment, RND_{it} is plant-specific R&D capital, EMP_{it}^{*} is total working hours adjusted for skill types as described before, and e_{it} is an error term. Sales (SALE) are deflated by consumer price index, capital (PPE) by capital investment index and R&D capital by capital investment and wage indices with equal weight. Note that the specification imposes higher returns to an additional investment in R&D capital at low levels of it (although the elasticity of output with respect to intangible assets is constant). It is therefore appropriate to have a wide definition of R&D occupations. The labor EMP is measured by total hours including overtime hours for production workers and using regular weekly working hours for non-production workers and in services. We use skill-adjusted number of employees. The skill-adjustment accounts for human capital embedded in labor that is clearly marketable.[5] Hellerstein et al. (1999) and Ilmakunnas and Maliranta (Ilmakunnas & Maliranta, 2005) analyze skill-adjusted labor input

[4] Caves and Barton (Caves & Barton, 1990) and Jorgenson (Jorgenson, Griliches, & Intriligator, 1986) give details on estimating firm production functions with fixed effects. Hulten (2000) provides a review of the theoretical foundations of the Solow residual and Divisia Index.

[5] Without this skill-adjustment organization capital would also play a role as a proxy for human capital.

when education and work experience of employees are perfect substitutes, but with differing marginal productivities. We similarly divide workers into j categories with lowest education level and experience as the reference. Scaling the productivity of least skilled equal to 1 and measuring the relative productivity of skilled workforce of group *j* by a parameter ϕ_i, *i=1…j*, the quality-adjusted labor input is

$$EMP^* = EMP\left(1+(\phi_1-1)s_1+...+(\phi_j-1)s_j\right), \quad (2)$$

where EMP is total work hours and s_j is the type *j* workforce share of total hours. Ten skill types are separated by mean experience (17 years) and by five education degree categories. The reference is those with experience below 17 years and no secondary education.

Hicks-neutral contribution of organization capital b_{0it} includes common organization capital (often narrowed to define output-augmenting technical change) c_{0it} and the returns to firm-specific organization capital $g_{0t}\log(OC_{it})$:

$$\log(b_{0it}) = c_{0t} + g_{0t}\log(OC_{it}) \quad (3)$$

Compensations in occupations OC_{it} relate to management, administration and management). R&D assets are calculated using information of related wage compensations multiplied by 1.25 (assuming that employee compensations to R&D work are 80% of total expenses in R&D). We find it relevant to emphasize the historical values as the returns from

R&D work emerge in long run. R&D asset is based on observed figures over three years and the previous figures are assed from this.

$$RND_{it} = 1.25*\{RND_{emp,it} + (1\text{-}\delta)RND_{emp,it-1} + (1\text{-}\delta^2)RND_{emp,it-2} + (1\text{-}\delta^3)Y_{emp,it-3}\frac{1}{1-(1-\delta-g)}\}, \quad (4)$$

where δ =depreciation rate , g=growth of R&D investment and $Y_{emp,it-3} = (RD_{emp,it} + RND_{emp,it-1} + RND_{emp,it-2})/3$ is the average compensations for R&D work over the last three period. The latter is used to decrease randomness when calculating past values. The short-time span of the data allow information of R&D for two lags and the value of R&D stock from period t-3 backwards is evaluated assuming R&D compensations in period t-3 to be as an average observed in periods t, t-1, t-2. We set the depreciation rate to 20% following the literature and R&D growth $g = 0.03$ follows the sample average growth rate of 3%. The distribution of R&D assets is also highly skewed, but still two-third of firms have R&D assets in comparison with one-third in LR. Thus we examine all firms and not separate production function of R&D intensive firms. The use of whole sample measures the additional organization capital created by investing in R&D relative to those with no R&D investment in the industry. All the estimates are done using an annual growth equation, i.e. log differencing the model

$$\log(SALE_{ikt}/SALE_{ik,t\text{-}1}) = c_{0t} + g_{0t}\log(OC_{ikt}/OC_{ik,t\text{-}1}) + c_{1t}\log(PPE_{ikt}/PPE_{ik,t\text{-}1}) + c_{2t}\log(EMP_{ikt}/EMP_{ik,t\text{-}1}) + c_{3t}\log(RND_{ikt}/RND_{ik,t\text{-}1}) + \log(e_{ikt}/e_{ik,t\text{-}1}) \quad (5)$$

for pooling over $k = t, t-1, t-2$ in years $t = 1998, \ldots, 2006$. For example, in year 1998, panel data over years 1996-1998 is used. Alternatively, we use annual estimates with two-stage least squares 2SLS as proposed by LR (2005) using as instrument either occupation compensations OC_{it} or Sales, General and Administration costs SGA_{it} (in the much smaller sample of firms) so that

$$\begin{aligned}\log(SALE_{ijt} / SALE_{ij,t\text{-}1}) \;=\; & c_{0\,jt} \;+\; g_{0\,jt} \log(X_{ijt} / X_{ij,t\text{-}1}) \\ & +\; c_{1\,jt} \log(PPE_{ijt} / PPE_{ij,t\text{-}1}) \;+\; c_{2\,jt} \log(EMP_{ijt} / EMP_{ij,t\text{-}1}) \\ & +\; c_{3\,jt} \log(RND_{ijt} / RND_{ij,t\text{-}1}) + \;\log(e_{ijt} / e_{ij,t\text{-}1})\end{aligned} \tag{6}$$

$$\begin{aligned}\log(X_{ijt} / X_{ij,t\text{-}1}) \;=\; & b_{0\,jt} \;+\; b_{1\,jt} \log(X_{ij,t-1} / X_{ij,t\text{-}2}) + b_{2\,jt} \log(SALE_{ij,t-1} / SALE_{ij,t\text{-}2}) \\ & +\; b_{3\,jt} \mathrm{Region}_{ijt} + \; b_{4\,jt} \log(PPE_{ijt} / PPE_{ij,t\text{-}1}) \;+\; b_{5\,jt} \log(EMP_{ijt} / EMP_{ij,t\text{-}1}) \\ & +\; b_{6\,jt} \log(RND_{ijt} / RND_{ij,t\text{-}1}) + \;\log(u_{ijt} / u_{ij,t\text{-}1})\end{aligned} \tag{7}$$

where $X = OC_{it}, \mathrm{Administration}_{it}$ and using cross-sectional estimation in eleven industries *j* for years $t = 1998, \ldots, 2006$. Organization capital expenditures are here tied up to the firm's past commitments (lagged value of organization capital instrument) and are portion of past activity level (sales). The estimation of expressions (6) and (7) uses the 2SLS for each sample year (1998–2006). The estimation is done separately in 11 industries (or 3 industries in the sample of firms with operation-based balance accounts). In services and manufacturing of non-durables (such as food, textile and leather) and durables (cars, industries, business equipment, finance and private health sector) firms may more easily adapt their organization capital for business cycle. Appendix C shows the adapted industry classification, which is grounded on Fama and French (1988) and (1997). The eleven industries are also divided into

three main industries: service (5 sub-industries), production of non-durables and manufacturing (2 sub-industries with production of non-durables excluded) and basic (energy, mining, construction, transportation, others). The three industries is the classification used for the sample of firms with operation-based accounts.

The following table reports first the estimates over three-year spans from equation (5) (column 1) and then using two-stage least squares 2SLS from equations (6) and (7) (columns 2-5). Columns 1-4 use as instrument for organization capital the organization compensation OC and column 5 the administration expenditures. Following table shows the estimation results (all variables in the estimation were in log difference).

Table 3. Estimates in Explaining Sales Growth Pooled over Years and Industries

	1	2	3	4	5
Organization Compensation	0.0400***	0.0358***	-0.218**	0.00679	
	(4.25)	(3.58)	(3.11)	(0.09)	
Organization Compensation, Capital			0.0354***		
			(8.71)		
Organization Compensation, Employment			-0.0136*		
			(2.3)		
Organization Compensation, R&D Asset			-0.000888		
			(0.32)		
Administration					0.605***
					(16.26)
Net Plant, Property, Equipment	0.144***	0.142***	-0.0577*	0.531***	0.215***
	(15.38)	(14.72)	(2.33)	(11.13)	(5.55)
Employment	0.209***	0.213***	0.290***	0.217*	0.0839
	(18.13)	(17.94)	(7.33)	(2.32)	(1.38)
R&D Asset	0.0372*	0.0453**	0.0461	-0.0116	0.024
	(2.37)	(2.78)	(1.88)	(0.11)	(0.34)
Constant	0.0501	0.0693	0.0737	0.0675*	0.025
	(1.22)	(1.65)	(1.77)	(2.12)	(1)
Observations	7240	6194	6194	350	364
R^2	0.098	0.122	0.133	0.32	0.594

t statistics in parentheses

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Columns 1 and 2 show that organization compensations are positively related to the sales growth irrespective of using pooled estimates in three-year-time spans (column 1) or industry-specific 2SLS estimates (column 2). The figures show the annual contribution of organization capital to sales growth, but the difference formula can also be interpreted to control for firm effects. One standard deviation increase in log difference of organization compensations (0.46) gives an annual increment to the level of sales of around 2% (from columns 1-2).

The earlier paper by LR (2003) also evaluated interaction of selling, general and administration expenditures SGA with all other factor inputs. Column 3 shows the

organization capital to complement the use of capital and skill-adjusted labor and being a substitute for R&D assets. The returns on R&D asset are most sensitive to the use of the interactions as the direct returns are now at least two-fold. Our results suggest that organization capital is used more effectively in firms that are not R&D intensive as the interaction is negative (even though organization capital and R&D asset are positively correlated). Organization capital explains higher returns in non-R&D intensive firms such as in service sector (as seen later). Cummins (2005), in contrast, found out that the accumulation of organization capital is positively associated with investment in R&D assets (and with marketing assets).[6] It is well known that the estimates of returns to R&D suffer from many omitted variable problems. Klette and Kortum (2004) summarize as the main findings in the literature that while the level productivity and R&D across firms are positively related, the effect of R&D on productivity growth is unclear.

Columns 4 and 5 use the sample of 82 firms with operation-based balance sheets. Column 4 shows that in the restricted sample the coefficient of occupation compensations is three-fold to the coefficient for occupation compensations for the whole sample (in column 2) but insignificant. Column 5 shows that the elasticity between administrative expenditures and sales growth is around 0.6 and the coefficient is highly significant (the coefficient to SGA would be close to unity). Hence, administrative expenditures (or even less so SGA) are not likely to capture the input of organization capital alone, as also the coefficients for other factor inputs are redundant.

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[6] He valued organization capital by adjustment costs explaining the difference between the price of each investment good from the market values of firms.

We next report the average coefficients and mean t-statistics from equations (5) through (7) (average over years and in columns (2) and (3) over industries)

Table 4. Mean estimates in yearly estimation 1998-2006

Panel Mean Estimate	(1) OC	(2) OC 2SLS	(3) SGA 2SLS
Organization Instrument	0.026	0.016	0.350
Average t-value over years (and industries)	(2.13)	(1.04)	(6.55)
Standard deviation over years	0.023	0.068	0.537
Net Plant, Property, Equipment	0.143	0.187	0.239
Average t-value over years (and industries)	(9.45)	(1.85)	(3.74)
Standard deviation over years	0.021	0.107	0.539
Employment	0.206	0.285	0.140
Average t-value over years (and industries)	(11.6)	(2.37)	(2.99)
Standard deviation over years	0.034	0.121	0.412
R&D Asset	0.048	0.000	-0.129
Average t-value over years (and industries)	(1.8)	(.79)	(2.2)
Standard deviation over years	0.019	0.234	0.597
Constant	0.042	0.043	0.054
Average t-value over years (and industries)	(7.02)	(1.72)	(2.45)
Standard deviation over years	0.009	0.029	0.064

OC spans over years; OC 2SLS spans over 11 industries and SGA 2SLS spans over 3 industries (1 service and non-durables, 2 manufacturing, 3 minings, construction other). Table shows the average coefficient and t-statistics the average over the years (and industries in 2SLS) and the standard deviation is calculated from the annual estimates.

The average coefficient using organization compensation as instrument is 0.026 in column 1, which is below the estimates of around 0.04 obtained in the pooled data in table 3 and the average t-value is significant. The yearly variation is from zero to -0.1 to 0.05 as indicated from the standard deviation. The lower returns in yearly estimates can have many

explanations. One reason is that organization capital has large external effects over the years. We are indeed here not measuring organization capital stock, whereas organization capital investment. The industry level estimations are on average insignificant (we have 11 industries and 9 years which makes 99 estimates). As seen later, the insignificance in some industries and years does not necessarily mean that the industry-specific estimates explain well the evolvement of market values of listed companies, as seen later. Finally, the average coefficient is high 0.35 with industry-specific SGA instrument (LR have 0.41 for firms with no R&D and 0.58 for firms with R&D assets).

5. Organization Capital

The contribution of organization capital to output can now be evaluated using the estimates obtained from expressions (5) through (7) and comparing the expected output (sales) computed with and without the common and firm-specific organization capital. We use as our preferred instrument the occupation compensation OC. The expected output of firm *i* in year *t* with organization capital is given by:

$$\begin{aligned} SALE_{it}^{*} \;=\; SALE_{i,t-1}\{\exp\{c_{0t}^{*} \;&+ g_{0t}^{*}\log(OC_{it}/OC_{i,t\text{-}1}) \\ &+\; c_{1t}^{*}\log(PPE_{it}/PPE_{i,t\text{-}1}) \;+\; c_{2t}^{*}\log(EMP_{it}/EMP_{i,t\text{-}1}) \\ &+\; c_{3t}^{*}\log(RND_{it}/RND_{i,t\text{-}1}) + \;\log(e_{it}/e_{i,t\text{-}1})\}\quad , \end{aligned} \tag{8A}$$

The expected output of firm *i* without the effect of organization capital is

$$SALE_{it}^{**} = SALE_{i,t-1}\{c_{1t}^{*}(PPE_{it} / PPE_{i,t-1}) + c_{2t}^{*}(EMP_{it} / EMP_{i,t-1}) + c_{3t}^{*}(RND_{it} / RND_{i,t-1})\} \quad (8B)$$

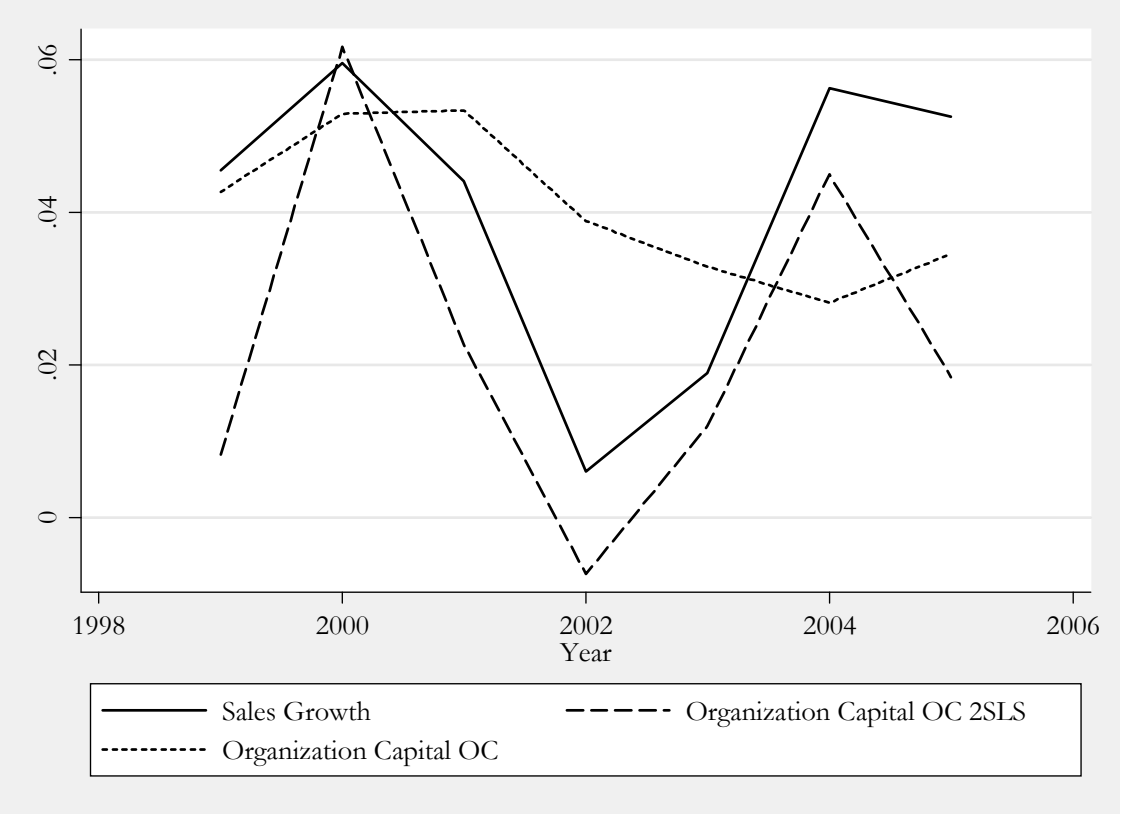
The instrument-based estimate of organization capital using occupation compensations (OC) is the difference between expected sales *with* and *without* organization capital, given by

$$I_{it}^{OC} \equiv SALE_{it}^{*} - SALE_{it}^{**} \quad (9)$$

where $SALE_{it}^{*}$ and $SALE_{it}^{**}$ are given by (8A) and (8B), respectively. The quantity I_{it}^{OC} is the inflated nominal value using the general price deflator. We are measuring the yearly contribution of organization capital and therefore it can be also considered as either the value of investment the values of organization capital when this fully depreciates over time. Accumulating it over time is considered later when assessing its impact on market value. Organization capital estimated separately over industries using 2SLS can be constructed using the same method from (6) and (7) is analogous. Table A.2 in Appendix shows that organization capital is on average 5% of sales or somewhat less 3.3% when using industry-specific 2SLS estimations. The median value of organization capital using SGA estimates for firms with operation-based balance accounting is close the same. However, the distribution is highly skewed to the right and mean value is ten times bigger. The estimates vary a lot between the three industries and do not give a reliable overall value. We also find fairly high variation in OC when using industry-specific 2SLS estimates, where standard deviation of 0.17. However, this is what we expect when the coefficient estimates in the eleven industries differ from one industry to another. It is indeed of interest to study separately industries that

are quick in adjusting to business cycle. We turn now to the evolution of organization capital per lagged sales using organization compensations as the instrument and contrast this to business cycle (sales growth).

Figure 1. Organization Capital per Sales



The yearly variation is much stronger with industry-specific 2SLS estimates and follows closely average sales growth. The drop in sales growth after the peak in 2000 is followed by a decrease in organization capital. The observations pooled of three-year categories show a gradual drop in organization capital. Evidently it lags behind and is not able capture fully the economic recovery after 2002.

Organization Capital, Globalization and Information Technology

Finnish multinationals firms have expanded their activities and employment abroad. Employment at domestic plants has stayed at about half million, while employment abroad has expanded from 137,000 in 1996 to nearly 0,4 million by 2006 according to the Bank of Finland foreign direct investment data.[7] It can be argued that organization capital is needed in globalization process: to expand activities abroad and to maintain the network of tasks spread over the plants across the countries. Bartel et al. {, 2007 #85} argue that new ICT investments also require complementary investments in a more skilled workforce and the adoption of new human resource practices (part of organization-related work). Beyond this, performance-related-pay PRP enables to reward the innovativeness when the tasks and occupations are subject to change and team work is required (for description of PRP in Finland see Piekkola (2005)).[8]

LR (2005) emphasized the use of information technology to enable the internet-based operations and new production designs. Bresnahan, Brynjolfsson, and Hitt (2000) have found that certain organizational practices, when combined with investments in information technology (ICT), were associated with significant increases in productivity in the late 1980s and early 1990s. Organization capital is explained by all these suggested complements to it.

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[7] Talouselämä data from 500 biggest firms in Finland give roughly the same figures. For the large firms with employees abroad average domestic employment is 4,400 and employment abroad 2,200.

[8] Bloom and Van Reenen {, 2006 #31} find work-life balance and management practices to be interlinked.

$$I_{it}^{OC} = a_1 GLOB_{it} + a_2 PRP_{it} + a_3 ICT_{it} + a_4 Y_{it} + m_0 + m_1[Year\ dummy] + e_{it}, \quad (10)$$

where $GLOB_{it}$ =globalization, PRP_{it} =performance-related-pay dummy, ICT_{it} assets and Y_{it} =controls and I_t^{OC} = organization capital again assessed from the value of investment in one year. Globalization is measured by employment abroad, the number of plants (1, 2-3, 4 or more plants) and whether the firm is listed in stock market. PRP_{it} receives the value of one from year t onwards once the firm has for the first time implemented PRP scheme and paid PRP compensations in year t+1 (thus dummy is set at one then onwards).[9] ICT assets of the firm is measured from ICT related occupations similarly as R&D assets and also assumed to depreciate at 20%. The control factors include market share $MKS_{imt} = SALES_{imt} / \sum_{j=1}^{n} SALES_{jmt}$ at two-digit industry-level and industry dummies. Table 5 shows the estimation results in explaining occupation capital using the alternative instruments OC (in column 2) or administrative expenditures (in column 3).

Table 5. Organization capital, Globalization and ICT personnel

[9] PRP remunerations are paid afterwards based on the set targets and have been relatively recent pay scheme covering less than 10% of firms in 1995 and extending to over 60% of firms in firms with more than 30 employees by 2006. The average pay is less than 5% of annual salaries (Confederation of Finnish Employers).

	Organization Capital OC	Organization Capital OC 2SLS	Organization Capital ISO 2SLS
Foreign employment	0.122***	0.120***	0.0362
	(11.66)	(7.85)	(0.73)
2-3 plants	0.188***	0.192***	-0.0267
	(5.21)	(3.66)	(0.11)
4 or more plants	0.200***	0.241**	-0.116
	(3.41)	(2.77)	(0.27)
Listed Firm	-0.0827	0.0548	-1.332
	(0.46)	(0.23)	(1.17)
Performance-Related-Pay Scheme	0.613***	0.541***	0.181
	(21.59)	(12.93)	(0.78)
IT-Assets	0.224***	0.213***	0.326***
	(49.17)	(31.74)	(7.02)
Firm Age	0.150***	0.149***	0.377
	(6.66)	(4.47)	(1.83)
Market Share	0.0248***	0.0264***	0.00136
	(20.78)	(15.11)	(0.2)
Constant	4.781***	5.007***	4.820***
	(29.44)	(34.71)	(4.67)
Observations	6593	4820	211
R^2	0.506	0.397	0.39

t statistics in parentheses
$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

It is seen from columns 1 and 2 that globalized firms use more organization capital. To begin with, the number of employees in the firm that are working abroad increases organization capital. An increase of foreign employment by 10% increases organization capital by 12% in Finland. Majority 72% of these firms are Finnish origin so the organization capital in the parent Finnish firm is strengthened. Column 3 shows that the foreign activities have no comparative effect on OC when using administrative expenses as instrument. One interpretation of this results is that organization capital is not synonymous to administrative expenses. It is also interesting to see that multinationals with 2 or more plants have around

20% more organization capital. Overall, the average organization capital is double higher in international Finnish firms with employees abroad (the average organization capital was around 5 million euro in 2000 prices). It is also interesting to see that the firms listed in Helsinki stock market have around 10% less organization capital. As typical in foreign direct investment, the Finnish affiliates of foreign companies (listed abroad) are relatively more productive and skill intensive. On other hand, listed companies are more globalized which yields the overall results to be ambiguous. [10]

It is seen that firms with Performance-Related-Pay (PRP) schemes have around 50-60% more of organization capital. Clearly the human resource practices are important part of an efficient use of organization capital. OC estimates also relate positively to the age of the firm. Average age of the firms is 40 years and one standard deviation increase in the age associates with 2% more organization capital. These firms have accumulated experience and human capital. All organization capital estimates are positively related to ICT assets as expected. Brynjolfsson et al. (1999) ascribe the high impact they documented of information technology on market values of companies for the fact that ICT expenditures also works as a proxy for organization capital.

Our most important control is market share at two-digit level. LR (2005) argue that the firm's market share controls for certain missing variables that affect organization capital. Average market share is 5.5% and double this share would roughly increase organization capital by around

[10] For skilled workforce intensity of foreign affiliates in Finland, see Huttunen (2007) in Finland and for US, see Doms and Jensen (1998).

3%. It is overall seen that organization capital is needed under globalization process. Organization capital is linked to the internationalization of the firm, to the networking and use of ICT assets and to the human resource practices.

6. Organization capital and market value

Our next step is to evaluate how organization capital enters the valuation of the firm. We do this using residual income valuation RIV or Ohlson's model introduced by Ohlson (1995)). We analyze whether organization capital can provide a solution for weak relation found between value changes and accounting information as recorded in many studies starting from Lev (1989). RIV similarly to virtually all market valuation models takes as a starting point that market value is equal to the present value of future dividends

$$MV_{it} = \sum_{\tau=1}^{\infty} \frac{E_t(DIV_{it+\tau})}{(1+r_i)^{\tau}} \qquad (13)$$

where MV_{it} = market value of equity at time t (corporate value of a non-listed companies), DIV_{it} = dividends (net cash payments of a non-listed companies) received at the end of period t, r_i the discount rate, and E_t is the expectation operator based on the information set at date t. The idea is to consider organization capital to improve the comprehensive income of the firm, as valuation depended on its contribution to firms' sales. We thus obtain a modified clean surplus relation CRS.

$$BV_{it} = BV_{it-1} + FE_{it} + a_{it}K_{it}^{OC} - DIV_{it}, \quad (14)$$

where BV_{it} = the book value (balance sheet value of assets minus liabilities), FE_{it} = analysts' forecast one year ahead of earnings in period ending at date t and a_{it} is the value of existing stock of organization capital K_{it}^{OC} that are not included in these analyst forecasts. This includes the growth potential that organization capital creates for future earning. Ignoring organization capital for the moment we have two variables and one equation. Lo and Lys (2000) examine the difference between earnings and comprehensive income defined as $BV_{it} - BV_{it-1} - DIV_{it}$, when dividends are known. This reflects retained earnings net of common and preferred dividends and of follows the initial Financial Accounting Standards Board Statement in 1984 of comprehensive income as "The change in equity (net assets) of a business enterprise during a period from the transactions and other events and circumstances from nonowner sources".[11] They find the deviation between ex post earnings and comprehensive income per comprehensive income to be on average 16%, while the median value is 0.4%. In CSR the organization capital should be considered as a stock when it is not fully depreciated in one period. Depreciation rate is set below or equal to one, $0 < \delta <= 1$. The transition equation for the stock of organization capital is thus given by

[11] Later SFAS 130 includes adjustments to unrealized gains and losses on available-for-sale marketable securities, foreign currency translation adjustments, minimum required pension liability adjustments and changes in the market values of certain futures contracts qualifying as hedges, for comparison of alternative definititons, see Biddle(2006).

$$K_{it+1}^{OC} = I_{it}^{OC} + (1-\delta)K_{it}^{OC}. \qquad (15)$$

Using the average firm-level growth or organization capital stock g_i^{OC} organization capital is given by $K_{it}^{OC} = I_{it}^{OC} / (\delta + g_i^{OC})$. We next use (13) through (15) and write market value as a function of book value, organization capital and discounted expected abnormal earnings.

$$MV_{it} = BV_{it} + \frac{a_i}{\delta + g_i} I_{it}^{OC} + RE_{it} \qquad (16)$$

where MV_{it} is the market value and $RE_{it} = \sum_{\tau=1}^{\infty}(1+r_i)^{-\tau}[FE_{it} - r_i BV_{it-1})]$ is the present value of abnormal earnings at the end of year t extrapolated to infinity. With the assumption that the book value of equity grows at a rate less than $1+r_i$ so that $(1+r)^{-\tau}E_t(BV_{t+\tau}) \to 0$ the residual earnings can be written as

$$\begin{aligned} RE_{it} = {} & (1+r_{it})^{-1}(FE_{it} - r_{it}BV_{it-1}) + \\ & (FE_{it+1} - r_{it}BV_{it})(r_{it} - g_{it})^{-1}(1+r_{it})^{-2} \end{aligned}, \qquad (18)$$

where g_{it} is the growth rate of abnormal earnings, which is set at r_{it} minus 3%. If financial analysts would be fully able to record the earnings potential created by organization capital a_i =0 the market value contribution would be equal to zero. Otherwise, the market value implications of organization capital is approximately given by a_i / δ (as g_i is relatively

small). The earning (sales) effect of organization capital investment transforms fully into the market price when the share not recorded in estimates of earnings made by financial analysts a_i equals the depreciation rate of organization capital δ . With some errors in forecasts of contribution of organization capital, the lower the depreciation rate of organization capital stock, the greater is also the error in missing the organization capital contribution.

In empirical estimates the discount rate r_{it} is the sum of the return on government bonds for the shortest period available (five years) and of the beta estimate (systematic risk). The beta in risk premium 1-beta is estimated by the capital asset pricing model CAPM for the companies listed in Finnish Stock Market. Thus, the beta for each year is an average when rolling beta estimations over the years using returns from preceding 60 months. The data used has all the currently 51 companies listed in Helsinki Stock market (in 2006). To obtain reasonable value in the volatile Helsinki Stock Market the risky return (one minus beta) is scaled down so that on average the return on projects is two times the average return on government bond (which is 4.5%).

The question imposed here is whether the financial analysts' forecast and the value of organization capital not recorded by them is close to comprehensive income (or other relevant earnings concept) if organization capital plays a significant role in the valuation of the firm. Estimation of the market value contribution also allows as to evaluate the share of organization capital to be included in earnings estimate in addition to that made by financial analysts (this can be positive or negative). In the estimation we use sales as the scaling factor

(shown, however, in Brown et al. (1999) to lead to an upward bias when R^2 is positively correlated with the coefficient of variation of sales). Our model then looks as

$$(MV_{it} - BV_{it}) / SALE_{it} = \sigma_{re} RE_{it} / SALE_{it} + \sigma_{org} I_{it}^{OC} / SALE_{it} + \sigma_{year} Year_{ijt} / SALE_{it}, \quad (19)$$

We can now test the extent to which financial analysts comprehend the value and profit implications of organization capital in their analyses and consequent earnings forecasts. Following table shows first the summary table.

Table 6. Summary

Variable	Mean	Standard Deviaton	Mini-mum	Median Value	Max	Obs number
Book Value of Assets	93614	612670	-604383	8324	13000000	5760
Organization Capital OC	7793	48240	-149757	1895	2104702	6212
Organization Capital OC 2SLS	5829	53277	-1559541	1026	2137411	5998
Organization Capital SGA 2SLS	62719	686276	-1254165	1120	11000000	375
Organization Capital/Sales OC	0.054	0.047	-0.05	0.05	0.9	6212
Organization Capital/Sales OC 2SLS	0.033	0.17	-8.7	0.031	3.4	5998
Organization Capital/Sales SGA 2SLS	0.051	0.21	-0.29	0.028	0.8	375

It is seen that market values exceed book values on average by half of sales. Abnormal earnings deviate substantially but are on average close to zero. Firms with operation-based balance accounts are large in size and have five-time more organization capital than all firms on average (see also summary table in appendix). Organization capital is around 8.5% of sales or somewhat less when proxied by SGA. The firms are thus double more intensive on organization capital than firms on average in table A.2 in Appendix.

We also expect that analysts' forecasts and organization capital can play a widely differing role in services and manufacturing. Bloom, Sadun, and Van Reenen (2007) argue that the role of organization capital in productivity growth (and hence on market value) is more important in the non-manufacturing sector than in the manufacturing sector. Sometimes the non-manufacturing sector also suffers from a lower productivity growth rate than the manufacturing sector does. Baumol (2004) explicitly also emphasizes the innovative role of many small high-technology firms. Following table 7 shows the results from estimation of (16) (the first column as a reference with no organization capital as explanatory variable).

Table 7. Random Effects Estimates for Organization Capital and Residual Earnings in Explaining Market Values less Book Value

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Market Value – Book Value				
				High	Medium	Low	Manu-facturing	Services Tecnology
Organization Capital/Sales OC		0.735						
		(1.42)						
Organization Capital/Sales OC 2SLS			0.944***	5.018	1.182***	-0.459*	-0.960**	1.344***
			(7.64)	(1.94)	(8.31)	(2.01)	(2.97)	(8.90)
Residual Earnings/Sales	0.164***	0.162***	0.128***	0.0803	0.137***	0.0993***	0.178***	0.0647
	(6.82)	(6.78)	(5.69)	(0.66)	(4.16)	(4.00)	(5.92)	(1.40)
Manufacturing	-0.130	-0.108	-0.149	0.454	-0.0936	-0.140		
	(0.88)	(0.73)	(1.10)	(1.73)	(0.48)	(0.68)		
Service, Consumer Non-durables	0.316*	0.345*	0.278*	0.526	0.294	0.0527		
	(2.20)	(2.38)	(2.10)	(1.89)	(1.69)	(0.23)		
Constant	0.381**	0.318*	0.323**	0.262	0.272	-0.144	0.326***	0.563***
	(3.10)	(2.44)	(2.85)	(1.02)	(1.75)	(0.69)	(4.30)	(6.06)
Observations	328	328	328	74	168	86	132	140
R^2	0.193	0.198	0.319	0.230	0.455	0.499	0.299	0.426
Adjusted R^2	0.165	0.168	0.293	0.078	0.413	0.417	0.241	0.381

Absolute *t* statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

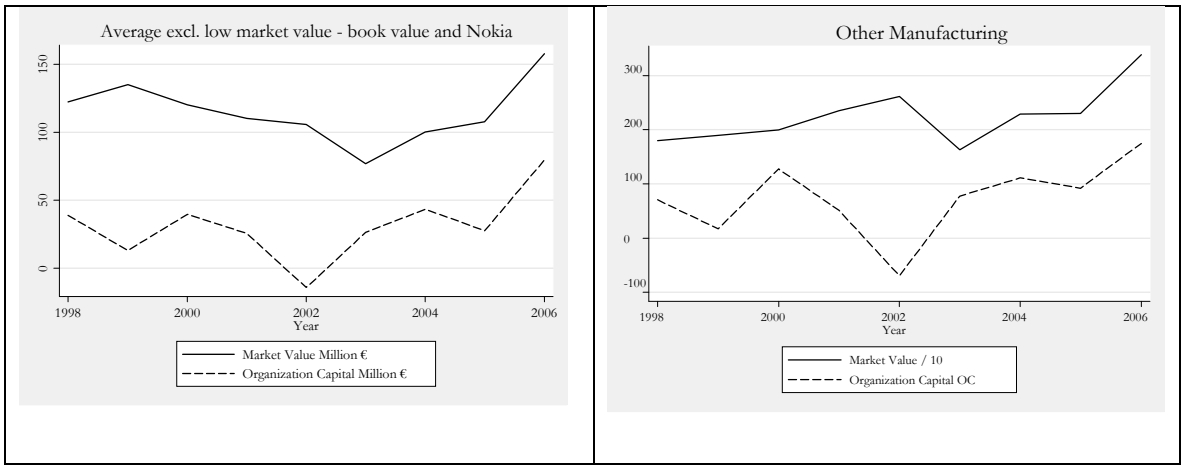
It is seen form column 1 that abnormal earnings and the three industry and year dummies alone explain nearly 20 percent of the variation in market value less book value. In all estimates except for services (column 8) residual (abnormal) earnings per sales are positively related to market value less book value of assets. In service sector analysts' forecasts have not thus succeeded in explaining future market valuation of the firms. Columns 2 shows that the inclusion of the organization capital estimated on aggregate level does not significantly improve the explanatory power of the model. However, column 3 shows that the industry-specific estimates explain ten percent of the unexplained variation of market value in excess of book value (R squared is 19.3% in column 2 and 31.9% in column 3). The magnitude of the improvement is similar to that obtained in LR (2005). In their paper organization capital using SGA instrument improved the explanatory power from 24% to 32%.

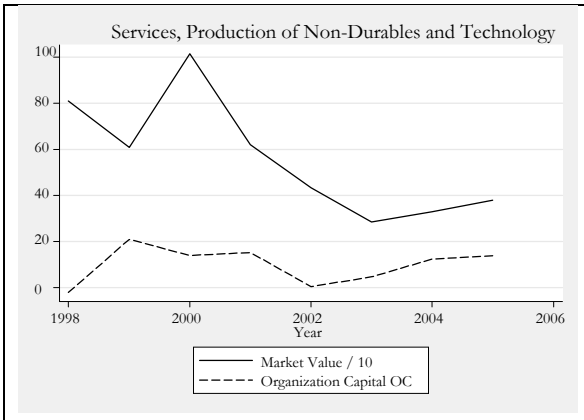
The almost unit value of the organization capital coefficient indicates that the contribution of organization capital to the market value is within one year, which is less than the two years obtained in LR. Columns 4-6 show the results to differ in high and low market value firms (measured relative to book value). Columns 4 and 6 respectively report the estimates done separately for firms belonging to the highest or lowest quartile in their average market value less book value; the rest half of firms belonging to the medium group in column 5. It is seen that the coefficient for organization capital is highest 5.7 for the high market value firms and insignificant and negative -0.4 for the low market value firms. The low market value firms are typically small in size and the greater weight given in estimations to them relative to larger firms bias the overall estimates downwards. This should offset much of the upward bias due to the use of personnel to scale all the variables. Last two columns 7 and 8 show that the organization capital explains market values in service sector and not at all or even

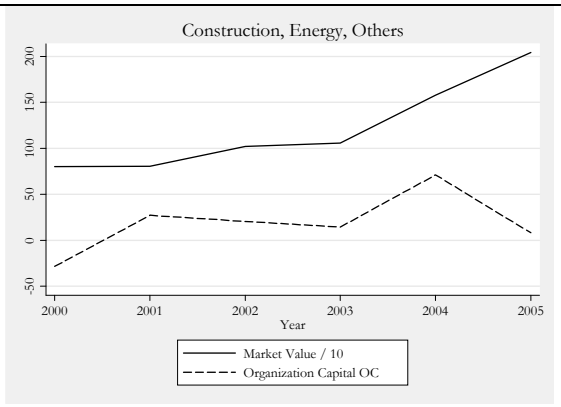
negatively in manufacturing. The analysts' forecasts also have more limited explanatory power in the service sector.

Overall it can be said that the organization capital plays an important role in explaining the caveats between market values, book values and abnormal earnings evaluated by analyst's forecasts. Here, the industry-level estimates appropriately capture the variation in growth and market values. Following table shows the development of market value and organization capital among the selection of firms in manufacturing, technology and construction, which are comparable in character (and size). The volatile market value is divided by 10.

Figure 6. Market Value and Organization Capital in Selected Industries







The first graph shows that on average organization capital tracks the evolution of market value except of the exceptional peak year 2000 in stock prices. The figure for service and technology firms shows clearest the peak in market values in some firms in the technology sector and without concomitant investment in organization capital. It is seen that in manufacturing industry the market values have not increased due to greater organization capital investments until 2003. Construction sector has experienced a boom in 2005-2006, which has not been followed by greater investment in organization capital.

7. Conclusions

Organization capital has increased in importance in the globalization process. R&D investments have also been increasing in share, while the compensations for R&D have not, in contrast to the compensations for OC. Firms can be fragile without sufficient investment in marketing and managerial abilities. The organization capital promotes returns to other factors in the long run. In fact it explains the cap found between the evolution of book values and earnings reasonably well. We have valued organization work by its influence on sales. If the depreciation rate of organization capital investment is equal to the unaccounted share of organization capital by ecnomic analysts, the organization investment also approximates organization capital. The unexplained organization capital value can thus be said to be on average fully capitalized in the market values in one year, since the coefficient is equal to one.. In some industries, and particularly in services, organization capital also explains larger share of the variation in market value than analysts' forecast.

Organization capital improves economic competence in Corrado, Hulten and Sichel and thus total factor productivity. Organization capital can turn out to be even a substitute for other intangible capital such as scientific innovations related to R&D investment. Many firms are lacking R&D investment and still use organization capital efficiently. A full model incorporating organization capital as one factor of input may provide a solution to much of the puzzles in the literature related to the returns to R&D and ICT assets.

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Appendix A. Summary

Table A.1 Summary of Variables

Variable	Mean	Std	Median	Obs
Sales	62256	211573	15921	9314
Difference of log(Sales)	0.043	0.37	0.03	9298
Value Added	17866	71842	4722	8849
Sales reporting SGA	109062	116474	65040	465
Selling, General, Administration	14093	17590	6981	462
Difference of log(SGA)	0.0094	0.7	0.0087	444
Selling	8924	13640	3749	465
Administration	5078	6349	2704	465
Employment	273	677	94	9314
Employees in Organization Work	41	154	12	9314
Organization Compensation	1306	4675	327	9314
Difference of log(Organisation Compensations)	0.025	0.4	0.013	9314
Management Compensation	632	1993	162	9314
Management personnel	16	101	3	9314
Marketing, Purchases Compensation	310	1489	54	9314
Marketing personnel	11	49	2	9314
Administration Compensation	363	2691	56	9314
Administration personnel	14	47	3.1	9314
ICT Compensation	253	1505	21	9314
ICT personnel	6.7	38	1	9314
R&D Compensation	740	2865	56	9314
R&D Asset	4211	15891	343	9314
Net Plant, Property, Equipment	2317887	1.4E+07	247773	9314
Hours per capita	1013	689	1033	9314
Hours per capita, skill adjusted	1412	1036	1347	9314

All in thousand euros 2000 prices. Deflator is consumer price index for sales, producer price index for value added. Half of wage and capital price index for organisation capital items.

Table A.2 Summary of Correlations

	Org OC	Org OC 2SLS	Org Admin 2SLS	Net Plant, Property, Equipment	Mana-gement Compen.	Adminis-tration Compen.
Organization Capital OC	1					
Organization Capital OC 2SLS	0.4627	1				
Organization Capital Admin. 2SLS	-0.1427	-0.0043	1			
Net Plant, Property, Equipment	0.6267	0.2545	0.0485	1		
Management Compensation	0.6157	0.3102	-0.0921	0.5356	1	
Marketing Compensation	0.2428	0.3594	0.5022	0.3942	0.4983	1
Administration Compensation	0.4767	0.2441	-0.1052	0.3406	0.5433	0.2543

Table A.2 Summary of Organization Capital

Variable	Mean	Standard Deviaton	Mini-mum	Median Value	Max	Obs number
Book Value of Assets	93614	612670	-604383	8324	13000000	5760
Organization Capital OC	7793	48240	-149757	1895	2104702	6212
Organization Capital OC 2SLS	5829	53277	-1559541	1026	2137411	5998
Organization Capital SGA 2SLS	62719	686276	-1254165	1120	11000000	375
Organization Capital/Sales OC	0.054	0.047	-0.05	0.05	0.9	6212
Organization Capital/Sales OC 2SLS	0.033	0.17	-8.7	0.031	3.4	5998
Organization Capital/Sales SGA 2SLS	0.051	0.21	-0.29	0.028	0.8	375

Table A.3 Correlation of Organization Capital

	Org. Cap	Org. Cap Incl. Outliers	Org. Cap SGA	Org. Cap Residual	Tangible Fixed A.	Manag. Comp.	Marketing Comp.	Administr. Comp.
Org. Cap	1							
Org. Cap Incl. Outliers	0.2968	1						
Org. Cap SGA	0.3528	0.4388	1					
Org. Cap Residual	0.3495	0.1103	0.5114	1				
Tangible Fixed A.	0.4814	0.0906	0.0836	0.1031	1			
Manag. Comp.	0.164	0.0351	-0.0067	0.039	0.037	1		
Marketing Comp.	0.4403	0.1377	0.213	0.1943	0.3048	0.1954	1	
Administr. Comp.	0.216	0.0525	0.0459	0.0737	0.2119	0.0881	0.2125	1

Table A.4 Summary of Organization Capital in Listed Companies

Variable	Mean	Standard Deviaton	Mini-mum	Median Value	Max	Obs number
Market Value Less Book Value/Sales	0.42	1	-1.7	0.37	12	256
Abnormal Earnings/Sales	-0.28	1.8	-5.3	-0.36	11	256
Organization Capital OC	32616	64455	-134665	7731	397873	256
Organization Capital OC 2SLS	18927	63215	-261291	3235	423977	256
Organization Capital/Sales OC	0.088	0.13	-0.05	0.045	0.8	256
Organization Capital/Sales OC 2SLS	0.072	0.17	-0.3	0.024	0.86	256
Organization Capital/Sales ISO	0.0031	0.03	-0.15	0	0.39	256
Organization Capital/Sales RO	0.14	0.81	-1.1	0.017	11	256
Tangible Capital/Sales	0.54	1	0.000035	0.25	10	256

Appendix B. Occupation Classification of Non-Production Workers

	Occupation of Non-Production Worker	Organization Worker	R&D Worker	IT Worker
Manufacturing	Management	Management		
	R&D		x	
	R&D superior		x	
	Supply transport non-prod			
	Supply transport non-prod superior			
	Computer			x
	Computer superior			x
	Safety quality maintenance non-prod			
	Marketing purchases non-prod	Marketing		
	Marketing purchases non-prod superior	Management		
	Administration non-prod	Administration		
	Administration non-prod superior	Administration		
	Finance admin non-prod			
	Finance admin non-prod superior	Management		
	Personnel management non-prod	Administration		
	Cleaner garbage collectors messengers			
Services	Media			
	Computer processing services			x
	Computer processing services super			x
	Salesperson contract work services			
	Warehouse transport services			
	Maintenance gardening forest servi			
	Teacher counceling social science professionals			
	Hotel restaurants			
	Hotel restaurants superior			
	Social and personal care			
	Health sector			
	Forwarder services			
	Purchases and sales services			
	Insurance worker			
	Insurance worker superior			
	Small business manager			
	Finance services			
	Finance services superior	Management		
	Marketing services			
	Marketing services superior	Marketing		
	R&D worker services		x	
	Personnel project manag serv	Administration		
	Personnel project manag serv super	Management		
	Administration services			
	Administration services superior	Management		

Appendix C. Industry Classification

	Industry	Nace Rev 1	Main Industry
1	Service, Consumer Non-Durables: Food, Tobacco, Textiles, Apparel, Leather, Hotels, Entertainment, Utilities	DA, DB, DC, DL(335), DM(354), E, H	Service, Production of Non-Durables
2	Consumer Durables: Cars, TVs, Furniture, Household Appliances; Transportation, Toys, Sports	DM(excl. 354) DL(322-323) DN(excl. 3611-3612) I(excl. 642)	Manufacturing
3	Other Manufacturing: Metal, Trucks, Planes, Office Furniture, Paper	DM(351-353) DD, DE, DK, DN(3611-3612), DJ, DN	Manufacturing
4	Energy, Oil, Gas, and Coal Extraction and Products	DF	Mining, Construction, Others
5	Chemicals and Allied Products	DG(excl. 244), DH, DI	Manufacturing
6	Business Equipment: Computers, Software, and Electronic Equipment	DL(300,311-316, 332-335) K(721-724)	Service, Production of Non-Durables
7	Telecom, Telephone and Television Transmission	I(642)	Service, Production of Non-Durables
8	Wholesale, Retail, and Some Services, (Laundries, Repair Shops)	J,K(excl. 721-724)	Service, Production of Non-Durables
9	Healthcare, Medical Equipment, and Drugs	N(private), DG(244)	Service, Production of Non-Durables
10	Money, Finance	J,K(excl. 721-724)	Service, Production of Non-Durables
11	Other: Construction, Transportation, Building Materials, Mining	CA, CB, F,	Construction, Others