VOORBURG GROUP ON SERVICE STATISTICS

Tenth Meeting

Voorburg, 11-15 September 1995

HUMAN CAPITAL IN PROFESSIONAL SERVICES

Some theoretical and practical aspects

Abstract: The objective of this paper is to discuss the role and measurement of human capital as a factor of production, with particular focus on computer and technical i.e. professional services. The idea is to show that the cost of labour (L) over physical capital (K) is more significant in professional services compared to manufacturing and retail trade. This is studied by using industry based accounting data.

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HUMAN CAPITAL IN PROFESSIONAL SERVICES: SOME THEORETICAL AND PRACTICAL ASPECTS

1. Background

The importance of the two traditional production factors, labour and capital, differ significantly from one industry to another. In general, the stock and accumulation of physical capital is recorded in detail in business accounts. However, data on employment is available to a very limited extent, often only the number of employees. Therefore qualitative data on employees, such as human capital, is often neglected in official statistics.

The educational structure of employees in professional services is assumed to have an effect on the economic performance of enterprises. Nordic experience has shown that the value added per employee tends to be high in professional business services even where the fixed capital used in the production process is low compared with e.g. manufacturing industries. The standard formula of enterprises' accounts is clearly inadequate in yielding information on human capital.

Since education is costly, it should be of common interest to identify the industries with growth potential. The financial risk of education is generally divided between the individual and society, depending on the system applied in each country. With rising unemployment rates in several countries, a major concern of policy-makers should be in the allocation of education given so that the efficiency and functioning of labour markets can be maximised. For these purposes, more information is needed on labour qualifications and their role in the whole economic structure.

The objective of this paper is to discuss the role and measurement of human capital as a factor of production, with particular focus on professional services. The idea is to show that the relative significance of labour over physical capital is underlined in professional services compared to manufacturing and retail trade. This is studied by using industry-based accounting data. The methodology is briefly introduced in chapter 5 and some results in chapter 6.

2. What is Human Capital? Different approaches

Human capital is the economists' approach to the analysis of skills or labour 'quality'. The central idea is that human capacities are in large part acquired and developed through informal and formal education, experience and training. However, these activities are costly including both direct expenses and losses in earnings while studying. Because benefits derived from these activities accrue mainly in the future, the costly acquisition of human capital can be viewed as investment (Mincer, 1989).

The easily verifiable fact that people with a better education earn more than people with less education is in accordance with the human capital theory. These higher wages result from further education, which has increased the relative productivity of individuals. There are also competetive models, such as the screening hypothesis, which emphasises innate productive skills and that is why individuals earn more and educate themselves better. The sorting theory links the marginal productivity of a worker to the occupation and not to the worker as in the human capital theory.

According to the human capital theory, a substantial proportion of production *growth* can be explained by increases in the quality of labour input in the production process due to investment in education. The underlying assumption then is that education can create human capabilities; it is an investment that turns unskilled into skilled labour. With greater knowledge individuals are assumed to be able to act more efficiently in different circumstances, which indicates that they will be more productive and therefore contribute more to economic growth. Moreover, since education is a productive input, any increase in educational attainment will raise worker productivity. This accumulation of human capital is, in turn, thought to be reflected in the market wage received by the worker (R. Aspholm, 1991).

There are different views of human capital or education related to its nature as an *investment* or *expenditure*. In purely economic terms, education can be considered an investment, which is expected to pay back in higher future income. In principal, this is true of societies, individuals and businesses. From the businesses' point of view, the general accounting formula places the expenditure on training and education to consumption, which is thus not accumulated in the balance sheets of the enterprises. However, by educating the employees, the potential of the enterprise to match the future requirements and increase its productivity is improved. If the rate of return on job training exceeds that on other investments, the economy would benefit from increased training.

The enterprise pays rent for the employed human capital in the form of wages. The more educated/skillful the persons employed are, the higher is the rent. Enterprises are only able to rent or lease human capital by employing persons. Unlike physical capital, human capital is thus not included as asset in the balance sheets of enterprises. In principal, the human capital assets should be shown in the 'balance sheet' of individuals, in which they are embodied.

The view adopted by the *System of National Accounts* 1993 considers education as an expenditure, and it is not accumulated to gross fixed capital formation in the same way as other assets. Expenditures on training and research and development do not lead to the acquisition of assets that can be easily identified, quantified or valued for balance sheet purposes (SNA 1993).

According to SNA, education services are consumed in the process of acquiring knowledge and skills. However, the SNA recognizes that human capital is closely related to investment goods as they increase the range of production possibilities in the future.

The decision whether to classify certain types of expenditure in the SNA by households or government, such as education or health services, as final consumption expenditures or gross fixed capital formation does not affect the size of GDP, as both are final expenditures. On the other hand, the decision to classify certain expenditures by enterprises as intermediate consumption rather than gross fixed capital formation does reduce the gross value added and operating surplus of the enterprise and hence GDP as a whole (SNA 1993).

In 1989 J. Köll and G. Nockhammar from Statistics Sweden presented their proposal at Voorburg Group for a broader concept of *business investment* to also include marketing and training and education of employees. The broader investment concept meant investments to create opportunities for economic activities in the future.

Studies on human capital traditionally concentrate on the manufacturing industries, which used to be the expanding sector of the economy. Unlike many services, the manufacturing sector is generally covered by comprehensive data records. However, the rapid changes in technology have reduced the relative importance of traditional manufacturing industries and introduced a set of new growing service industries, which employ mainly highly skilled/educated labour.

3. Traditional Production Function

The two traditional factors on production in economic theory are labour and physical capital giving the following production function (all other inputs are excluded here),

$$Q = f(L,K)$$

where Q is output, f ( ) is the production function, and L and K are homogenous labour and physical capital inputs respectively. The idea here is to briefly study the existing relations between labour and capital in some industries.

The increased knowledge-intensity in advanced economies tends to make human skills more crucial to economic progress and that shortages of requisite skills are likely to impede the rate of technical change and thus economic development. Implicit in these arguments is a presumed *complementarity* between technology and human knowledge, an assumption which stands in sharp contrast with the traditional view according to which physical capital and labour are to be regarded as separate factors of production in economic conflict (G. Eliasson, 1988).

The decisive role of human capital accumulation in rapidly developing technology is also the assumption of low elasticity of substitution between more and less educated /skilled labour. As an indication, the increases in physical capital raise the demand for educated labour relative to less educated labour (R. Aspholm, 1991).

4.The Data Available on Labour and Physical Capital in Business Accounts

The traditional business accounts keep detailed records on the businesses investments and the accumulation of tangible assets. The validity of this tradition is not questioned when the tangible assets play a decisive role in the production process. Consequently, the data available on human capital intensive sectors are far from satisfactory because of the insufficient information on the human capital side of production.

According to Eliasson (1990), the statistical accounts of both business organizations and nations are structured on the concept of goods producing firms. The representation of assets is limited to tangible items that can be traded in external markets. Costs are itemized to the extent needed to exercise cost control and to carry out pricing calculations.

When estimating the value of real physical capital stock and its changes based on business accounts, one can always argue that the use of book values of balance sheet items and depreciation rates do not reflect the real market values correctly. These issues are e.g. dependent on country practices and on how accounting principles are applied.

Data availability regarding labour (L) as a production factor is limited. Often only the number of employees is available. In business accounts no data are available on the quality component of labour, which is called human capital here. Such information as the educational structure of the employees is not reported in the standard accounting formula or annual reports.

When measuring the productivity of labour it is generally assumed that the labour inputs are homogenous i.e. that their effect on production is equal. In reality, the quality of different persons is not equal. The measurement of productivity should be based more often on data on labour quality and structural changes in the composition of labour, as well as in educational attainment (O. Lehtoranta, 1995).

The crucial importance of human capital in the production of professional services has so far been emphasised. Where available, the qualitative data on labour, such as *sex, age and education*, generally has to be extracted from labour force surveys and censuses. The problem with the former survey is the inaccuracy where the level of industry is needed in detail. On the other hand, census-based data is often old and they are carried out only once in every five or ten years (S. Rikama, H. Jeskanen-Sundström, P. Boegh Nielsen, B. Olsson, 1994). The other qualifications of individuals,

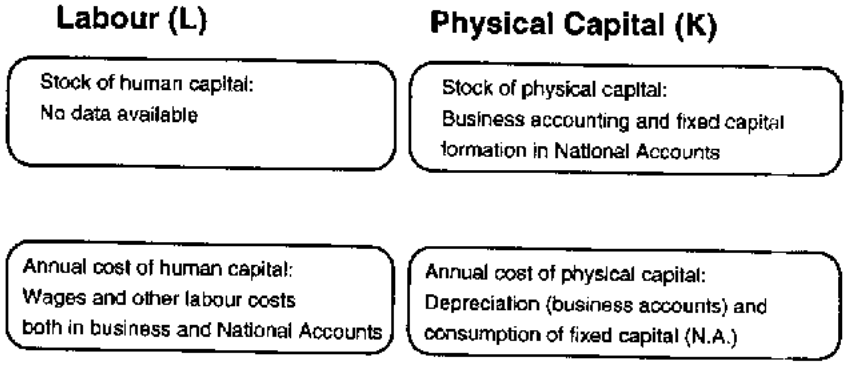
such as innate skills, are in practice extremely difficult or impossible to measure in statistical terms.

5. Methodology of Estimating the Relative Importance of Inputs K and L

The method of evaluating the relative importance of K and L here is very rough and intended only to give a preliminary view to this issue. The source used here is the annual financial statement survey for enterprises in Finland.

Several difficulties arise when trying to estimate the relative importance of capital and labour on the basis of accounting information. For physical capital[1], the accounting data classifies the capital stock and annual changes by type of capital i.e. buildings, machinery etc. Furthermore, the depreciation of fixed assets is also available.

Figure 5.1 : Data availability on capital stock and cost by type of capital



The case of labour is more problematic, since business accounts or any other method gives no calculated value for human capital stock. Consequently, in order to compare the relative importance of L and K by industry, the *cost approach* of each input is chosen here. The information available on L is the annual wages and other labour costs, which are assumed to represent the annual cost of using the human capital stock. It thus implicitly takes into account the quality aspect of labour. Labour costs are compared to calculated user costs of physical capital giving a ratio of their relative importance.

For instance, the training costs of the employees have to be left out from labour costs, together with repair and maintenance costs of physical capital, since they are not recorded in sufficient detail in business accounts. Physical capital is narrowly defined here to include the major groups: buildings and machinery and equipment of fixed assets. However, in the case of e.g. manufacturing, the need for total financing is much higher because of raw materials, inventories etc. needed for production.

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1 Physical capital here refers to machinery and equipment and buildings.

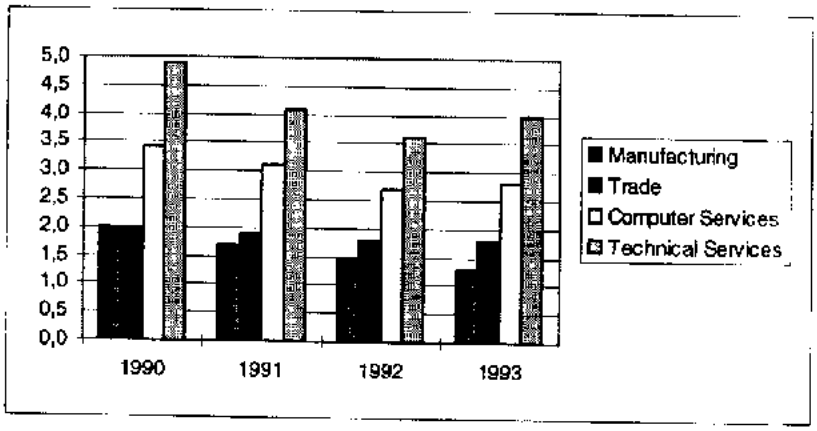
The depreciation percentages used in the calculations are the fixed rates of 30 per cent for machinery and 10 per cent for buildings. These values represent the maximum allowed annual depreciation rates according to Finnish tax laws. The rents and leases are taken into account from cost accounting to cover cases where the businesses do not own the fixed assets used in the production process. In addition, an alternative cost is calculated for the value of fixed physical capital of each industry by using the average annual interest rates of Finnish banks. The actual interest payments of the income statement are not used in calculations, because capital costs are dependent on the equity of the enterprises and industries.

6. Finnish data on L/K costs for some industries

This chapter describes some basic characteristics of the labour and capital structure for computer and technical services. For comparative reasons, the total manufacturing sector and retail trade sector are also studied.

The relative weights of the costs of production factors of labour and physical capital are given in figure 6.1. The figures refer to the period of 1990-1993, during which the Finnish economy underwent an exceptionnally deep recession. In 1993, the cost for labour in manufacturing and retail trade was less than two times the cost of physical capital (here buildings and machinery and equipment). On the other hand, the computer and technical services are more labour (human capital) intensive. The labour costs in technical services was four times more than the physical capital costs and for computer services almost three times more respectively.

Figure 6.1: Labour costs per physical capital costs in selected industries 1990-1993



Source: Statistics Finland

The reduction in labour costs related to capital costs in 1990-1993 took place in retail trade and manufacturing due mainly to cuts in labour costs. The time series also reveals that the range in L/K ratio is greater for computer and technical services in 1990-1993. This could be an indication of the flexibility of production factor L in a situation where output has

declined sharply. Since enterprises do not own employees (human capital), the labour has turned out to be a very flexible factor of production. During the recession the companies were forced to cut expenses by dismissing employees. In these cases, the individuals themselves bear the risk of the capital instead of the enterprises, as human capital is embodied in individuals.

By contrast, selling physical capital at a reasonable price in the case of excess supply is a much more problematic issue for enterprises. Since the stock of human capital used in professional services is relatively high, one could make a hypothesis that professional services enterprises can adapt their operations and survive through business cycles with less severe problems than companies which must bear the risk of a great amount of physical capital, e.g. manufacturing enterprises.

According to figure 6.2, the average labour costs per person are highest in computer and technical services, while the physical capital costs per person are greatest in the manufacturing industries. The highest labour costs per person in professional services is assumed to reflect the high average level of human capital in these services. This view is supported by studying the educational attainment of the labour force in these services.

The results of a *sample* study of computer and technical services enterprises (S. Rikama, 1994) suggests the educational attainment of the employees in computer and technical services to be remarkably high. The average record of the Educational Level of Population - indicator[2] (ELP) for the total population of Finland aged 20 and over was 280. Both for computer and technical activities the ELP-indicator shows records about 60 per cent higher, being 460 for technical activities and 450 for computer activities.

The value of the total balance sheet per person illustrates the *stock* of total capital in the enterprise's accounts. The predominance of total capital in manufacturing industries is obvious, exceeding three times the values per person in all the services industries.

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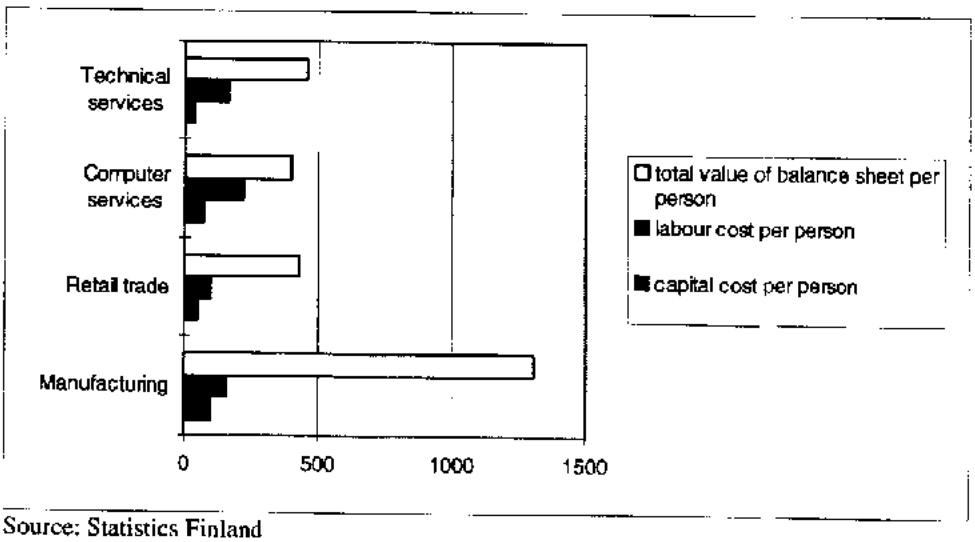
[2]In the early 1990s Education Statistics of Statistics Finland developed a tool known as the ELP-indicator to measure the educational level of the population. Basically the ELP-indicator is very simple, assuming equal differences between the educational classes, i.e. average educational attainments can be calculated from the data. This permits comparison of the educational level of various sectors of the population and in it by region. The advantage of the indicator is that educational levels can be compared between different groups, such as sex and age, with a single figure.

The indicator is calculated according to a person's highest qualification using the level code for education. The higher the figure of the three digit indicator, the higher the level of education is. The criterion behind the Finnish Educational Classification is the number of schooling years: The longer the education is, the higher the code for the educational level is.

Figure 6.2: Total value of balance sheet, labour costs and cost of physical capital per person (FIM 1000) by industry in 1993



Source: Statistics Finland

7. Conclusion

The primary purpose of this paper was to highlight the human capital aspect in professional services production. Some principal aspects of human capital, as expenditure vs. investment were discussed from the perspective of the individual, of businesses and of the System of National Accounts (SNA). The SNA views the human capital embodied in individuals as an expenditure, although the close relation to investment is recognized.

From the point of view of businesses, human capital is not accumulated in the enterprises balance sheet, although it is recognized to be a major production factor of e.g. professional services. The employees are rented by the employing enterprise with the expense of annual labour costs. Training programs for employees offered by enterprises are in general recorded to annual costs of income statement, even though they improve the enterprises' capability to meet future expectations.

The accounting data suggested that relatively labour costs over physical capital costs were higher for computer and technical services than for retail trade or manufacturing. Furthermore, the average labour costs per person in computer and technical services implies that these services employ a high human capital stock per person. On the other hand, for manufacturing industries, the total balance sheet value per person was more than three times that of the other industries studied.

The increasing importance of human capital should be somehow quantified since current accounting practices do not generally give sufficient information on the future potential of enterprises. The behaviour of professional services enterprises that depend on business cycles could be an interesting field for further study. It is suggested here that professional

service enterprises, although in general employing an increasing number of persons, will during a recession flexibly adapt their operations to lower demand by dismissing their employees. By doing this the companies also reduce the risk of capital, since human capital is a major production factor in professional services type of industries.

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