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ABSTRACT

Three presentations are provided from Symposium 13, Knowledge and Intellectual Capital, of the Academy of Human Resource Development (HRD) 2000 Conference proceedings. "Human Capital Measurement" (Joanne Provo) begins with a literature review that provides a context for understanding how investments in human capital add value to the firm, discusses evaluation techniques, and cautions against using financial measurement systems for human capital investment analysis. It reviews an alternative approach to the positioning of HR investments and presents a process HR professionals can initiate to demonstrate value of investment in human capital initiatives. "Measures and Indicators of Intangible Assets for Research Institutes and Colleges: A Literature Review" (Eunsang Cho, Gary N. McLean) explores definitions, measures, and indicators of intangible assets. A model is provided for customization by research institutes and colleges. "The Corporate Curriculum: A Working-Learning Environment" (Jaap van Lakerveld, Joukje van den Berg, Kees de Brabander, Joseph Kessels) focuses on development of a corporate curriculum for learning in service organizations, health care, business, and industry in the context of a knowledge economy. It is both a theoretical framework and a report of the second phase of a three-phase research project conducted in the Netherlands in 42 institutions for public health and welfare. The papers contain reference sections. (YLB)

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Human Capital Measurement

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Organizations have come to realize the value of effective human capital strategies and HRD initiatives. While momentum is building in this area, measurement systems that optimize human capital investments have not kept up. Most HR measures are based on financial accounting techniques that were developed to maximize return on capital, not return on people. These measures are often focused on the efficiency of HR investments and rarely consider the effectiveness or impact of these initiatives.

Keywords: HR Measurement, Human Capital, HR Effectiveness

While there may be some debate over the use of the term human capital, for purposes of this paper it will be used to demonstrate that like other assets that must be invested in to yield value, there is a return on human assets as well. A firm can leverage its human capital by increasing its collective ability to extract the best ideas and solutions from the knowledge of its people. Salamon (1991) uses human capital to refer to the skills, knowledge, and abilities of human beings. Underlying this concept is the notion that these skills and knowledge increase human productivity, and that they do so enough to justify the cost incurred in acquiring them. Human capital theory states that "human capital is the knowledge and skills (physical and intellectual) that an individual possesses that make that individual a productive worker" (Besanko, Dranove, & Stanley, 1996, p. 641).

Problem Statement and Theoretical Framework

Like any asset people should be seen as a source of strategic advantage and invested in as other tangible assets. Lewis (1997) uses the accounting perspective to enhance his case by noting that there is a growing recognition that organizations must invest in all assets appropriately if they intend to be successful in the long term. Further, he makes the point that all organizations need to invest in building intellectual capital and it can no longer be a luxury for a small minority of enlightened companies.

Information and technology are changing the way we deploy human assets, and with this there is a need to explore what it means to effectively manage the human capital that contributes to organizational wealth. It is certainly plausible to believe that what differentiates successful companies will be their accumulation, development, and deployment of human capital. Mirabile (1998) calls human assets the true measure of corporate wealth.

More and more organizations are announcing their plans to strategically manage their intellectual capital and see the cultivation and investment in human capital as an opportunity to enhance their market positions (Bontis, 1996). It is important to note here that the management of human capital is distinctive from managing physical assets and that an entirely different skill set is required. The management of an organization's human assets is going to require a different set of management skills and the incorporation of organizational and measurement systems that appropriately reflects the value of investment in human capital.

Methodology

The methodology used was a conceptual analysis based on the review of human capital measurement literature. The review covers a broad spectrum of scholarly works and also incorporates practitioner-based literature. A consulting model was also reviewed against the prevailing literature to understand the alternative approaches to human measurement and analyze the application problems of many of the prevailing measurement processes.

While many of the works studied agreed on the need for HR measurement and often proposed a particular approach, a comprehensive and agreed upon set of measures has not resulted. Scholar's and practitioners, (Huselid, 1995; Swanson, 1998; Welbourne & Andrews, 1996) have presented strong arguments that investments in human capital yield value for the firm, yet these processes often rely on measures typically applied to the valuation of financial and not human assets. Boudreau & Ramstad (1997) present strong arguments against the application of these financial measures to human capital investment valuation. This paper will review the various positions and analyze an alternative approach.

The literature review provides a context for understanding how investments in human capital add value to the firm, discusses various evaluation techniques, and presents cautions against using financial measurement systems for human capital investment analysis. Finally the paper reviews an alternative approach to the positioning of HR investments and presents a process that HR professionals can initiate to demonstrate the value of investment in human capital initiatives.

The Case for Measurement

It is becoming increasingly difficult to participate as a strategic business partner within an organization without demonstrating the value that is generated through investment in the assets that you manage. In the case of human resource professionals that asset is people, an asset long thought to be immeasurable. There is a need for the development of HR measurement systems that accurately demonstrate the value of investment in HR initiatives. Walker and Bechet (1991) say that human resource staff functions need to measure both efficiency and effectiveness. They note that, "Efficiency addresses the relationship between key results and short term human resource activities. Effectiveness addresses the relationship between key results and longer term issues and strategies" (p. 235). They further identify that effectiveness is the extent to which human resources support long term business planning and strategies. Their caution is that efficiency may not be the goal of the human resource function. They provide the following example, "An 'efficient' source of new hires (defined in terms of cost per hire) may indeed be quite ineffective when many of the employees that are hired do not stay with the organization for an adequate length of time" (p. 243). Becker and Gerhart (1996) caution against the use of HR measures at the corporate level. In their view HR practices differ substantially across the business units and facilities and corporate measures may lose some of their meaningfulness.

Boudreau and Ramstad (1997) note that while HR processes have evolved from administrative activities to those having strategic significance, we have not seen a corresponding evolution in human resource measurement systems. Gray (1986) echoes the support of strong information systems, noting that it is difficult for a strategic planning system to reach its full potential without support of the appropriate control systems.

Evidence that a Focus on Human Resources Adds Value

In a review of the theory and practice of demonstrating the financial benefit of human resource development Swanson (1998), summarizes a number of HRD studies that demonstrate how focused and systematic HRD interventions can lead to positive returns. Delery & Doty's (1996) study also shows strong relationships between individual HR practices, such as profit sharing, results-oriented appraisals, and employment security and important accounting measures of performance. Delaney & Huselid's (1996) study suggests "that progressive HRM practices, including selectivity in staffing, training, and incentive compensation, are positively related to perceptual measures for organizational performance" (p. 965). These and other studies have begun to make the case for investments in HRD. The two studies summarized below are frequently cited (Gubman, 1998; Pfeffer, 1998) as solid evidence that investments in HR lead to enhanced financial results for the organization.

Welbourne

The study by Welbourne and Andrews (1996) captured a great deal of attention in that it showed that an investment in human resources was a predictor of long-term survival and viability for organizations. The study focused on 136 non-financial companies that made their initial public offering (IPO) in 1988. These companies were evaluated to determine the extent to which they considered their employees to be a source of competitive value. The prospectus for each of these companies was examined and coded using the following criteria:

1. The company's strategy and mission statements cited employees as a competitive advantage.
2. A training program for employees was mentioned.
3. An officer with responsibility for human resource management was listed.
4. The extent to which full-time rather than temporary or contract employees were used.
5. The employee relations climate.

The documents were also examined to determine if organization-based compensation programs (stock options and profit sharing) were available for all employees or only management.

The results of this study showed that while the companies that valued human resources were initially valued lower at the time of the IPO, those same companies had much higher values and survival rates five years later than those that did not recognize the value of human resources. The results are significant for two reason: 1) this study clearly relates investments in people to organizational success and survival, 2) the financial valuations systems failed to recognize the value of investments in human resources and saw only the costs. It is this second point which surfaces the disconnect between what the financial statements reflect and the true value of an organization. The analysts who were conducting the valuation process to determine the initial IPO price saw employee profit sharing plans as a drain on the returns that would accrue to the stockholders and the market reacted negatively to firms using their capital for employee reward programs. The analysts were unable to account for the benefit that these policies would have on the efficacy of these organizations and thus they proposed a lower valuation for these companies. In examining these companies five years after the IPO, the researchers found that, "a firm that has a high level of human resource value and a high level of organization-based employee rewards boosts its chance of survival to .92"(p. 911).

Huselid

Huselid's (1995) study was designed to be a comprehensive evaluation of the links between systems of high performance work practices and firm performance. In this study high performance work practices included comprehensive employee recruitment and selection procedures, incentive compensation and performance management systems, and extensive employee involvement and training.

Nearly 1000 firms participated in the study by submitting a questionnaire that had been mailed to the senior HR professional in each of the firms. The results indicated that high performance work practices lower employee turnover and result in greater productivity and corporate financial performance. In fact in this study the magnitude for returns on investments in high performance work practices was substantial. "A one-standard-deviation increase in such practices is associated with a relative 7.05 percent decrease in turnover and, on a per employee basis, $27,044 more in sales and $18,641 and $3,814 more in market value and profits, respectively"(p. 667).

This study is currently being replicated by other researches to see if the results can be substantiated. While future researchers may find varying results in the financial performance associated with these practices, this study initiated that further research and broke ground by demonstrating that effective human resource practices can increase the value of the firm.

Beyond Evaluation

Evaluation techniques for many years have relied on the four levels proposed by Kirkpatrick (1994): reaction (satisfaction), learning results, changes in behavior (transfer), and organizational performance. In many cases, unfortunately, the evaluation of a human resource initiative rarely went beyond the first level (Holton, 1996). Increasingly organizations are expressing an interest in evaluating the results that can be demonstrated by an investment in human capital. The organization may proclaim that people are their most important asset, but that doesn't mean they aren't interested in the return generated for an investment in that asset.

Kaufman & Keller (1994) suggest that evaluation techniques are often underutilized and inappropriately applied in organizations. They identify three reasons for this:

1. The most-used definitions and models of evaluation often are too restricted,
2. we do not ask the right questions for evaluation to answer, and
3. the relationship between ends and means is not made clear in the evaluation, planning, and implementation process. (p. 371)

They propose modifications to Kirkpatrick's model to include the consideration and determination of the value and worth of resources, and an added level, which deals with the impact and consequences in, and for society. They also support the extension of the evaluation model to organizational interventions beyond training.

Phillips (1996) model of evaluation gets right to the issue of effectiveness and performance. The three levels of evaluation in his model are:

1. Measures of Perceived Effectiveness
2. Measures of Performance
3. Measures of Return on Investment (p. 60)

While there are few human resource professional who would question the need to measure beyond perceived effectiveness, there is little agreement and very few step by step guides that show how to measure performance. While human resource professionals readily grasp the concept, there is not a clearly understood approach to demonstrating this value. The mistake that some organizations make is in trying to apply financial ratio analysis and measurement models to human resource initiatives. A discussion of the problems arising from using these models and in particular the Return on Investment (ROI) methodology will be presented in the following sections.

Cost – Benefit Analysis

Swanson and Gradous (1988) presented a model and method for evaluating HRD outcomes for business and industry. Their HRD benefit-forecasting model and the methods that were introduced consisted of the following components: "(1) the *performance value* to result from the HRD program, (2) the *cost* of the HRD program, and (3) the *benefit* resulting from the HRD program" (p. 21). While this approach was relatively simple and straightforward it did provide focus on the performance value as the key component in financial benefit analysis.

Cascio (1987) uses a cost accounting platform for his cost-benefit approach to HR analysis. He recognizes as Swanson & Gradous (1988) do, that performance is a key factor. Cascio introduces the use of a performance ratio to measure individual productivity. He also introduces the Cascio-Ramos estimate of performance in dollars (CREPID) model to value an increase in productivity for an individual. The approach assumes that the employee's salary is an economic value of the employee's labor. The analysis is described as follows:

> CREPID breaks down each employee's job into its principal activities, assigns a proportional amount of the annual salary to each principle activity, and then requires supervisors to rate each employee's job performance in each principal activity. The sum of the dollar values assigned to each principal activity equals the economic value of each employee's job performance to the company. (p. 182)

This measure represents the performance value. Any investment in improving performance could be measured against the cost incurred in increasing that level of performance.

Jarrell (1993) notes that cost-benefit and utility analysis are used most often to evaluate human resource procedures and programs. But he warns, "Using cost-benefit analysis alone, it is difficult to determine or obtain precise estimates of human resource costs and usually impossible to obtain precise estimates of human resource benefits" (p. 239). However, he goes on to say that precise estimates of costs and benefits are not always necessary where the evaluation is intended to support the planning process. Approximate estimates are useful for allowing comparisons among several alternative programs, increasing planners' awareness of kinds of costs and benefits, revealing hidden costs and benefits, and improving the ability of planners to judge value.

Return on Investment (ROI)

Phillips (1996) calls ROI analysis the "ultimate level of evaluation" (p. 61) in the evaluation of the actual return in HR programs. His discussion of when to use ROI illustrates that a measure of this type is not always appropriate. In fact in a table developed to provide guidance on when to use the ROI approach there are only two areas where he finds the use of ROI calculations to be highly appropriate. Those two human resource functions are in Safety and Health and Productivity/Quality Improvement (p.301). The conclusion that can be drawn by human resource

professionals is that unless they manage or contribute to the effectiveness of either of these two functions they are unable to apply the ultimate level of evaluation to their programs.

Swanson (1998) cited several early HRD financial studies that used the ROI approach to demonstrate the value of HRD interventions. He noted that these studies "... demonstrated that HRD imbedded in a purposeful performance improvement framework -- and systematically implemented -- yielded very high returns on investments, an ROI of eight to one or more in year or less" (p. 289). These results are indeed impressive and demonstrate the clear value of HRD interventions. Unfortunately in the financial world high returns are associated with high-risk projects (Brigham, Gapenski, & Ehrhardt, 1999), and the reporting of high ROI's reinforces the perception that investments in HRD programs are risky.

Cautions in the use of Financial Analysis Tools to Evaluate HR Programs

Early adopters of capital budgeting and financial accounting techniques to evaluate human resource programs were sharply criticized by Hunter, Schmidt, and Coggin (1988) who claimed in their view that "... many of these methods are often conceptually and logically inappropriate" (p. 522). Their skepticism and concern were driven primarily by the definition of utility and the translation of that concept to a financial analysis. Boudreau's (1983) early work on utility analysis presented one of the first applications for the use of capital budgeting as applied to such traditional human resource functions as selection and training. Boudreau believed that utility figures should be discounted, and adjusted for variable costs and the taxation effect. This resulted in a definition of utility as contribution to after-tax profits. While this early work broke critical ground in valuing human resource investments in a financial context, it is difficult to apply a single utility model to every situation. While Hunter, Schmidt and Coggin (1988) were critical of the utility model and the application to HR investment decisions, they were later challenged by Cronshaw and Alexander (1991) who argued that capital budgeting theory can be a useful framework for demonstrating the utility of human resource programs. Cronshaw and Alexander encouraged practitioners to use the utility analysis models and supported the use of capital budgeting techniques that rank investment alternatives. They supported providing capital budgeting analysis of HR programs to organizational decision makers as a means of identifying relevant investment decisions. This debate is central to the issue of whether financial measurement techniques are appropriate in the measurement of human resources.

Parsons (1997) lists the benefits and limitations of using financial analysis tools to evaluate human resou rce development programs. Her list of advantages follows:

1. The tools help HRD practitioners analyze programs through customers' eyes and ask strategic questions.
2. These tools guide practitioners in talking with other stakeholders about their programs.
3. HRD financial analysis tools provide a rationale way of making decisions.

While the application of financial models may provide some comfort in being able to demonstrate value in dollar terms, the measures are often misapplied. Parsons (1997) recognizes this factor in identifying the limitations of using financial models:

1. These tools are unidimensional, only capturing aspects of performance that can be financially translated.
2. HRD financial analysis tools have difficulty measuring aspects of performance where the feedback between action and effect is not immediate or direct.
3. The analysis is only as useful as the information and values on which it is based.

Her third point is true of most any analysis, although the values associated with people may understandably be more of a factor than the values of a capital asset. The result of using financial analysis for a human resource intervention is often a cost benefit analysis where the responsibility for justifying the assumptions falls back to the human resource managers to defend. This propose - defend trap is a sure way to frustrate the human resource professional and the line managers. The key is in demonstrating the value of investments in capabilities in a way that the line managers can understand and believe.

Drew (1996) notes that "... direct transfer of financial models to management of knowledge is limited in scope, presents conceptual difficulties, and if implemented could result in poor quality, over-simplified decision-making" (p. 13). Boudreau & Ramstad (1997) expound on the danger of simply applying financial accounting measures to human resources. They remind us that accounting systems were developed over 500 years ago to be used as an internal management control device. Applied to HR this is the activity monitoring function that provides insight on the efficiency of HR by measuring cost per hire or turnover rates, but does not provide insight into the impact that HR practices have on the competitive positioning of an organization.

An Alternative ROI Approach

Peter Ramstad at Personnel Decisions International (PDI), introduced a concept called threshold ROI (Provo & Neumann, 1998, Ramstad, 1998). Rather than scramble to develop the financial projections that are required to calculate the ROI, PDI's Return On People™ approach presents an alternative process. This method may provide a better approach for human resource professionals for a number of reasons. First and foremost, the presentation of a definitive ROI percentage is discouraged. As mentioned above high ROI's are associated with high levels of risk. Investments in human resources are typically small relative to the benefits received and the reported ROI's do little more than signal management that the investment is risky.

Second, the line managers are involved and asked to quantify what an increase in performance is worth to them. This process has been demonstrated to work even for highly skilled jobs where output has been difficult to measure. The following example illustrates how this would happen for a particular client case.

Case Example

The XYZ Corporation designs software products. XYZ determined that its ability to sell and build products was a key source of competitive advantage. Design capabilities were the single biggest factor keeping XYZ from meeting its strategic goals. The HR management team wanted to identify the best HR investments for the coming year and to quantify the impact of increasing software designers' capabilities. The following process demonstrates the threshold ROI approach for estimating the dollar value, or *impact*, of increasing design capabilities.

Step 1: People who knew the job well ranked the current software designers in order of job performance.

Step 2: The experts were then asked to think about the differences in performance between people who were in the 75th percentile vs. the 25th percentile. The brainstormed differences were:

- Designs better solutions,
- Reaches a higher percentage of milestones on time,
- Identifies synergies with other products, and
- Provides more accurate cost estimates.

Step 3: The experts were then asked to quantify the value of these performance differences. Since there was naturally a bit of disagreement around the exact value, agreement was obtained on the minimum value of the differences by using the lowest numbers that were proposed.

Step 4: The values assigned to these performance differences were summed, providing a total value of $80,000. Dividing $80,000 by 1.3 (the number of standard deviations represented by the difference between the top and bottom 25% of performers) resulted in an estimate of $61,500 as the dollar value of changing the performance of the software designers by one standard deviation.

A Strategic HR Measurement Approach

"The key to financial accounting is the consistent application of accounting rules producing comparable information across organizations" (Boudreau & Ramstad, 1997, p. 350). Given this rationale it is a short leap to supporting the notion that HR measurement could be used much the same way where certain HR practices could be evaluated across organizations or even across divisions in a decentralized organization. Human resource managers need a set of measures that appropriately account for the return on their assets, people. Boudreau and Ramstad (1997) use the differentiation between accounting and finance to differentiate between the professional and strategic applications of HR measures.

> HR measurement systems should focus beyond simple descriptions of past activities, similar to traditional accounting. They should not be satisfied with measurement systems that merely satisfy regulatory requirements. Instead, HR measurement should adopt a predictive perspective, similar to finance. (p. 351)

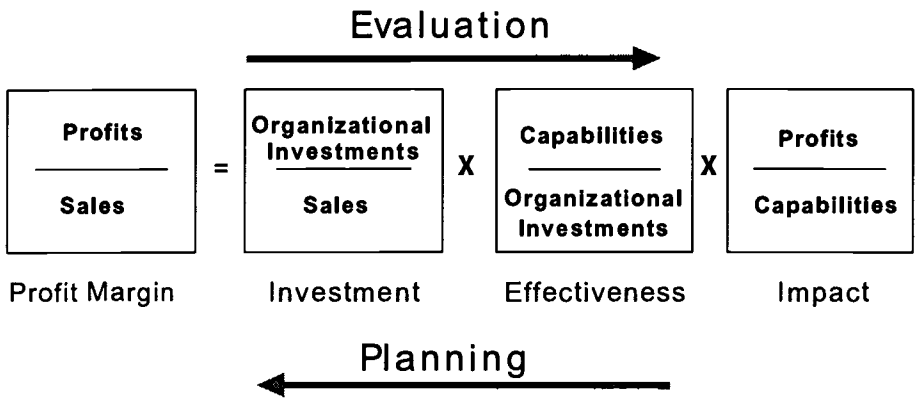
Boudreau & Ramstad (1997) are also clear in their recommendations for applying lessons learned from financial history to the strategic role of human resources. They note that it is critical to establish linkages between business needs and HR processes and to understand constraint analysis as a way of developing appropriate and useful

measurement systems. Specifically they recommend that HR professionals:

- *Build on the value chain.* One way for HR to be a "business partner" is for HR managers and their constituents to truly understand the value chain and what it reveals about key constraints.
- *Search for constraints.* For HR measures to create change, they must identify and alleviate critical constraints.
- *Use data models even if the data are imperfect.* Both financial measurement and marketing measurement do not require perfectly objective information. In fact, their evolution shows that they began with very imperfect data, but with very coherent models of the value linkage. (pp. 352-353)

Figure 1 shows the Return On People™ Model. This approach provides the business case context needed to enhance the role of human resource professionals as strategic partners. The model demonstrates that planning should be initiated by considering the impact that additional capabilities can bring to the organization in the form of increased profits. Effectiveness is measured by how well the investments contribute to increased capabilities. This approach provides a context for making a decision on what to invest in those capabilities.

Figure 1: Return On People™ Model



Summary

It is difficult to participate as a strategic business partner without demonstrating the value that is generated through investments in the assets you manage. The challenge for HR professionals is to demonstrate the value of investments in an asset, people, which has long been thought to be immeasurable. Measurement of human capital investments needs to consider effectiveness, efficiency, and impact. Unfortunately most HR measurement systems are focused on measuring efficiency alone.

Human resource professionals should be cautioned against the application of financial accounting techniques to evaluate their initiatives. Financial techniques were developed to ensure maximum returns on capital, which for decades has been considered the scarcest resource in an organization. Today the scarcest resource is human capital and measurement systems that optimize capital and not people will result in the misapplication of resources. This paper suggests a variant on the traditional financial techniques and incorporates the strategic positioning of HRD initiatives. Application of human capital strategies and measurement tools that appropriately leverage the constrained resource have the ability to provide greatest impact on the organization.

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Measures and Indicators of Intangible Assets for Research Institutes and Colleges: A Literature Review

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Until recently, little attention has been given by HRD to intellectual capital (also known as intangible assets), primarily because of the difficulty of measurement. This paper explores several definitions, measures, and indicators of intangible assets. A model is provided as a basis for customization by research institutes and colleges.

Keywords: Human Capital, Intangible Assets, Financial Returns

The discussion of intellectual capital (also referred to as intangible assets) appears to go back to Becker (1962) who initiated human capital theory. Capital usually refers to financial capital, but Becker categorized both school-based education and on-the-job training as human capital investment, both of which are expected to increase future real earnings over a lifetime. School-based education is considered general human capital investment and is expected to increase productivity irrespective of the specific job or occupation the person pursues. On-the-job training is specific human capital investment and is generally not applicable to other firms, leading to minimal transferability.

Research shows that investment in intangible assets is important because: a) technology, work systems, and organization (all influenced by intangible assets) may determine the competitive edge for the organization; b) the pillar of economic structures is being transformed from a skill-based manufacturing industry into high technology and service industries, which emphasize innovation, work systems, and information; and c) flexible production systems require such assets. It is regrettable that managers and investors often neglect intellectual inputs and outputs, though these may well outweigh the importance of physical assets. In fact, research provides some evidence that intangible assets account for the difference between stock market value and net book value. Firms in information technology, or the so-called high-tech industries, like Microsoft or Intel, have a high ratio of intangible assets to market assets. According to research reported by Sveiby (1997), many electronics companies, like Hewlett-Packard, had a fairly low proportion of intangible assets to market value, compared with those of media companies, waste management companies, and many other branded consumer product companies, like Coca-Cola, which had high proportions.

There are many types of research on the measurement of the impacts of human capital, HRD programs, or HR practices. Medoff and Abraham (cited in Strober, 1990) used performance ratings by immediate supervisors as the measure of productivity and examined data on education, experience, productivity, and earnings for about 7,600 white, male, full-time managers and professional employees in two U. S. manufacturing firms. Their findings showed a positive correlation between experience and earnings, although the relationships between experience and productivity were zero or negative. Bartel (1995) showed positive relationships between training and job performance, using a company database. Bassi and Van Buren's (1998) research revealed a possible link between organizational investments in human capital and organizational measures of performance, including market-to-book value, by utilizing a national cross-industry survey of over 500 organizations. The research, while not conclusive, suggests that training, by itself, in one year may enhance a company's market-to-book value the next year.

Using a laboratory study with students participating in a business simulation game, Dermer and Siegel (1974) found no significant or systematic relationship between any of the four behavioral variables: motivation, effort, group cohesion, and satisfaction, and performance measured by sales, earnings, return on investment, and stock price. However, if valid relationships and reliable bases can be established upon which accountants can base measurements, such measures can be utilized to complement traditional accounting information. Paperman (1976) examined the effect of human resource accounting measures on investment decisions and attitudes regarding measurement of human resources, using CPA subjects in a laboratory experiment composed of two simulated

investment decision cases. The research results indicated a change in investment decisions when information on human resources measures was added to earnings per share trends.

It has been suggested that HR management practices constitute a core competency of organizations in the long run and affect organizational performance. As a result, there have been efforts to examine the relationship between human resource management practices and firm performance. Research by Huselid, Jackson, and Schuler (1997) and Becker and Gerhart (1996) empirically shows that task rotation, small circle activities, autonomous work teams, functional teams, performance-based pay systems, education and training, and management participation , all of which are designed to increase intangible assets or enhance the sharing of intangible assets and information among employees, exert a positive influence on firm performance.

These studies, however, provide little pragmatic guidance to HRD managers about ways to measure assets related to intangible or invisible assets. Therefore, the following research questions are suggested in order to guide practical decisions made by HRD managers.

Research Questions

While there are many definitions of intangible assets, there has been no consensus. The major questions to be answered by this research were: "What are the dimensions of intangible assets for organizations, especially for research institutes and colleges?" "How are intangible assets measured in organizations, especially for research institutions and colleges?" and "What are the indicators for intangible assets for research institutes and colleges?"

To pursue these research questions, generic definitions and classifications of intangible assets are reviewed, and then proper dimensions of intangible assets for research institutes are suggested. Similarly, the measures of intangible assets categorized by different scholars are examined, and then a set of measures of intangible assets proper for research institutes is developed. Finally, a list of indicators of intangible assets for research institutes is suggested in order to develop and manage intangible assets of research institutes and colleges. Research institutes and colleges are the focus of this research because of the affiliation of the authors of this paper.

Definition of Intangible Assets

A number of scholars have defined intangible assets or intellectual capital. For instance, Lowendahl (1997) and Haanes and Lowendahl (1997) defined intangible assets for the strategic management of professional service firms. According to them, intangible assets are categorized into intelligible resources, intelligible assets, capabilities, and competence. Stewart (1997) classified intellectual capital into human capital, structural capital , and customer capital. Human capital includes "the capabilities of the individuals required to provide solutions to customers" (p. 76). Human capital is an important resource because it is the driving force of innovation and renewal. Structural capital consists of internal structure and external structure. Internal structure is generated by employees and owned by the organization. The components of internal structure include patents, concepts, models, computer and administrative systems, corporate culture, and mentality. External structure includes the relationship between customers and suppliers, such as brand names, trademarks, corporate reputation , and images. Customer capital indicates "the value of an organization's relationships with the people with whom it does business" (p. 77). Customer capital includes repeat customers and brand value. Similarly, Edvinsson and Malone (1997) also defined intellectual capital as human, structural, and customer capital. All individual capabilities, including the knowledge, skills, and experiences of the firm's employees and managers, are included under the category of human capital. Structural capital is defined as the embodiment, empowerment, and supportive infrastructure of human capital , as well as organizational capability, including the physical systems used to transmit and store intellectual material. Customer capital includes the relationship of a company to its customers, critical to the company's value.

According to Brooking (1997), the intellectual capital of an enterprise can be split into market assets, intellectual property assets, human-centered assets, and infrastructure assets. Market assets are "the potential an organization has due to market-related intangibles" (p. 13). These comprise various brands, customers and their loyalty, repeat business, backlog, distribution channels, various contracts and agreements, such as licensing, franchises, and so on. Intellectual property represents the legal mechanism for protecting many corporate assets. Examples include know-how, trade secrets, copyrights, patents, and a variety of design rights. Human-centered assets include the collective expertise, creative and problem solving capabilities, leadership, entrepreneurial and managerial skills embodied by employees, and psychometric data and indicators of how individuals may perform in given situations. Infrastructure assets are defined as those technologies, methodologies, and processes that make the organization able to function. Examples comprise corporate culture, financial structure, databases of information on the market or customers, and communication systems, such as e-mail and teleconferencing systems.

According to Sveiby (1997), the invisible assets of an organization's balance sheet can be classified as a family of three components: employee competence, internal structure, and external structure. Employee competence involves the capacity to act in a wide variety of organizational settings to create both tangible and intangible assets. The internal structure includes patents, concepts, models, and computer and administrative systems , as well as the organizational culture or spirit. The external structure refers to relationships with customers and suppliers, in addition to brand names, trademarks, and the company 's reputation or image.

Hall (1991) categorized intangible resources into assets and skills, using the criterion of belongingness. The scope of intangible resources which may be classified as assets includes the intellectual property rights of patents, trademarks, copyrights, and registered designs, as well as contracts, trade secrets, the reputation of product and company, and databases. Skills, or competencies, include public knowledge (such as scientific works, the people-dependent or subjective resources of know-how of employees, suppliers and distributors), networks, and organizational culture. Reputation can be categorized as an asset because of its belongingness feature.

Intangible resources may also be classified as follows (Hall, 1991). The *having* capabilities represented by intangible assets are patents, while the *doing* capabilities represented by skills and competencies are know-how. Reputation is people dependent, while databases are people independent intangibles. Trademarks are protected in law, while organizational networks are not protected in law. Among intangible assets, trademarks, patents, copyrights, registered designs, contracts, trade secrets, and databases are legally protectable, while information in the public domain, reputation of product and company, and organizational and personal networks are not legally protectable. Intangible resources, the competencies or doing capabilities, are classified into functional skills or cultural capabilities. Functional skills include employee know-how, supplier know-how, distributor know-how, and servicers' know-how, such as advertising agencies, while cultural capabilities comprise perception of quality standards, perception of customer service, ability to manage change, ability to innovate, and team working ability.

Weston Anson, an MBA and lawyer who runs a company called Trademark & Licensing Associates, Inc, in California, categorized intangible assets into three groups:

> (1) a technical bundle (trade secrets, formulas, proprietary test results, etc.); (2) a marketing bundle (copyrights, corporate name and logo, warranties, advertising, package designs and copyrights, trademark registrations, etc.): and (3) a skills and knowledge bundle (databases, manuals, quality control standards, asset management processes, security systems, business licenses, noncompete clauses; proprietary management systems, etc.). (cited in Stewart, 1997, pp. 235-236)

A simple, yet measurable and useful definition of intellectual capital is proposed by Ulrich (1998) as follows: intellectual capital = competence * commitment. This equation indicates that intellectual capital requires both competence and commitment. A low score on either competence or commitment significantly reduces overall intellectual capital, because the equation multiplies rather than adds. Firms with high competence but low commitment have talented employees who can not get things done. Firms with high commitment but low competence have less talented employees who get things done quickly.

Scholars differ on definitions of intangible assets, though some components are similar. Table 1 shows that Stewart's (1997) definition of intangible assets is similar to that of Edvinsson and Malone (1997). The human capital component of Stewart (1997) is similar to the human-centered asset concept of Brooking (1997), while the internal structural capital of Stewart (1997) is a comprehensive concept to which both the intellectual property assets and infrastructure assets of Brooking (1997) belong. The external structural capital of Stewart (1997) is similar to the market assets concept of Brooking (1997) and Anson (cited in Stewart, 1997).

Table 1
Definitions of Intangible Assets

Stewart (1997)	Edvinsson & Malone (1997)	Brooking (1997)	Sveiby (1997)	Hall (1991)	Ansen (cited in Stewart, 1997).
1.Human capital 2.Structural capital -internal -external 3.Customer capital	1.Human capital 2.Structural capital -internal -external 3.Customer capital	1.Market assets 2.Intellectual property assets 3.Human-centered assets 4.Infrastructure assets	1.Employee competence 2.Internal structure 3.External structure	1. Assets 2. Skills = competence	1.Technical bundle 2.Skills/knowledge 3.Marketing bundle

For the defmition and classification of intangible assets for research institutes, the defmition of Brooking (1997) was followed in that it reflects to a large extent the human resources, research functions, and infrastructure of research institutes. That is, intangible assets of research institutes are classified into market assets, intellectual assets, human-centered assets and infrastructure assets.

Measurement of Intangible Assets

The measurement of human assets is a critical function in enhancing human resource development in organizations although it has been questioned in several aspects (Sackman, Flamholtz, & Bullen, 1989). First, critics argue against mathematically computing the cost and value of human resources as assets for internal management or external corporate fmancial statements because, they argue, it diminishes their humanity and treats them as objects. However, proponents of measuring human resources hold that what is being measured is not human resources, per se, but the investment in human resources or the services that human resources are expected to provide. Thus, such measurement does not reduce people to things but, rather, reflects value to the resources. Second, there are arguments regarding specific training as a necessary but not sufficient condition for the existence of human assets. Third, the uncertainty of human resource measures and the potential for manipulation of earnings exist not only if we capitalize investments in human resources, but also if we fail to capitalize them. Fourth, measurement of human resources is difficult.

There are two major goals for measuring intangible assets and two main interest groups involved (Sveiby, 1997). For external purposes, the organization needs to describe itself as accurately as possible to stakeholders, customers, creditors, and shareholders so they can assess the quality of its management. For internal purposes, management needs to know as much as possible about the company so it can monitor its employees, processes, structures, and capital. In other words, measurement of intangible assets plays an important role in a management information system. This again raises the question, should the value of intangible assets at a particular time be measured or should the attempt be to get a feeling for changes and flows? The parallel to this question in fmancial resources is a comparison of a balance sheet with a profit and loss statement. Change is the important question when managers are most interested in flows and trends. In this situation, they are more concerned with the speed with which intangible assets are measured than with accuracy.

Buhner (1997) suggested three major reasons why traditional fmancial and accounting indicators are not appropriate measures for human resources. First, employees are often regarded as costly liabilities rather than as valuable assets, while tangible assets, such as machinery or buildings, are treated as investments. Second, traditional fmancial measures, such as return on investment or earnings per share, are subject to arbitrary management decisions, so a company may appear successful in the short term but will not deliver long-term profitability. Third, traditional accounting data do not provide real-time feedback for continuous improvement or preventive action programs.

Based on human resource accounting theories and models, many firms and government agencies are engaged in developing indicators of human resources. For example, Stewart (1997) classified intellectual capital into human capital, structural capital, and customer capital and then presented tools for measuring and managing intellectual capital as follows. The simplest measure of intellectual capital is the difference between its market value and its book equity. In this context, market value equals price per share multiplied by the total number of shares outstanding. Tobin's Q, developed by Nobel prize winning economist James Tobin, compares the market value of an asset with its replacement cost. This indicator was originally designed to predict corporate investment decisions independent of macroeconomic factors, such as interest rates. However, it can be a good measure of intellectual capital, as suggested by Federal Research Chairman, Alan Greenspan, who noted that high Tobin's Q and market-to-book ratios reflect the value of investments in technology and human capital.

Human capital measures include innovation, employee attitudes, tenure, turnover, experience, learning, and the knowledge bank. Innovation is measured by the percentage of sales attributable to new products or services. A measure of gross margin from new products is another measure. Some research shows a strong relationship between employee attitudes and customer attitudes, providing evidence of the interplay between human and customer capital. Correlational studies between morale and fmancial performance show a positive relationship. Another approach to measuring human capital is to maintain indexes of human resource inventories. These indexes include the average number of years of experience employees have in their professions, turnover among experts, seniority among experts, value-added per expert and per employee, the percentage of customers who are competence-enhancing, and rookie ratio, the percentage of employees with less than two years' experience.

Structural capital measures consist of measures of the values of accumulated stocks of corporate knowledge and measures of organizational efficiency, i.e., of the degree to which the company's systems augment and enhance the work of its people rather than obstruct them. In order to measure corporate knowledge, the first job is to look at an intangible asset's uniqueness, breadth of use, incremental profit margins, legal status, life expectancy, and so on. Then, the relative strength of the asset is measured by comparing the organization's assets with comparables. As a measure of operating efficiency, working capital turnover, i.e., the number of times each year that working capital cycles through a company, is suggested. This measure was devised by George Stalk of the Boston Consulting Group and used by Allied-Signal, GE, and others. Some customer capital measures are customer satisfaction and the net present value of the customer base. Customer satisfaction should satisfy the link between increased customer satisfaction and improved financial results. Happy customers are featured by loyalty (retention rates), increased business (share-of-wallet), and insusceptibility to a rival's price tolerance. To calculate how much a customer is worth, four steps are suggested: first, decide on a meaningful period of time over which to do the calculations; second, calculate the profit customers typically generate each year; third, chart customer life expectancy, using samples to determine annual erosion of the customer base;.fourth, calculate the net present value of a customer.

Brooking (1997) categorized intellectual capital into market assets, intellectual property assets, human-centered assets, and infrastructure assets. Methods for measuring market assets comprise customer survey, customer interviews, analysis of sales data, analysis of cost of sales, market research, audit of agreements, competitive analysis, evaluation of ROI, and analysis of payments. Methods for evaluating intellectual property assets include survey for market pull, competitor analysis, ROI, audit of agreements, ROI on legal fees, survey for know-how, and analysis of payments. Methods for evaluating human-centered assets are interview, test and assessment, knowledge elicitation, self-assessment, manager assessment, peer review, and track record assessment. A portfolio of knowledge measures is suggested in Drake (1997) to include economic, strategic, user-based, and outcome measures. Economic measures comprise replacement value, external market value, and internal time/money allocations. User-based measures consist of insight creation, sense-making, uncertainty reduction, and assurance increase. Strategic measures include maintenance, depreciation, replenishment, and anticipatory measures. Outcome measures include patents, new products, customer retention, and innovative practices.

Measuring intellectual capital is a multidisciplinary task. Developing a variety of measurements for a particular organization requires energy and time, so it is suggested that HRD managers look for similar measures and test whether they fit the organization. Customized measures are most desirable. Stewart (1997) suggested three principles to guide a company in choosing what to measure: first, keep it simple--choose no more than three measurements each of human, structural, and customer capital, plus one number that gives you a whole picture; second, measure what's strategically important; and third, measure activities that produce intellectual wealth.

Following Stewart's (1997) advice and Brooking's (1997) definition of intangible assets, dimensions of intangible assets for research institutes are suggested as follows. The measures of market assets for research institutes may include name values of a particular research institute; customers and their loyalty; continuous research and business; channels for printing, publication, and distribution; types of research; and so on. The measures of intellectual assets may consist of know-how, copyrights, patents, models, design rights, and trade secrets. Measures of human-centered assets may include academic degrees, experience, leadership, creativity, problem solving ability, self-development efforts, on-going research, entrepreneurial spirit, and management techniques, networks, work attitudes, turnover, and tenure. Finally, the measures of infrastructure assets may include financial structure, computer systems, including both hardware and software, communication system, information-sharing corporate culture, financial structure, and databases of information on the market or customers.

Indicators of Intangible Assets

The indicators of intangible assets for research institutes and colleges have rarely been implemented in organizations. Grojer and Johansson (cited in Sveiby, 1997) reported that few attempts to convert people and competencies into dollars have proved useful for managers, although they are theoretically interesting. Celemi, a Swedish company, was the first company which made an assessment of the performance of intangible assets based on the data that the firm provided (Sveiby, 1997). Celemi's "invisible" balance sheet classified intangible assets into external structure, internal structure, and competence according to its knowledge-focused strategy. Each category of external customers, internal structure, and competence had measures of growth/renewal, efficiency, and stability. In fact, the choice of indicators was dependent on the firm's knowledge-focused strategy. The following is an example of indicators for intangible assets used by Celemi.

Table 2
Intangible Assets of Celemi Company, Sweden. (Source: Company Annual Report, 1995) (from Sveiby, 1997)

External Customers	Internal Structure	Competence
Growth/renewal Revenue growth Image-enhancing customers	Growth/renewal IT investment % value added Organization-enhancing customers Product R&D % value added Total investment in org. % value added	Growth/renewal Avg. professional experience Competence-enhancing customers Total competence, experts Average education level
Efficiency Change in sales per customer	Efficiency Change proportion of admin. Staff Sales per admin. staff growth	Efficiency Value added per expert Value added per employee
Stability Repeat orders Five largest customers, %	Stability Admin. Staff turnover Admin. Staff seniority, years Rookie ratio	Stability Expert turnover Expert seniority, years Median age all employees, years

Edvinsson and Malone (1997) reported the following indicators based on Skandia's early intangible capital annual reporting. For the infrastructure, PCs/employee (#), administrative expense/employee ($), IT expense/employee ($), IT staff/total staff (%), IT literacy of employees (#), and others were listed. The renewal and development indices included share of training hours (%), training expense/employee ($), share of employees under age 40 (%), R & D resources/total resources (%), and satisfied employee index (#), among others. Leadership index (%); motivation index (%); empowerment index (#); number of employees/number of employees in alliances (%); full-time permanent employees as percentage of total employment; per capita annual cost of training, communication, and support programs for full-time permanent employees; and average years of service with company (#); were some of the indicators belonging to Skandia's human focus factors. The indicators for customer focus included satisfied customer index (%), number of contracts (#), and customer IT literacy (%). A list of tentative measurements for a hypothetical organization includes number of company patents (#), average age of company patents (#), patents pending (#), employees based at partners' facilities (#), and partners' employees based at company's facilities (#), out of over 60 listed.

To pave the way for developing indicators of intangible assets for research institutes and colleges, some plausible indicators are suggested in Table 3 based on the dimensions of intangible assets as follows, although it is suggested that each research institute or college needs to develop its own indicators, reflecting on its vision and strategies.

Contributions to HRD

Even though HRD managers may recognize the importance of intangible assets and their impact, few appear to know how to integrate intangible assets and their measurement with human resource development. This research, then, is important in examining and comparing ways of measuring intangible or intellectual assets. Different definitions of intangible assets may provide HRD managers with a new perspective of the knowledge organization in order to assist in developing new assets for their organization. Second, as Brooking (1997) pointed out, measurement of intellectual capital enables managers to understand where value lies in the company and provides a metric for assessing success and growth in those assets. Further, as suggested by Flamholtz (1985), measurement of human resources has the potential of leading to a reconceptualization of managing and developing human resources in organizations. In addition, the research provides HRD managers in research institutes and colleges with detailed and concrete information of their intangible assets and demonstrate that the role the model could play in measuring and ultimately developing their intangible assets. "knowledge economy." Sveiby (1997) suggested that a knowledge-focused strategy will earn increasing returns from intangible assets, assets that convert invisible revenues into tangible revenues. Finally, the indicators developed research institutes and colleges will provide a baseline with which a research institute or college can develop a customized set to fit their particular vision, strategy, and culture.

Table 3
Possible Measures and Indicators of Intangible Assets for Research Institutes and Colleges

Category	Measures	Indicators
Market assets	Name values of a research institute or colleges Customers and their loyalty Continuous research and business Channels for printing, publication, and distribution, types	Rankings among similar institutes or colleges, # of publications # of contracts, total funds, funds/employee ($) weight of big 5 customers, satisfied customer index (%) # of continuous research over 2-3 years # of publications distributed # of organizations/persons listed as consumers
Intellectual property assets	Know-how Copyrights Patents Models Design rights Trade secrets	Value added per employee R & D cost per employee # of outside advisors # of copyrights # of patents, average age of patent, patents pending (#) # of models # of design rights # of trade secrets
Human-centered assets	Academic degrees Experience Leadership Creativity Problem solving ability Self-development efforts On-going research Entrepreneurial spirit Management techniques Networks Employee attitudes Turnover intra-organizational knowledge	# of Ph.D's, % of Ph.D of different nationality, average education level Years of research profession Leadership index (%) Creativity index (%) Problem solving index (%) # of self development plans training expense/employee ($) # of presentations, seminars and workshops, # of working papers Share of employees under age 40 (%) # of management techniques # of employees/# of employees in alliances (%) Motivation index Satisfied employee index (#) Turnover rate Years of service with the organization
Infrastructure assets	Financial structure Computer systems, including both hardware and software Communication system Information-sharing corporate culture Databases of information on the market or customers	Administrative expense/employee costs($) IT expense/administrative expense (%) Computerized financial structure Performance-based pay IT staff/total staff (%) IT literacy of employees (#) Utilization rate of intranet # of information-sharing workshops, seminars Per capita annual cost of communication and support programs for full-time permanent employees Utilization rate of intranet List of customers

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The Corporate Curriculum: A Working-Learning Environment

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Organizations that offer a powerful learning environment to their employees, tend to be more innovative and to provide better quality than those that do so to a lesser extent. This hypothesis has been explored and tested in a large number of institutions of public Health and Welfare in the Netherlands. The research project described provided promising data to support the theory tested. Furthermore the project led to the construction of a diagnostic instrument for organizations to analyze their own work environment as for its quality as a learning environment.

Key words: Knowledge productivity, Corporate curriculum, Learning

The paper focuses on the development of a corporate curriculum: a plan for learning in service organizations, health care, business and industry in the context of a knowledge economy. Partly it provides a theoretical framework; partly it presents a report of the second phase of a three-phase research project conducted in the Netherlands in 42 institutions for Public Health and Welfare.
The following aspects will be addressed:

a. The impact of a knowledge economy on learning in organizations
b. Knowledge productivity as a dominant indicator for successful performance
c. The corporate curriculum as a set of learning functions that gear toward knowledge productivity.
d. The results of research activities supporting the theory presented

The main question dealt with in this paper, is the question what elements in the working environment contribute to the learning processes needed in organizations in order to adapt to, or be ahead of developments in society.

Theoretical framework

Knowledge productivity

Nowadays challenges of increasingly fast extending information and knowledge have profound implications for the way in which organizations operate and compete. The most effective organizations are those that are capable of signaling new trends and developments, those that are able to develop new knowledge and that know how to disseminate and apply this newly developed knowledge. In doing so organizations will prove to be more capable to innovate and to provide better quality services and products. Organizations that have the ability described here, we call knowledge productive. In the design of this study, knowledge productivity was elaborated along two lines.

1. The innovative ability of an organization. (change)
2. The ability to enhance the quality of existing approaches (improvement)

The corporate curriculum

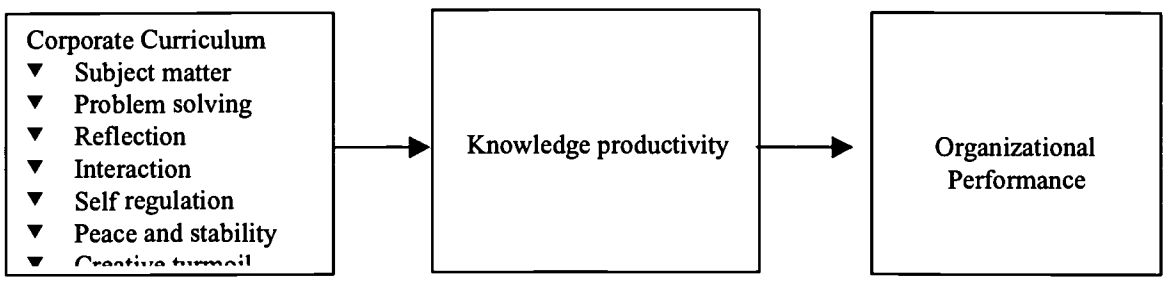
The process needed to enable both individual professionals and their organization to be knowledge productive basically consists of learning. The learning processes meant might be triggered by the environment in which the individuals operate. The work environment thus functions as a learning environment. It is this work-learning environment we refer to as the "corporate curriculum". Theories of learning provide a basis for analyzing the richness of such an environment seen from a learning perspective.

The corporate curriculum consists of all the intended and not intended conditions that affect the learning processes among the workers in organizations. In order to emphasize that the concept of the corporate curriculum does not only include the intentionally planned elements in the work environment, we like to refer to this curriculum as something that is a mix of natural and man made conditions. The corporate curriculum should be viewed as a rich landscape in which personnel and teams find their ways and construct knowledge. An organization that tries to improve its knowledge productivity will focus on the analysis and support of the following learning functions (Kessels 1996):

1. *Subject matter expertise*: Acquiring subject matter expertise and skills directly related to the target competencies. The competencies related to acquiring subject matter expertise have been the main objective of training and development.
2. *Problem solving:* Learning to solve problems in new and ill defined problem areas by using domain specific expertise.
3. *Reflective skills and meta-cognitions*: Developing reflective skills and meta-cognitions aiming at the identification and understanding of determinants of successes or failures in learning
4. *Communication skills:* Securing communication skills that provide access to the knowledge network of others and that enrich the learning climate within a workplace.
5. *Self-regulation of motivation, emotions and affection:* Procuring skills that regulate the motivation and affections related to learning.
6. *Peace and stability:* Promoting peace and stability to enable specialization, synergy, cohesion, and integration. Peace and stability are necessary for gradual improvement.
7. *Creative turmoil:* Causing creative turmoil to instigate innovation. Creative turmoil brings the dynamics that push towards radical innovation and leaving traditional paths behind. Creative turmoil requires a certain amount of existential threat

Of the seven functions mentioned, five refer directly to distinct learning processes. Two of them refer both to conditions of learning (peace and stability and creative turmoil), ánd to the processes of learning how to control those conditions. This ambiguous nature of these functions made us decide to focus on the first five functions and leave the sixths and seventh function for the third phase of the project.

The policies, the activities, and the conditions an organization develops to prom ote the learning functions form its *corporate curriculum*: the plan and the conditions for learning to increase knowledge productivity. Knowledge productivity in turn is assumed to have an impact on the eventual organizational performance.



Problem statement and research questions

The theory outlined above may be summarized in the following statement, which at the same time serves as our general hypothesis:

> *The more powerful the learning environment provided by an institution, the more an institution will prove to be knowledge productive, which eventually will show in a better organizational performance.*

Phrased slightly different, this means the more elaborated, or the richer the corporate curriculum, the more knowledge productive people and work units, working in that particular environment, will prove to be. The increased knowledge productivity will become evident in better processes, better products and better services. The assumed relation is visualized in the following scheme:

Corporate curriculum
↕

Learning processes
↕
Learning results:
↕
a. The ability to adapt to contextual changes and
b. The quality of work processes, products and services.

In order to find the evidence needed, the following four research questions were formulated:

1. To what extent are the functions of the corporate curriculum fulfilled in the investigated organizations?
2. What elements in the work environment promote these functions?
3. Is there a relation between the extent to which functions are being realized and the innovative ability the organization appears to have?
4. Is there a relation between the realization of the functions of the corporate curriculum and the quality shown in work processes, products and services rendered by the organization?

Research methodology

The project was set up as a two-phase design. A third phase, which is not yet completed, was added later. The first phase consisted of a number of case studies and study of literature to identify possible variables operating within a corporate curriculum. A number of sources of literature were analyzed in order to identify the variables that should be included in further investigations.

Five institutions were selected, that were considered rich and well elaborated cases in various sectors of Public Health and Welfare. In each of the cases interviews were held from a variety of perspectives. Interviewees were asked to describe their career and identify important learning opportunities and experiences. Furthermore they were asked to describe the information, communication and documentation arrangements in their organization. Finally they were asked to describe the history of their organization and to identify important moments of progress for the organization. Based on both the study of literature and the interviews a series of questionnaires was developed.

Then a more extensive second phase of the project followed. It is this particular part of our research on which we concentrate in this article. This phase included a survey among 82 working units in institutes for Public Health and Public Welfare. It was decided to choose work units as our focus instead of organization as a whole. This decision was made on two grounds. First of all for reasons of feasibility and reduction of complexity. That was the weak part of our choice. Secondly it was made for reasons of utility of the instruments to be developed. We felt that work units rather than organizations would be the entities that decide to do a self-analysis and to develop their own learning environment and policies. Especially in the larger organizations we identified a strong tendency towards decentralization, leaving the decisions to the units.

The perspective chosen is a learning perspective. For each of the functions of the corporate curriculum questions were constructed in order to identify to what extent the investigated learning processes actually could be identified. For each of the learning processes related to the first five functions of the corporate curriculum items were developed. The items are meant to identify whether, and if so, to what extent motivating conditions, a rich environment, room for experimenting and feedback are available and effective.
In addition to that, respondents were asked to mention conditions they experienced as either facilitating, or obstructing the processes involved (instrument 1).

Furthermore an inventory was constructed to inquire about the elements included in the work environment, that might be promoting these learning processes according to the outcomes of the first phase of the project (the elements in the work-learning environment, instrument 2). The first instrument was mainly based upon theoretical concepts of learning; the second instrument mainly upon organizational theories, enriched with the variables mentioned in the interviews held in the first phase of the research project.

Thirdly an instrument (3) was designed to investigate what innovations (within a few national polic y trends) the units being studied, had implemented over the last years. A general trend in the field under analysis, is an increasing need for more client centered approaches and more tailor made provision of services. Concerning this trend respondents were asked to identify to what extent their organization has been effective in developing new

strategies. The questionnaire consists of items to identify to what extent the organization has been able to signal national developments, to actually work out new strategies and to implement these new approaches. The respondents had to answer a number of questions keeping a particular innovation in mind. The questions, however are the same regardless the innovation chosen.

Based on quality indicators recognized and used in the sectors being investigated, an instrument was developed to identify the level of quality provided by the studied work units (instrument 4). In order to develop this instrument we could include a number of items of existing quality-instruments.

Finally an existing instrument was selected. This instrument measures a related concept. In this particular case an instrument was chosen that measures the four competencies of a learning organization (Sprenger, 1995). This fifth instrument was included as a means for external validation of the concepts used in the first two instruments. The concept measured in this particular instrument includes many elements of what we consider the components of knowledge productivity.

In sum, the first instrument ident ifies the learning processes taking place. The second instrument checks whether organizational conditions that might be influencing these processes actually may be identified. Together the first two instruments give a full picture of the corporate curriculum in operation in an investigated work unit. The third instrument indicates the innovative ability of the unit, while the fourth instrument provides an indication of the level of quality of the work processes of the unit. Together the third and the fourth instrument measure the concept of knowledge productivity. The fifth instrument is included for validation purposes.

The relation between the concepts and the instruments

corporate curriculum ➢ *instrument 1 and instrument 2*

↓

knowledge productivity ➢ *instrument 3 and instrument 4*

↓

performance

Instrument 5: external validation of the concept of a corporate curriculum with a comparable concept (the learning competencies of an organisation).

The investigated institutions, units and staff

In the first phase of the project we selected a number of cases (5). Instead of selecting them at random we deliberately decided to choose a small number of 'avant garde' organizations. We hoped to be able to see more of the dynamics of the processes we intended to study in organizations that were actively dealing with matters of learning, innovation and quality enhancement.

In the second phase, the survey phase, we chose another way of selecting work units. We tried to choose the units in such a way that they would cover:

a. the various distinguished sectors within the field of Public Health and Welfare;
b. both innovative and more conservative organizations;
c. units within large organizations as well as units of smaller organizations.

In reality we approached the intended coverage quit well, but it appeared impossible to actually choose particular organizations. To some extent we just had to accept the organizations that happened to be prepared to cooperate. 48 institutions were included in the project, each participating with two work units, making 96 units in total. Each work unit in turn participated with three workers and one head of the unit. Besides that, two persons either responsible for training or professional development, or for quality enhancement or quality management participated on behalf of the institution. This makes 10 respondents per institution.

Not every respondent appeared to have followed the instructions for filling in the questionnaires, so in the end it appeared that from the 96 units that would have been included only 82 could actually be analyzed. In total the number of respondents was 381, 271 of which are workers, while the others are either managers or people responsible for quality management or training.

Research analyses

In the first phase of the project, we did case study research. Literature searches and analyses were done, semi structured interviews were held, cases were described based on the interview data. The cases were fed back to the respondents and authorized. Furthermore the cases were analyzed both together with the respondents (in focus groups) and with groups of experts (expert groups). Within case analyses and cross case analyses were carried out. Based on these analyses variables were identified and questionnaires were constructed.

At this point the survey among a large number of organizations started. Vast amounts of data were collected and processed. To find answers to the research questions, two kinds of analyses were conducted:

1. A principal component analysis, to check the quality of the individual items and to find out what are the most important dimensions within the concept being measured;
2. Canonical correlation analyses, in order to identify the strength and the nature of the relation between the concepts measured with the different instruments.

The following scheme shows what the different instruments contribute to finding support for the different research questions.

The relation between the research questions and the instruments

1. To what extent are the functions of the corporate curriculum fulfilled in the investigated work units?	➢ Instrument 1
2. What elements in the work environment promote these functions	➢ The correlation of the results of instrument 1 and 2
3. Is there a relation between the extent to which functions are being realized and the innovative ability work units appear to have?	➢ The correlation of the results of the instrument 1 with 3
4. Is there a relation between the realization of the functions of the corporate curriculum and the quality of work processes, products and services rendered by work unit?	➢ The correlation of the results of instrument 1 with 4

Outcomes

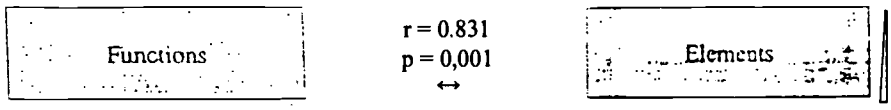
The instruments used were analyzed. A few items had to be skipped. The principal component analysis showed that the instruments 1 and 2 form together a valid instrument to map the elements in the learning environment (instrument 2) and measure the power of the learning environment (instrument 1). Instrument 1 appears to measure a homogeneous factor, the power of the learning environment. The analysis revealed two contrasts. One was interpreted as a contrast between social and individual learning, the other as a contrast between the learning of subject matter and a kind of meta-learning, learning how to learn. In our view these contrasts coincided with the curriculum functions we had distinguished between, to such an extent that we felt we could stick to the original categories within our questionnaire.

In the second instrument we found also a strong first factor and furthermore confirmation of most of the distinctions we made in constructing the instrument. The components found are shown in the 6 figures included in this section of this article. Those found in the instruments 3, 4 are also shown in these figures. After analyzing the instruments separately, we concentrated on the relation between the instruments.

The study shows a very strong correlation (0.831) between the learning processes identified and the elements included in the work learning environment (figure 1). In that sense it strongly supports the findings of the first

phase of the project. The second and the third relation (figure 2 and 3) we have not yet been able to interpret satisfactory.

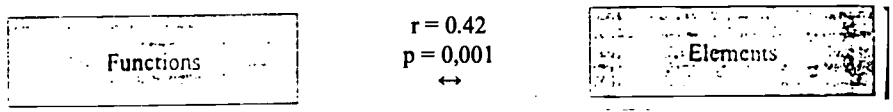
Figure1.



Subject matter
Problem solving
Reflection
Interaction
Self-regulation

selection, induction
mobility
training & development
self directed learning
external orientation
Communication
inter/supervision
shared policies
quality & organization

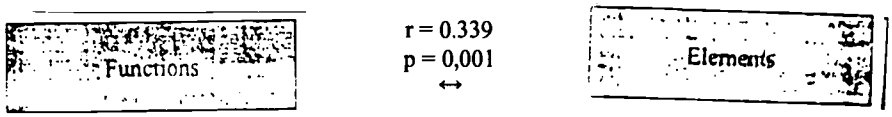
Figure2.



Subject matter
Problem solving
Reflection
Interaction
Self-regulation

selection, induction
mobility
training and development
self directed learning
external orientation
Communication
inter/supervision

Figure 3.



Subject matter
Problem solving
Reflection
Interaction
Self-regulation

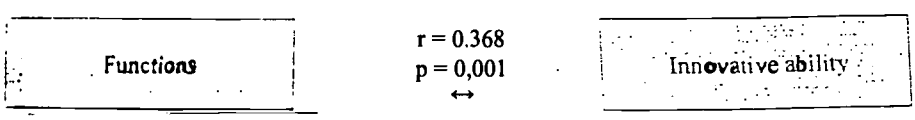
selection, induction
mobility
training and development
self directed learning
external orientation
communication
inter/supervision
shared policies

quality & organization

** Variables printed in bold show the strongest relation*

The corporate curriculum appears to contribute significantly to the ability of organizations to change (figure 4). Especially the functions of reflection, communicative skills and social skills appear to contribute to the effect. The other functions also show a significant correlation with the ability to change.

Figure4.



Subject matter
Problem solving
Reflection
Interaction
Self-regulation

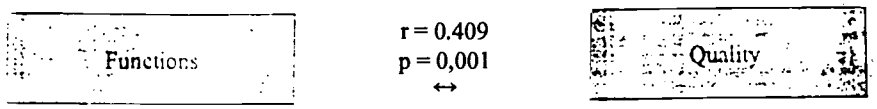
ability to innovate the organization

ability to innovate one's own work

* *Variables printed in bold show the strongest relation*

The realization of the different functions of the corporate curriculum significantly correlates with the ability of work units to provide quality. Only the function of social and communicative skills does not appear to correlate significantly (figure 5).

Figure5.



Subject matter
Problem solving
Reflection
Interaction
Self-regulation

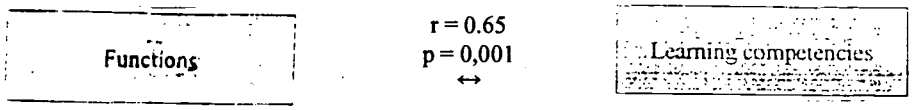
improvement

innovation

* *Variables printed in bold show the strongest relation*

The outcomes of the first instrument strongly correlate with the outcomes of the fifth instrument which was included in order to validate the first instrument by comparing its results with the results of a similar instrument (figure 6).

Figure 6.



Subject matter
Problem solving
Reflection
Interaction
Self-regulation

absorption
diffusion
generation
exploitation

**Variables printed in bold show the strongest relation*

The developed instrument offers more possibilities to differentiate between the different functions of the corporate curriculum than the fifth instrument. The fifth instrument measures a more homogeneous factor.
A diagnostic instrument was developed out of the two first instruments. It includes both the learning processes and the elements in the work learning environment that may contribute to these processes. The instrument measures a coherent factor, the power of the work learning environment (the corporate curriculum). In addition to that, the instrument makes it possible to differentiate to some extent between the distinguished functions of the corporate curriculum.

The diagnostic instrument shows to those who apply it, what elements are included in the work environment or what are not included. It provides work units with a basis for discussing directions in which to go in order to strengthen or enrich the work/learning environment.
Finally a first tentative overview over the investigated sectors of health care and social welfare could be given.

Conclusions

Empirical evidence was found to support the used theoretical concepts.

A positive relation could be identified between the corporate curriculum and the ability of organizations to change. Especially reflection contributes to that. Reflection often suffers from a lack of time. Yet it shows that reflection is no luxury. Time used for reflection is said to pay itself back in terms of a growing ability to adapt to the changing contexts organizations are facing.

The more powerful the corporate curriculum, the better organizations will be able to develop quality of processes, products and services. By paying attention to the learning environment, an organization improves its potential to innovate and improve its work.

Instruments were developed

The instruments used make it possible to measure the power of the learning environment (the corporate curriculum). As compared to the instrument available (the fifth instrument) to measure the four competencies of the learning organization, it gives a more differentiated picture of the analyzed situation. From the instruments used, a diagnostic instrument was derived to be applied in organizations for purposes of organization development.

Some conclusions may be drawn concerning the state of affairs in this field of work (health and welfare)

Most respondents feel that their work situation to a high extent may be considered a learning environment. Reflection is the function most often mentioned as suffering from lack of time. Still this is the function that appeared to be the most crucial for raising the ability to change and important for the ability to improve the work.

The responses show that among the participants learning still is associated with being taught. They attribute more learning effects to the more traditional ways of being taught (courses) and less to more implicit learning situations like cross organizational cooperation, or participation in research activities. This may very well be the consequence of their implicit definitions and beliefs about learning and being taught

Discussion

The data collected and analyzed in this project strengthened the empirical basis of the theory presented in beginning of this paper. Still we have to realize that the data being presented involve perceptions of facts; not facts. The learning processes people claim to have experienced appear to have a strong correlation with the way they claim the work is organized and the quality and changes they say it produces. The questions asked have been put in such a way that they were factual rather than judgmental. Still we must realize we found relations between perceptions. There definitely is a need for further research to try to replace some of the perceptions by actual facts. The challenge will be to prove the relationship between actual learning results (acquired in the working situation and brought about by that very environment) and the actual level of quality and of ability to change organizations show. An important step forward has been put. Still there is a need for harder evidence.

The concepts of corporate curriculum, of knowledge productivity and of organizational performance are interrelated and each show a certain complexity, which makes it difficult to avoid the pitfalls of tautology. We tried to keep the concepts distinct but yet we feel we have to stay alert in order to avoid the risk mentioned.

The data did not suffice to reach firm conclusions about the state of affairs in Health and Welfare. Here again further systematic work is needed to build up a database about institutions for each relevant sub sector in the field. That way, organizations will be able to use this base as a reference to compare themselves with.

Perspective

Already initiatives were taken to start a third phase of the project including

a. Pilot projects to explore the practical applicability the instrument and the guidance it provides to those who use it. The group of consultants participating in the pilot projects meet regularly in order to share and discuss their experiences and translate them into plans for further action.

b. Further dissemination of the concept of knowledge productivity to extend the number of work units involved. That way more units may be observed, in order to build up an empirical data base, both to strengthen the theory and to develop a set of standards for comparison per sector. After the completion of the second phase of the project at least 30 units could be added to the built up databases.

c. Further explorations focussing on issues of peace and stability on one side and creative turmoil on the other. Here the assumed relation to be investigated is that the creative turmoil will be operating mainly in favor of the ability to bring about radical changes, while peace and stability may show a stronger relation with the ability to improve already established work procedures.

d. Attempts to get more firm evidence of actually increase organizational performance. The operationalization of that performance still is one of the major issues in this third phase op our project.

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