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Intellectual capital – does it create or destroy value?

Ante Pulic

Abstract Taking into account the transformation in economic reality towards a knowledge economy it seems logical that we treat IC as a resource, equal to that land, physical assets, and financial capital. This means that it is not anymore treated as a cost but as an investment. In order for the new system to be consistent we have to define a new index, namely the value creation efficiency of intellectual capital. Its empirical applications shows that while revenue, profit and GDP may indicate successful performance, IC efficiency may indicate the opposite, that value is being destroyed and not created.

Keywords Intellectual capital, Value added, Resource efficiency

Introduction

Many books and articles have been written about knowledge and intellectual capital and its role in value creation. As intellectual capital has become such a powerful factor in today’s economic reality, I would like to point out a seemingly common problem. Most economic and financial models treat employees – the prime carriers of knowledge – as a cost and not as a resource.

In order to take a step forward it is necessary to define a new status for employees. Employees and their intellectual capital ought to receive the official status of key resource. This means that it should be put on the same level as financial and physical capital. This is not a hard thing to do. If we agree that IC is the key resource of the 21st century and that knowledge is today what once were land, manual work and money, then it would be only natural to give this resource the status it deserves: of an investment instead of a cost.

The treatment of employees as investment is the beginning and the end of the knowledge based economy. In the same way, as in the industrial era, where investments were made in plants and machines as the base for value creation, today companies invest in employees, who are becoming the key factor of value creation. This way companies combine the two key resources, financial capital and intellectual capital, which together create value.

Rational value creation has been the main goal in all economic era and it is therefore the goal of any modern company, institution, region or nation too. With the same resources a company can create more or less value. Therefore, the key question of the new economy is how do we know whether value is created or destroyed, whether enough value is created and whether it is created efficiently?
An index for the new economy

Many IC experts agree that traditional financial measuring systems are inadequate for today’s businesses. As the business processes are to a lesser amount based on tangibles, the question arises how to manage not only processes and companies but also regional or national economies in the situation when intangibles are becoming the key factor of value creation? Many methods and approaches appeared during the past 15 years trying to provide an answer to that question (Marr et al., 2003). Below, I would like to comment on just a few.

The economic value added (EVA®) methodology can be found on most IC-measuring lists. I find this odd as I do not believe that it is a suitable measuring system for intellectual capital. EVA® focuses on the efficiency of just one resource, capital employed. Therefore this method can not be a valid measuring system for the new economy.

The balanced scorecard (BSC) is very popular too and has been applied for quite a long time. Although it seems to me a very useful management tool, I do not find it suitable as a standard measuring system. David Norton, co-author of the BSC, states that “The BSC is definitely not a measuring system. It is a technique for describing strategy” (Daum, 2002).

Now I would like to briefly comment on the whole group of non-monetary measurement systems. Even though they might be very useful as a basis for internal management information, on a macro level they pose the problem of comparability and scope. Most of them are operating with a large number of (non-transparent) indicators, at business levels. This makes it difficult, if not impossible, to compare companies.

What is required is an index which would allow us to assess business success more objectively. It is therefore our goal to find an index which would be useful to all participants in the value creation process, employees, management, investors, shareholders and business partners. Such an index has to be able to indicate the real value and performance of a company and its units, provide comparison with others and predict future abilities in a relatively objective way.

The solution to this issue can be found in the very essence of economic activity. Traditional, the industrial economy functioned in the following way: the process of production was based on a price forming system, which was based on costs plus the potentially achievable profit in the market. This is the origin of the close relationship between product costs (material and work) and its market price. With knowledge based products this relationship does not exist in the same way any more.

The value of a knowledge based product or service is not formed through quantity (e.g. the number of programming lines, number of experiments in laboratories or the amount of money invested in a film shooting). Value is based on the perception of customers. Therefore it is the creation of value and not the production of pieces that is the dominant activity of the new economy. Quantity has been replaced by value.

This transformation provides the framework for a new measuring system. In the traditional economy wealth was created by an increase in quantity (e.g. units produced) and therefore the measuring system was based on quantity, with indicators like revenue, costs, and profit. Based on the shift from quantity to value, a new measuring system, with a new index has to be introduced (Table 1).

| Table 1 |
|-------------------|-------------------|-------------------|
| Economy: Measurement system: | Industry age | Knowledge age |
| Measurement unit: | Quantity | Value |
| Pieces | Efficiency |
On the one side of value creation there is the relationship between customer and the product or service and on the other side is the relationship between created value and resources utilized in creating the products and services. This relationship, between resources and result is what I refer to as efficiency. With this the base for a new measuring system is laid, which considers efficiency of resources in value creation as the new index.

**Efficiency of intellectual capital**

Peter Drucker states “The most important, and indeed truly unique contribution of management in the 20th century was the 50-fold increase in productivity of the manual worker in manufacturing. The most important contribution management needs to make in the 21st century is to increase the productivity of knowledge work and knowledge workers. The most valuable asset of a 20th century company was its production equipment. The most valuable asset of a 21st century institution will be its knowledge workers and their productivity”. In order to understand the efficiency of intellectual capital it has to be measured. I take value added as the most appropriate indicator for business success, which is calculated as the difference between output and input. The basic definition is as follows:

\[ VA = \text{OUT} - \text{IN} \]

where: \( VA \) = value added for the company; \( \text{OUT} \) = total sales; \( \text{IN} \) = cost of bought-in materials, components and services.

Value added can be calculated from the company accounts as follows:

\[ VA = \text{OP} + \text{EC} + \text{D} + \text{A} \]

where: \( \text{OP} \) = operating; \( \text{EC} \) = employee costs; \( \text{D} \) = depreciation; \( \text{A} \) = amortization.

Value added is an objective indicator of business success and shows the ability of a company to create value, which needs to include the investments in resources including salaries and interests on financial assets, dividends to the investors, taxes to the state and investments in future development. After \( VA \) has been calculated, the computation of the efficiency of resources – intellectual capital and financial capital – is a matter of simple mathematics.

Intellectual capital has two components, human capital and structural capital. All the expenditures for employees are embraced in human capital. What is new about this concept is that salaries are no longer part of the input (Pulic, 1993). This means expenses related to employees are not treated as cost but represent an investment.

Efficiency of human capital is calculated as a result:

\[ HCE = \frac{VA}{HC} \]

where: \( HCE \) = human capital efficiency coefficient for the company; \( VA \) = value added; \( HC \) = total salaries and wages for the company.

Structural capital, as the second component of IC, is calculated as follows:

\[ SC = VA - HC \]

where: \( SC \) = structural capital for the company; \( VA \) = value added; \( HC \) = total salary and wage duties for the company.

As the equation already indicates, this form of capital is not an independent indicator. It is dependent on the created VA and in reverse proportion to HC. This means that the bigger the share of human capital (HC) in the created VA the smaller the share of structural capital (SC). In some cases SC does not even have to occur – e.g. if VA is less than the investments in HC.

It is logical that the efficiency of both, HC and SC rises as the total efficiency of IC increases. Structural capital efficiency (SCE) is therefore calculated in the following manner:

\[ SCE = \frac{SC}{VA} \]

where: \( SCE \) = structural capital efficiency for the company; \( SC \) = structural capital; \( VA \) = value added.
Intellectual capital efficiency (ICE) is obtained by adding up the partial efficiencies of human and structural capital:

\[ \text{ICE} = \text{HCE} + \text{SCE} \]

where: ICE = intellectual capital efficiency coefficient; HCE = human capital efficiency coefficient; SCE = structural capital efficiency coefficient

I believe that today ICE is for knowledge work and the knowledge worker what once was productivity for manual work and the manual worker. In order to receive a full insight into the efficiency of value creating resources, it is necessary to take financial and physical capital into account. Intellectual capital cannot create value on its own. Therefore we also need information on the efficiency of the capital employed which can be calculated in the following manner:

\[ \text{CEE} = \frac{\text{VA}}{\text{CE}} \]

where: CEE = capital employed efficiency coefficient; VA = value added; CE = book value of the net assets of company.

In order to enable comparison of overall value creation efficiency all three efficiency indicators need to be added up.

\[ \text{VAIC} = \text{ICE} + \text{CEE} \]

where: VAIC = value added intellectual coefficient; ICE = intellectual capital efficiency coefficient (HCE + SCE); CEE = capital employed efficiency coefficient.

This aggregated indicator allows us to understand the overall efficiency of a company and indicates its intellectual ability. In simple words, VAIC measures how much new value has been created per invested monetary unit in each resource. A high coefficient indicates a higher value creation using the company’s resources, including its intellectual capital. We therefore have a new way to understand organizational efficiency.

**Empirical application of the index**

**Organizational efficiency**

As already shown all the substantial elements for the calculation of the VAIC index exist in the regular accounting system. For the following empirical applications we have used annual reports. More than 1,000 companies in Europe were analyzed. In many examples the traditional measures indicate positive performance, whereas the VAIC index shows decreasing efficiency. Figure 1 and 2 show the result for Ericsson as an example.

According to traditional indicators (Figure 1) Ericsson is doing very well: a rise in revenue, profit and dividend is recorded. However, using the VAIC index the situation is surprisingly different (Figure 2). In 2000 ICE created over three monetary units new value per one unit invested, in 2002 the return was only 2.5. The same fall in efficiency was recorded with capital employed. Considering this information, management cannot be satisfied and instead should be concerned with its performance.

**Figure 1** Business results – classic

![Business results chart](image-url)
This paradox can be explained in the following way. The production of quantity, as a way of creating value in the industrial era is in total contrast to the new mode of value creation in the knowledge economy. It shows that a company can achieve high revenue, and report profit but that it is not creating value. This is because in today’s conditions of value creation quantity (number of pieces, revenue or profit) is not relevant, but instead the relation between the business result and the utilized resources, the efficiency.

A renowned historian refers to such transition as “dealing with the same bunch of facts as before just establishing new kinds of relationship between them, thereby providing a totally different framework” (Butterfield, 1949). This is what intellectual capital efficiency is about. The same data – revenue, profits, and costs – are brought into a new system of relationships, naturally much more complex than before, and new results are received, more objective and more appropriate for the new business reality.

*National efficiency*

Something similar is occurring at the macro level. The main criteria for business success of companies are revenue and profit – like in the famous Fortune 500 rankings – but on a national level it is GDP. This means companies do not receive a benchmark and therefore the ability to compare themselves against a national average. Measuring IC efficiency is as important on a national level as it is on a company level. Maybe it is even more important, as laws and policies are made at the macro level which are then influencing company performance as well as the entire economy. Therefore it is vital to establish a common measuring system applicable to all levels of business activity – from a processes level up to national economies.

The data for calculating intellectual capital efficiency (ICE) is easily obtained at any national statistics office and therefore it was possible to calculate the ICE on a national level and compare it to GDP. Such analysis was done for all countries of the EU and some others. Figure 3 shows the results for The Netherlands. While GDP per capita was rising from year to year, ICE was falling accordingly. This paradox matches the one found on company level. The traditional indicator – GDP – implies that it is a successful economy but ICE, focussed on value creation efficiency, indicates the opposite.

This example demonstrates very well why IC efficiency measures should be introduced on a national level. It sheds new light on the performance of a national economy, which is different from the one provided by GDP, revenue and profit, and because of that it is vital as a benchmark figure in the knowledge based economy. Governments and all parties responsible for the national economies have to pay due attention to the presented results, which has the following message: in order to acknowledge national intellectual capital, its performance has to be monitored.

These paradoxes indicate that we do have to accept the fact that our economy has been facing a Copernican change, based on a totally new worldview. For thousands of years people did believe that the Sun circles around the Earth, and that was the accepted reality. No one even
doubted that something could be wrong with that notion until 500 years ago when Copernicus provided a totally different explanation – the Earth circles around the Sun. This shift in worldview was not caused by a change in the natural environment – the movements of the planets were the same all the time – but due to a new interpretation of the existing reality. And this is what we are doing now, through the concept of intellectual capital (as a resource). We are interpreting the existing economic reality of companies and national economies in a new way.

The creation or destruction of value

In the closing part of this paper I would like to highlight the benefits, which all economic participants – employees, managers, investors, governments – gain by accepting intellectual capital as a resource and by measuring its efficiency.

In order to do that it is best to start with the new economic reality – the knowledge economy – which has changed the perception of value creation. Companies do not produce just products or services but create value. If we compare the production of steel or cars, which were the important products of the 20th century, and software packages nowadays, we can clearly see the difference: the result is not just tons or pieces but incorporated value. Thus a new system has emerged that is based on knowledge. There are different rules for this kind of value creation, new laws and new indicators, which explain and describe reality in a more appropriate way.

VA takes over the role which once had financial capital. VAIC and ICE replaces profit and all types of indicators like ROI and ROE in their traditional role as indicators of business success. Value creation per invested monetary unit in intellectual capital is a more appropriate index for the new economy, because it has the value creator in the denominator.

Only these two indicators (VAIC and ICE) show whether value has been created or destroyed. As pointed out in the case of organizational efficiency, traditional indicators, such as revenue and profit, created an illusion of success while value was actually being destroyed. Value destruction can happen in the following two ways:

1. If a fall in value creation efficiency occurs.
2. When efficiency is below the average of the environment.

A fall in value creation efficiency in comparison to a previous period e.g. the previous year, means value destruction, but I have to make an important remark here. Not every fall in value creation efficiency is devastating. A short-term fall in efficiency caused by investments is natural and can be considered a normal process. But, as a return on investment is to be expected, a fall in efficiency should not last for a longer time period.

As already said before, the second type of value destruction is efficiency being under the average. Each company consists of organizational units, subsidiaries, branches or similar...
entities. The individual results of all entities amount to the overall intellectual capital efficiency, which represents the average efficiency of the company. It is composed of efficiencies below company average and those above it. All these entities that perform under average actually destroy value. The reason: they spend more resources for the creation of one unit of value added than it is necessary on company level.

Today's economy is facing a dangerous situation since our outdated measurement systems create distorted pictures of business performance. Many companies, as well as nations, are convinced of their economic progress, while the reality might be entirely different. By using new indicators companies and governments get the chance to receive a more realistic picture of their business ability and gain control over the value creation process.

In addition, value added and efficiency of IC unite the micro and macro level of the economy. We are dealing with measures indicating business success at any level of business activity, from process and units inside the company to regional and national economies. IC unit two spheres as it treats both, micro and macro level in the same way, using the same database for calculations.

In such a way value creation on national level can be monitored by sectors and the ones above or below national average can be identified. Causes can be traced and measures for improvement initiated. The same applies to the economy of regions within a national economy.

One unified measure for all levels means that companies will finally receive benchmarks based on the national economy, in other words, they will know how efficient they are in comparison to national IC efficiency average. This will give governments a better understanding of how to support organizations or regions in the national economy.

Finally, the shift towards intellectual capital as a resource and its value creation efficiency has also a sociological component. It highlights the importance of employees as value creators and bridges the gap between investors, managers and employees, as well as between organizations and governments.

References