Journal of Intellectual Capital

Value creation and sustainability in knowledge-based strategies

Gianpaolo Iazzolino Domenico Laise

Value creation and sustainability in knowledge-based strategies

Gianpaolo Iazzolino
Department of Mechanical, Energy and Management Engineering (DIMEG), University of Calabria, Rende, Italy, and
Domenico Laise
Department of Computer, Control and Management Engineering, University of Rome "La Sapienza", Rome, Italy

Abstract

Purpose – The purpose of this paper is to place the value creation process within sustainable growth strategies. Building on Drucker (1968, 1999a, b), Pulic (2000, 2004, 2008) and other papers by the same authors (Iazzolino and Laise, 2013) the specific aim of this research is to propose an accounting-based framework able to: distinguish between knowledge-intensive firms (KIFs) and nonknowledge intensive firms (nonKIFs); and investigate the contribution of the two sets of firms (KIFs and nonKIFs) to overall sustainability, from a social point of view, of the economic system.

Design/methodology/approach – The paper uses the notion of value added (VA) (Pulic, 2000, 2004, 2008) as the main indicator to measure the value creation in a knowledge economy context. As regard the first point of the framework, the approach is based on the analysis of VA and its components, starting from a reinterpretation of the concept of value added intellectual coefficient made by the same authors of this paper. An empirical analysis based on the composition of VA in ten Italian industries, by using an overall sample of 1,000 firms, has been carried out and is described in the paper. As regards the second point, the paper analyses, from a theoretical point of view, the necessary conditions to set up a sustainable value creation strategy in social terms, using the conceptual categories introduced by Drucker (1968, 1999a, b) and Pulic (2000, 2004, 2008).

Findings – From results of the empirical analysis it emerges that: first, in traditional industries the weight of the cost of employees on VA (human capital investments) is less than the other sectors (low human capital intensity). In these sectors the value creation strategy is mainly based on "dead knowledge," embedded in machines (physical capital); and second, in nontraditional industries (consulting, advertising, research, etc.) the economic value creation is mainly based on "living knowledge," embedded in human resources (high human capital intensity). In these sectors we have lower productivity of work (VA/human capital) and higher employment.

Practical implications – The framework proposed makes it possible to reduce the risk of myopic valuation of economic performance. Through this methodology it is possible to highlight the effects of sustainable strategies based on knowledge investments oriented toward the stakeholder value theory and corporate social responsibility. The approach can be very useful for top managers and for accountants, as it underlines the importance of the VA income statement and constructs a strong link to the themes of knowledge management.

Originality/value – The originality and the value of this methodological proposal can be appreciated by taking into account that in the literature there is no accounting-based methodology that is able to identify: the knowledge-intensive firms; and the firms that can contribute to overall social sustainability, within the set of all firms.

Keywords Performance measurement, VAIC, Intellectual capital, Corporate social responsibility, Sustainable value creation

Paper type Research paper

The authors would like to thank two referees for their precious suggestions that contributed to significantly enhancing the paper.

Journal of Intellectual Capital
Vol. 17 No. 3, 2016
pp. 457-470

1469-1930
DOI 10.1108/JIC-09-2015-0082

1. Introduction and research questions

Many scholars believe that a sustainable business strategy, achieved through investment in knowledge workers, is the greatest competitive weapon of today's organizations (Grant, 2010). By sustainable growth strategies we mean the firm behavior that in the long run tends to legitimize the social, environmental and economic expectations of both internal and external stakeholders (Donaldson and Preston, 1995).

Drucker (1999b) believes that "knowledge worker productivity is the biggest of the 21st-century management challenges. In the developed countries, it is their first survival requirement." He argues that "the ability of an organization […] to survive will come to depend on their comparative advantage in making the knowledge worker more productive" (p. 94). But, how can we increase the productivity of knowledge workers?

Drucker (1968, 1999a, b) sets the agenda of things to do and lists the major factors affecting the increase in the productivity of knowledge workers:

(1) Knowledge workers themselves have to plan what the task is or should be. In fact, in knowledge work, unlike manual work, the task does not program the worker.

(2) Knowledge workers have to manage themselves (autonomy).

(3) Knowledge work requires continuous innovation and learning.

(4) Knowledge workers have to plan the quality of their output.

(5) Knowledge workers productivity requires that the knowledge worker is seen and treated as an asset rather than a cost.

The supply and the productivity of people educated and trained for knowledge work are the only possible advantages that developed countries can hope to have.

Can the productivity of knowledge workers be measured or is purely an "intangible thing"? Drucker does not offer an answer to this question.

The author who accepts the challenge of measuring the productivity of knowledge workers is Pulic (2000, 2004, 2008). The main objective of Pulic (2008) is to find a productivity "measuring model" for the knowledge economy which will serve employees, management, investors, business partners (p. 6).

Even though the method proposed by Pulic has been subject to criticisms (Starovic and Marr, 2003; Andriessen, 2004; Chang, 2007; Stahle *et al.*, 2011; Nimtrakoon, 2015), some of which are also made by the authors of this paper (Iazzolino and Laise, 2013) (see next section for further details), he believes that the method for measuring the productivity of knowledge workers is the same as the one used to measure the productivity of manual workers.

The productivity of knowledge workers is equal to the ratio between the value added (VA) by the worker and his wages. Other authoritative scholars share the same opinion (Kaplan and Norton, 1992).

From a methodological point of view, therefore, there is no relevant news, because everything we need is in the value added income statement (VAIS). However, Pulic and Drucker think that the VAIS must be reinterpreted, and this requires a "change of mentality," namely, a new "semantic" of value creation.

It is necessary to start from the premise that "people are investment and not cost anymore" and that the cost of labor (intellectual), in the income statement, measures the investment in human capital (HC) rather than a cost, which has to be reduced or eliminated.

If this change of mentality is accepted, then the VA measures the value created by knowledge workers for the whole economy, namely, the VA measures the value

creation from the stakeholders' point of view. Then, to increase the productivity of knowledge workers we have to invest in intellectual workers that add value to a greater extent than what they cost. This is Pulic's answer to the problem left open by the seminal Drucker's effort.

Building on Pulic's work (Pulic, 2000, 2004, 2008), and from other works by the authors of this paper (Iazzolino and Laise, 2013), the research questions at the basis of this paper are:

RQ1. Is it possible to distinguish (from an accounting point of view) between knowledge-intensive firms (KIFs) and nonknowledge intensive firms (nonKIFs)?

RQ2. Is it possible to understand the contribution of the two sets of firms (KIFs and nonKIFs) to the overall sustainability, from a social point of view, of the economic system?

In both cases the analysis of the VA and of its components, HC and SC, has a central role. In Pulic's meaning HC = cost of employees and SC = earnings before interest, taxes, depreciation and amortization (EBITDA), as it will be clarified below in Section 3.

The paper is organized as follows: in Section 2 a brief literature review is described; in Section 3, following the approach suggested by Pulic (2000, 2004, 2008), the reasons will be stated leading to the belief that VA is the best method to measure value creation for stakeholders associated with a strategy that takes into account corporate social responsibility (CSR); in Section 4 the concept of VA is used to describe the two main models of value creation, that of a "win-win" type, which is based on value creation for all the stakeholders, and the "lose-win" type, which is based on value creation for the shareholder only. The two models are associated, respectively, with a strategy exploiting "living knowledge," incorporated in human resources and with a strategy employing "dead knowledge," incorporated in machinery.

Section 5 illustrates, from an accounting point of view, the empirical descriptive content of our analysis: the value creation models will be studied on ten industrial sectors each made up of 100 firms. Finally, Section 6 contains conclusion and further research.

2. Literature review

This paper can be framed in the intellectual capital accounting (ICA) literature stream (Guthrie *et al.*, 2012). ICA has been defined as a "management, accounting and reporting technology toward understanding, measuring and reporting knowledge resources" (Guthrie *et al.*, 2012). Starting from the seminal work by Petty and Guthrie (2000) the ICA Research (ICAR) moved through the first and the second stage. A third stage of ICAR emerged characterized by a critical and "performative" analysis of IC practices in action (Dumay, 2013; Guthrie *et al.*, 2012).

New topics have been addressed in the ICA regarding developed countries, public listed companies, management control and strategy, and more recently the public sector (Dumay *et al.*, 2015).

This paper contributes to the debate in the management control and strategy area within the ICA. It develops a particular aspect of the importance of knowledge-based drivers for value creation and sustainable competitive advantage (Grimaldi *et al.*, 2013; Lerro *et al.*, 2014).

As regards the knowledge-based strategic profile of the firm and the performances, several researches have been carried out. Shakina and Barajas (2015) proposed three strategic profiles of firms regarding intangibles. They demonstrated that

investments in intangibles allow a company to be better off, even in a period of crisis. Martínez-Torres (2014) proposed a procedure for identifying the intangible assets that generate value to knowledge-intensive organizations. Olander *et al.* (2015) studied how human resources create the basis for continuing innovation and subsequent firm performance in knowledge-intensive industries. Massingham and Tam (2015) examined the relationship between HC and value creation and employee reward. Other papers investigated the relation between intellectual capital and firm value also from the strategic point of view (Baiburina and Golovko, 2008; Huang and Wang, 2008).

This paper builds in particular on Drucker (1968, 1999a, b) and Pulic (2000, 2004, 2008). The model by Pulic has been subject to several criticisms (Starovic and Marr, 2003; Andriessen, 2004; Chang, 2007; Stahle *et al.*, 2011; Nimtrakoon, 2015).

The authors of this paper made a deep methodological and critical review of the concept of value added intellectual coefficient (VAIC; Iazzolino and Laise, 2013). The aim was to investigate the strengths and weaknesses of the VAIC, primarily from the accounting theory perspective.

The authors retain that most of the misunderstandings that have occurred in the literature debate in the past arise from a radically different sense that Pulic gives to the terms HC and SC from that of the Skandia Navigator and in general from the meaning commonly assigned to those word by the entire IC research community. Pulic starts from the Skandia Navigator (Pulic, 2000), but after he makes a "semantic shift" that radically modifies the meaning of those terms.

The bridge that Pulic created between the notion of VA and the notion of intellectual capital constitutes the main point of strength of Pulic's proposal. Pulic argues that the VAIS is a valid analysis tool, even in a knowledge economy context. In other words, this means that it is possible to measure the value creation also in organizations in which the presence of knowledge workers is prevalent.

The main point of weakness of Pulic's proposal is the attempt to qualify VAIC as a criterion for performance measurement that is alternative (rival) to the existing ones (EVA, for example). In fact, there is no rivalry, because VAIC measures a dimension of performance that is not considered by other traditional measures (for more details see, Iazzolino and Laise, 2013).

In this paper the VAIC is used mainly considering its strength points.

3. The proposed theoretical framework

3.1 Stakeholder point of view and VA

In the traditional way of measuring the company performance of an organization the focus is mainly on value creation for the shareholder (shareholder point of view). But, as already seen, a strategy that is socially sustainable has to create value not only for the shareholder, but also for the other stakeholders and, in particular, for the employees.

A strategy that only considers the shareholder's interests is a strategy that can only be satisfactory for a part of society. The idea underlying performance measurement in terms of satisfaction only from the point of view of the shareholder is based on the idea that by maximizing profit (NOPAT, EVA, dividends, etc.) also social well-being is maximized. But it is immediately evident that the economic facts of the last 20 years, dominated by shareholder value analysis, have not brought social benefits for everyone, as promised. Mass unemployment, a characteristic of the current world economy, does not allow the affirmation that the application of the "philosophy" of shareholder value analysis has brought socially sustainable benefits.

The reason, as Pulic (2000, 2004, 2008) states, is that value creation has not been correctly measured. Value from the social sustainability point of view cannot be measured only by EBITDA or by other measures such as EVA which are based, on final analysis, on NOPAT which is a variant of EBITDA (Iazzolino *et al.*, 2014).

If the measurement of value creation is based only on EBITDA then we should not be surprised that the strategies which emerge cannot be socially sustainable. The reason is obvious. Creating value for the shareholder does not mean creating value for all the stakeholders.

In fact, the EBITDA measures the value created for all capital investors (within which category there is also the shareholder) whereas value created for all the stakeholders is measured by VA. This is the fundamental criticism that Pulic (2000, 2004, 2008) levels at traditional value measurement. This concept will be better explained in the next section.

According to Pulic, in addition to value created for capital investors and for the shareholder, it is necessary also to consider value created for employees, which is measured by wages and salaries, that is by the capital invested in acquiring human resources. VA is, therefore, the adequate measure of value creation from a stakeholder point of view.

3.2 VA and value creation for stakeholders

The short-sightedness of the traditional measures of value creation can be illustrated following the approach proposed by Pulic (2000, 2004, 2008).

From the point of view of society as a whole, value created is equal to:

$$\mathrm{VA} = \mathrm{HC} + \mathrm{SC} \tag{1}$$

where, VA is the value added; HC, the human capital (= cost of employees = wages and salaries); SC, the structural capital.

Considering Pulic's definition, SC in fact coincides with EBITDA (Iazzolino and Laise, 2013). Expressing EBITDA in terms of its components, it holds that:

$$\mathrm{SC} = \text{structural capital} = \mathrm{EBITDA} = \text{depreciation/amortization} + \text{interest expenses} + \text{taxes} + \text{net income}.$$

The latter definition stresses the fact that in EBITDA, less taxes, there are the remunerations of various capital investors, understood in the physical sense and in the financial sense (and therefore also shareholders).

Some elucidation is needed to link the Equation (1) with the themes of knowledge management. Knowledge that creates value is incorporated in HC (people). Pulic states that: "People are the main carriers of knowledge" (Pulic, 2008). If this observation is correct then expenditure on human resources has to be seen as an investment and not as a cost: "it is only reasonable to give this resource the status it deserves of investment and not cost anymore" (Pulic, 2008). But: "employees, who are treated as investment, are the beginning and the end of the new, knowledge-based, economy" (Pulic, 2008). The reason for investing in human resources is that they are "the main value creators of the contemporary economy" (Pulic, 2008).

Now, considering human resources as an investment and not just a cost, needs a change in managerial mentality. In fact, costs owing to their nature have to be cut and the traditional performance measurements are based on a logic of "cost cutting."

To increase the EBITDA the cost of human resources is also cut. But, if human resources are the source of value creation then cutting them can be a "short-sighted" strategy in the long term. Maybe the saying: "the lower the cost, the higher the profit" can be fine for the cost of raw materials and energy costs, but not when it refers to human resources. The reason is obvious: human resources create value.

4. Value creation models and social sustainability

4.1 Two main models for value creation

Using Formula (1) the significance of fundamental strategies for value creation can be explained.

The basic strategies are:

- grow the "cake" (VA) in such a way as to increase both HC and SC (EBITDA); and
- redistribute the "cake" (VA) reducing HC and increasing SC (EBITDA).

In the first case, the increase in work productivity is obtained with a labor intensive strategy. In the second case, on the contrary, the increase in work productivity is obtained with a labor saving strategy.

This concept can be illustrated in the following way.

Equation (1) can be rewritten in the following way in terms of variations:

$$\Delta VA = \Delta HC + \Delta SC \tag{2}$$

If we invest in human resources ($\Delta HC > 0$) and if there is an increase in the VA such that $\Delta VA > \Delta HC$, then there is also an increase in work productivity (VA/HC) and in working profits ($\Delta SC > 0$).

Note that the condition $\Delta VA > \Delta HC$ is the main feature of investment in HC. Note, also, that this is what Drucker and Pulic intend when saying "invest in people."

In Pulic's terminology this means that an investment in human resources makes HCE = VA/HC (human capital efficiency) grow and therefore makes the efficiency of the SC grow, that is the working profits with respect to the VA (SCE = SC/VA). In fact, the following relation holds (Iazzolino and Laise, 2013):

$$SCE = 1 - (1/HCE) \tag{3}$$

It is clear that if $\Delta HCE > 0$, then $\Delta SCE > 0$.

This is an example of socially sustainable strategy because it creates new value for employees ($\Delta HC > 0$) and for capital investors ($\Delta SC > 0$). It could be said that such a strategy is an example of "win-win" strategy that does not dissatisfy anyone, since it creates new value for everyone.

It is for this reason that it can be understood as a socially sustainable strategy. Using the metaphor of a "cake" (Pulic, 2004), it can be said that a win-win strategy does not dissatisfy anyone because there is an increase in the size of the "cake" (VA) and, therefore, an increase in the size of the "slice" apportioned to human resources (HC) and in the one apportioned to capital investors (SC).

Therefore one should ask: why is the win-win strategy not adopted by all firms?

The reason can be explained using, again, Equation (2).

If one invests in human resources ($\Delta HC > 0$) which, however, have a low knowledge content and professional qualification, the growth of VA, as a result of investment, is insufficient, and in particular can be lower than the investment realized ($\Delta VA < \Delta HC$).

In this case there is a reduction in profits for capital investors ($\Delta SC < 0$). This is what happens in some sectors that, for their nature, do not invest in human resources but in machinery.

In these sectors, in order to make profits grow, there is often a reduction of the workforce (destruction of the value quota of employees) through a growth in work productivity obtained by investing in labor saving plants. In these cases the growth of value for capital investors ($\Delta SC > 0$) and the growth of the work productivity (VA/HC) is obtained by the reduction of investment in human resources ($\Delta HC < 0$) by means of reducing employment. This is an example of strategy of the "lose-win" type, since there is the creation of value only for capital investors.

The "lose-win" value creation model is mainly based on dead knowledge, while the "win-win" model is based on living knowledge, as will be clarified in the next section. But the lose-win strategy is not socially sustainable in the long term since it destroys jobs and income for employees.

The characteristics of the two models are represented in the following figure (Figure 1).

4.2 Living and dead knowledge in sustainable strategies

Knowledge can be understood as the ability to act for survival implemented by organizations (Maturana and Varela, 1992). The actions for survival are solutions to problems and require creative thinking and ability for innovation. Knowledge is therefore a typical human characteristic that should not be confused with the knowledge embedded in machines. For this reason we distinguish the knowledge embedded in the human mind (living knowledge) as distinct from the knowledge embedded in technology investments (dead knowledge).

The strategy based on investment in knowledge, suggested by Drucker and Pulic, can be better described by using the distinction cited above.

When investing in human resources, trust is placed in "living knowledge," which is incorporated in the employees, that is, in people. It is believed that only human beings are able to create new knowledge and, therefore, produce VA in such a way to justify investment. Only qualified and educated human resources are, in fact, able to create

Shareholders / Workers	Win	Lose
Win	Win -Win	Win -Lose
Lose	Lose -Win	Lose-Lose

where, for the strategies in the first column, it is:

(1) "Win-Win" Strategy

$\Delta HC > 0$ $\Delta SC > 0$

$\Delta VA > \Delta HC$ ⇒ $\Delta (VA/HC) > 0$ Value creation for all stakeholders

(2) "Lose-Win" Strategy

$\Delta HC < 0$ $\Delta SC > 0$

$\Delta VA \approx 0$ ⇒ $\Delta (VA/HC) > 0$ Value creation for shareholders only

Figure 1.
The two main models of value creation

patents, copyrights, know-how, etc. Moreover, only highly trained human resources are able to increase the quality and quantity of intangible assets (organizational relations and relations with customers).

Value creation for all stakeholders therefore necessitates heavy investments in highly trained and skilled human resources. It is from this type of resource that comes VA suitable to make investment in HC convenient. It is necessary to increase the size of the cake ($\Delta VA > 0$) so that everyone can have a bigger slice ($\Delta HC > 0$, $\Delta SC > 0$).

It is a kind of "nonzero sum" game. This is the way to create greater motivation, greater satisfaction and greater employee collaboration. This is the way for a win-win strategy (nonzero sum game).

The other more traditional strategy places its trust in "dead knowledge" incorporated in ever more perfected machinery whose use is "labor saving."

The machine, as far as technologically advanced and innovative, is to be considered as an archive, a record of human work provided before. It is knowledge "stored," crystallized, no longer vital. Furthermore, dead knowledge cannot self-activate but, in order to be used, it requires other living knowledge.

With this strategy operating profits can be increased (SC) also at parity of VA, that is, profits can be increased destroying value for employees (HC).

This strategy presupposes a given cake ($\Delta VA \cong 0$) and is based on the reduction of the slice of the cake that goes to the employees ($\Delta HC < 0$) to increase the size of the slice that goes to capital investors ($\Delta SC > 0$). If the VA is given, then its distribution among employees and capital investors becomes "a game with a zero sum." It is a lose-win strategy.

The problem with this value creation model is that it can determine problems at the overall level in terms of social sustainability.

The model based on dead knowledge results in a low use of workforce and in particular of skilled workforce. It can be good for the firm in itself but not for the overall economic system. The more firms using the dead knowledge model, the less the social sustainability at an overall level. Therefore, there has to be a high number of industries using the living knowledge model in order to assure the overall sustainability.

The model based on living knowledge (human resources) is the one that determines the sustainability in social terms of the global system.

At a global and social level, it is necessary to understand what is the fundamental driver of value creation. That is, it is necessary to place human resources at the center of management and understand that the following factors are crucial:

(1) First and foremost, it is necessary to aim at innovation, which is able to continuously increase the knowledge content of products and services. Continuous innovation is nothing other than new knowledge for the growth of VA.

(2) Second, it is necessary to develop and increase employees' skills with the aim to develop VA of products and services.

It is necessary, definitively, to abandon the idea that profits are low because the costs are high and think instead that profits are low because the VA is low.

5. The empirical analysis: value creation models in different Italian industries

An analysis of Pulic's thesis was carried out on a sample of firms belonging to different Italian industrial sectors.

The data used in the research were taken from the AIDA Bureau van Dijk Database. In particular, ten industrial sectors were analyzed:

(1) legal and accounting activities (ATECO M69);

(2) manufacture of wearing apparel (ATECO C14);

(3) manufacture of computer, electronic and optical products (ATECO C26);

(4) manufacture of chemicals and chemical products (ATECO C20);

(5) electricity, gas, steam and air conditioning supply (ATECO D35);

(6) manufacture of food products (ATECO C10);

(7) manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials (ATECO C16);

(8) computer programming, consultancy and related activities (ATECO J62);

(9) advertising and market research (ATECO M73); and

(10) employment activities (ATECO N78).

The first 100 firms in each section were chosen, in decreasing order of turnover, which could provide available balance sheet data for the last eight years. Overall, the sample is made up of a total of 1,000 firms (Table I).

The average values of the components of VA were calculated for each sector, considering the time interval relative to the last three years available (2010, 2011 and 2012).

The sectors considered were then subdivided into two wide classes.

Class (I) traditional industries (T):

(1) manufacture of wearing apparel;

(2) manufacture of food products;

(3) manufacture of chemicals and chemical products;

(4) electricity, gas, steam and air conditioning supply; and

(5) manufacture of wood.

Class (II) nontraditional industries (NT):

(6) computer programming, consultancy and related activities;

No.	Industry	Numbers
1	Legal and accounting activities	100
2	Manufacture of wearing apparel	100
3	Manufacture of computer, electronic and optical products	100
4	Manufacture of chemicals and chemical products	100
5	Electricity, gas, steam and air conditioning supply	100
6	Manufacture of food products	100
7	Manufacture of wood	100
8	Computer programming, consultancy and related activities	100
9	Advertising and market research	100
10	Employment activities	100
	Total	1,000

Table I.
Sectors and number of firms

(7) advertising and market research;

(8) employment activities;

(9) legal and accounting activities; and

(10) manufacture of computer, electronic and optical products.

The results of the survey, in Pulic's codification, are reported in Table II.

As can be clearly seen from Table II two different situations emerge. In the traditional sectors the entity of investments in human resources (HC) with respect to VA is on average lower compared with the nontraditional sectors. This datum is unsurprising since in traditional sectors the weight of nonhuman resources (nonhuman capital) is greater compared with the weight of human resources (HC). In the course of time, in fact, in traditional sectors technological progress has triggered labor saving processes that have made the use of human resources "obsolete" and redundant. This also explains the diversity among the sectors in terms of operating profits on VA (SC/VA). In traditional sectors the greater work productivity (VA/HC) and the lower cost of work on the VA (HC/VA) is translated into in greater operating profits on the VA (SC/VA).

With the aim of better highlighting the main sectorial differences the data of Table II have been re-calculated in terms of average quantities and are reported in Table III.

The data reported in Table III highlight that in traditional sectors a kind of value creation strategy of the "lose-win" type has been carried out. In fact, in these sectors the weight of investments in HC/VA is low and, moreover, is much less than that of nontraditional sectors.

In fact:

$$(\mathrm{HC/VA})_{\mathrm{T}} = 45.6\% < 62.4\% = (\mathrm{HC/VA})_{\mathrm{NT}}$$

Sectors	HC/VA (a)	SC/VA (b)	VA/HC (c)
Traditional			
1. Manufacture of wearing apparel	0.50	0.50	2
2. Manufacture of food products	0.52	0.48	1.92
3. Manufacture of chemicals and chemical products	0.46	0.54	2.17
4. Electricity, gas, steam and air conditioning supply	0.20	0.80	5
5. Manufacture of wood	0.60	0.40	2.5
Nontraditional			
6. Computer programming, consultancy and related activities	0.64	0.36	1.56
7. Advertising and market research	0.55	0.45	1.81
8. Employment activities	0.63	0.37	1.58
9. Legal and accounting activities	0.72	0.28	1.38
10. Manufacture of computer, electronic and optical products	0.58	0.42	1.72

Table II. Performance per sector

Sectors	Average cost of employees % $(\mathrm{HC/VA})_{\mathrm{av}}$	Average EBITDA % $(\mathrm{SC/VA})_{\mathrm{av}}$	Average work productivity $(\mathrm{VA/HC})_{\mathrm{av}}$
Traditional (T) (1-5)	45.6	54.4	2.7
Nontraditional (NT) (6-10)	62.4	37.6	1.6

Table III. Average performance per sector

Most probably, in traditional sectors a logic prevails that has favored, in the first place, value creation for capital investors. That is, a logic has asserted itself that places the interests of the employees the background, who have become superfluous. In all probability value creation in traditional sectors has come about investing in "dead knowledge" incorporated in ever more sophisticated machinery of the "labor saving" type. Human resources are seen as a cost to cut by introducing automation and robotics that have increased the work productivity and have reduced the requirements for human resources.

This strategy of a "lose-win" type also emerges from the data relative to work productivity (VA/HC). As can be seen from the data in Table III, the work productivity in traditional sectors is higher than that achieved in nontraditional sectors. In fact:

$$(\mathrm{VA/HC})_{\mathrm{T}} = 2.7 > 1.6 = (\mathrm{VA/HC})_{\mathrm{NT}}$$

this, as already seen, explains the "labor saving" effects of the strategy carried out by the traditional sectors.

The traditional sectors achieve better performances also from the point of view of operating profits on the VA. In fact it results:

$$(\mathrm{SC/VA})_{\mathrm{T}} = 54.4\% < 37.6\% = (\mathrm{SC/VA})_{\mathrm{NT}}$$

But this means a lower level of employment, especially highly skilled. At an overall level it can generate problems in terms of social sustainability, as already discussed in Section 4.2.

In nontraditional sectors the opposite of what happens in traditional sectors is found. In fact, in nontraditional sectors value creation comes through investing more in "living knowledge" incorporated in human resources. This is a more labor intensive strategy, that is, it is of the "win-win" type. This greater attention to human resources is also reflected at the level of operating profits (percent on VA) of the nontraditional sectors, which are lower than those of the traditional sectors.

From the data of the empirical analysis two different strategic profiles seem to emerge. In the traditional sectors there is a distribution of VA that favors operating profits (and therefore capital investors) and penalizes HC, creating structural unemployment. Vice versa, the strategy of the nontraditional sectors is characterized by a distribution of VA, that is, more favorable to HC.

The model based on living knowledge (human resources) contributes much more to overall sustainability from a social point of view.

6. Conclusion, contribution of the paper and further research

The overall aim of the research presented in this paper is to place the value creation process within the sustainable growth strategies. Knowledge is certainly a notably competitive weapon since it is the most important driver for value creation for all stakeholders, and it can be measured by VA. Pulic's idea referred to this specific point is, therefore, sharable.

The main reason that distinguishes knowledge-based strategies as sustainable strategies (Grant, 2010) derives from the fact that the modern firm is seen as an assembly of accumulated knowledge whose value derives from its utilization (knowledge-based view of the firm). Knowledge management is, therefore, one of the main resources to support sustainable competitive advantage (Edvinsson and Malone, 1997; Kaplan and Norton, 1992; Nonaka, 1994; Nonaka and Takeuchi, 1995; Sveiby, 1997, 2001).

The paper has started from the conceptual categories introduced by Drucker (1968, 1999a, b) and Pulic (2000, 2004, 2008) and has examined, from a theoretical point of view, some basic conditions to distinguish between KIFs and nonKIFs and to investigate on the contribution given by the two sets of firms (KIFs and nonKIFs) to the overall sustainability of the system, by analyzing the different value creation models used in the two different types of industries. The first set of firms typically use a value creation model that is based on living knowledge while the second bases its model on dead knowledge. The first set (KIFs) seems to contribute to the overall sustainability much more than the second (nonKIFs).

As regards the contribution to the literature, the paper contributes to the field of the ICA (Petty and Guthrie, 2000; Guthrie *et al.*, 2012). More specifically it can be framed in the debate concerning the management control and strategy area within the ICA. It develops a particular aspect of the importance of knowledge-based drivers for value creation and sustainable competitive advantage (Grimaldi *et al.*, 2013; Lerro *et al.*, 2014) also from the point of view of the overall economic system.

Furthermore, the paper gives important insights in the field concerning the knowledge-based firm profile and connection to strategy and performances (Baiburina and Golovko, 2008; Huang and Wang, 2008; Martínez-Torres, 2014; Massingham and Tam, 2015; Olander *et al.*, 2015; Shakina and Barajas, 2015).

This paper has several practical implications, as it makes it possible to reduce the risk of myopic valuation of economic performance. Through the proposed methodology it is possible to highlight the effects of sustainable strategies based on knowledge investments oriented toward the stakeholder value theory and CSR.

Managers generally underestimate the importance of a performance measurement that takes into account the advantages in terms of intangibles.

The proposed approach can be very useful for top managers and for accountants, as it underlines the importance of the VAIS and constructs a strong link to the themes of knowledge. No authors have previously addressed the issue of income statement and its link with knowledge.

As regards further research, at first it has to be underlined that in this paper the first step of the research is described. This step is primarily theoretical and methodological. Empirics are here used to obtain a preliminary descriptive analysis of the research hypotheses.

The authors of this paper are already carrying out further empirical researches also using statistical instruments, at first the regression and the discriminant analysis but also, possibly, other classification methods such as data mining techniques or neural networks.

Moreover, further researches concerning the framework proposed in this paper will be: regarding the first point of the framework (distinguish between KIFs and nonKIFs) it will be studied the inclusion of other indicators in the overall set of KPIs to be analyzed, such as indicators regarding R&D (no. of patents, R&D expenses) and employees' education (training investments, skills); and with reference to the second point (make considerations about the overall sustainability), empirical applications will be carried out with the aim to analyze the time trend of the VA and of its components, in order to appreciate the variations of VA and its composition, as exposed in a theoretical way in Section 4.

References

Andriessen, D. (2004), *Making Sense of Intellectual Capital: Designing a Method for the Valuation of Intangibles*, Elsevier Butterworth-Heinemann, Burlington, MA.

Baiburina, E.R. and Golovko, T.V. (2008), "Empirical investigation of intellectual enterprise value and its factors for big Russian companies", *Corporate Finance*, Vol. 2 No. 6, pp. 5-23.

Chang, S.L. (2007), "Valuing intellectual capital and firms' performance: modifying value added intellectual coefficient (VAIC^{TM}) in Taiwan IT industry", unpublished doctoral dissertation, Golden Gate University, San Francisco, CA.

Donaldson, T. and Preston, L. (1995), "The stakeholder theory of corporation: concepts, evidence and implications", *Academy of Management Review*, Vol. 20 No. 1, pp. 65-91.

Drucker, P.F. (1968), *The Age of Discontinuity: Guidelines to our Changing Society*, Transaction Publishers, London.

Drucker, P.F. (1999a), *Management Challenges for the 21st Century*, Harper Collins, New York, NY.

Drucker, P.F. (1999b), "Knowledge-worker productivity: the biggest challenge", *California Management Review*, Vol. 41 No. 2, pp. 79-94.

Dumay, J. (2013), "The third stage of IC: towards a new IC future and beyond", *Journal of Intellectual Capital*, Vol. 14 No. 1, pp. 5-9.

Dumay, J., Guthrie, J. and Puntillo, P. (2015), "IC and public sector: a structured literature review", *Journal of Intellectual Capital*, Vol. 16 No. 2, pp. 267-284.

Edvinsson, L. and Malone, M.S. (1997), *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower*, Harper Business, New York, NY.

Grant, R.M. (2010), *Contemporary Strategy Analysis*, John Wiley & Sons Ltd, Chichester.

Grimaldi, M., Cricelli, L. and Rogo, F. (2013), "A theoretical framework for assessing managing and indexing the intellectual capital", *Journal of Intellectual Capital*, Vol. 14 No. 4, pp. 501-521.

Guthrie, J., Ricceri, F. and Dumay, J. (2012), "Reflections and projections: a decade of intellectual capital accounting research", *The British Accounting Review*, Vol. 44 No. 2, pp. 68-82.

Huang, C. and Wang, M. (2008), "The effects of economic value added and intellectual capital on the market value of firms: an empirical study", *International Journal of Management*, Vol. 25 No. 4, pp. 722-731.

Iazzolino, G. and Laise, D. (2013), "Value added intellectual coefficient (VAIC): a methodological and critical review", *Journal of Intellectual Capital*, Vol. 14 No. 4, pp. 547-563.

Iazzolino, G., Laise, D. and Migliano, G. (2014), "Measuring value creation: VAIC and EVA", *Measuring Business Excellence*, Vol. 18 No. 1, pp. 8-21.

Kaplan, R.S. and Norton, D.P. (1992), "The balanced scorecard – measures that drive performance", *Harvard Business Review*, Vol. 70 No. 1, pp. 71-79.

Lerro, A., Linzalone, R. and Schiuma, G. (2014), "Managing intellectual capital dimensions for organizational value creation", *Journal of Intellectual Capital*, Vol. 15 No. 3, pp. 350-361.

Martínez-Torres, M.d.R. (2014), "Identification of intangible assets in knowledge-based organizations using concept mapping techniques", *R&D Management*, Vol. 44 No. 1, pp. 42-52.

Massingham, P.R. and Tam, L. (2015), "The relationship between human capital, value creation and employee reward", *Journal of Intellectual Capital*, Vol. 16 No. 2, pp. 390-418.

Maturana, H. and Varela, F. (1992), *The Tree of Knowledge: The Biological Roots of Human Understanding*, Sambala, Boston, MA.

Nimtrakoon, S. (2015), "The relationship between intellectual capital, firms' market value and financial performance: empirical evidence from the ASEAN", *Journal of Intellectual Capital*, Vol. 16 No. 3, pp. 587-618.

Nonaka, I. (1994), "Dynamic theory of organizational knowledge creation", *Organization Science*, Vol. 5 No. 1, pp. 14-37.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge Creating Company: How Japanese Companies Create Dynamic of Innovation*, Oxford University Press, New York, NY.

Olander, H., Hurmelinna-Laukkanen, P. and Heilmann, P. (2015), "Human resources – strength and weakness in protection of intellectual capital", *Journal of Intellectual Capital*, Vol. 16 No. 4, pp. 742-762.

Petty, R. and Guthrie, J. (2000), "Intellectual capital literature review: measurement, reporting and management", *Journal of Intellectual Capital*, Vol. 1 No. 2, pp. 155-176.

Pulic, A. (2000), "VAIC^{TM} – an accounting tool for IC management", *International Journal of Technology Management*, Vol. 20 Nos 5-8, pp. 702-714.

Pulic, A. (2004), "Intellectual capital – does it create or destroy value?", *Measuring Business Excellence*, Vol. 8 No. 1, pp. 62-68.

Pulic, A. (2008), "The principles of intellectual capital efficiency. A brief description", Croatian Intellectual Capital Center, Zagabria.

Shakina, E. and Barajas, A. (2015), "Intangible-intensive profile of a company: the key to outperforming", *Journal of Intellectual Capital*, Vol. 16 No. 4, pp. 721-741.

Stahle, P., Stahle, S. and Aho, S. (2011), "Value added intellectual coefficient (VAIC): a critical analysis", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 531-551.

Starovic, D. and Marr, B. (2003), *Understanding Corporate Value: Managing and Reporting Intellectual Capital*, CIMA Group, Cranfield University School of Management, Cranfield, Bedford.

Sveiby, K.E. (1997), *The New Organizational Wealth: Managing & Measuring Knowledge-Based Assets*, Berrett-Koehler, San Francisco, CA.

Sveiby, K.E. (2001), "A knowledge-based theory of the firm to guide in strategy formulation", *Journal of Intellectual Capital*, Vol. 2 No. 4, pp. 344-358.

Further reading

Collins, D.J. and Montgomery, C. (2005), *Corporate Strategy: A Resource-Based Approach*, MaGraw-Hill Company, Boston, MA.

About the authors

Gianpaolo Iazzolino is an Assistant Professor in Business Economics at the Department of Mechanical, Energy and Management Engineering at the University of Calabria, Italy. His research interests are in business performance evaluation models, evaluation of innovation and intangibles, knowledge management systems. Gianpaolo Iazzolino is the corresponding author and can be contacted at: gianpaolo.iazzolino@unical.it

Domenico Laise is an Associate Professor at the Department of Computer, Control and Management Engineering at the University of Rome "La Sapienza," Italy. His main interests are in bounded decision models, multicriteria decision making, management control models, organizational design.