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## **The knowledge value chain: how intellectual capital impacts on business performance**

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**Abstract:** This theoretical paper explores the fundamental issue of how knowledge management initiatives impact business performance. Reflecting on the management literature in the fields of knowledge management and performance management enabled the deduction of four basic assumptions, representing the links of a conceptual cause-and-effect framework – the knowledge value chain. Drawing on the resource-based view and the competence-based view of the firm, the paper identifies strategic, managerial, and operational dimensions of knowledge management. The review of performance management frameworks discusses the role of knowledge management in those models. These reflections allow linking knowledge management with core competencies, strategic processes, business performance, and finally, with value creation.

**Keywords:** knowledge management; performance management; intellectual capital; intangible assets; value creation; knowledge assets; knowledge-based view; resource-based view.

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## 1 Introduction

In the present competitive climate where the only certainty is uncertainty [1], knowledge is considered the main distinguishing factor of business success and is seen as the foundation of competitive advantage [2–7]. In fact, many organisations accredit their 'capability differential' [5] essentially to their intangibles resources and consider knowledge as the differentiating element in a 'knowledge society' [3]. Knowledge is seen to be the most important strategic resource, and many organisations realise that the value incorporated in their products and services is mainly due to the development of organisational knowledge resources [8]. In fact, the capability of any company to produce outputs can be considered as integration and application of the specialised knowledge held by individuals in the organisation [9].

In such an environment, companies need to 'know what they know' and how they can use their knowledge more effectively to gain or sustain competitive advantage. Knowledge management (KM) consists of processes that facilitate the application and development of organisational knowledge, in order to create value and to increase and sustain competitive advantage. Over the past decade, there has been increasing focus on this knowledge paradigm, resulting in many related contributions both theoretical and practical. In the past five years, various methodologies and tools have been provided to help organisations identify and assess their intellectual capital [10–14]. Despite the wide acknowledgements of knowledge as a strategic resource, it is still not well understood how KM impacts business performance. Even if organisations recognise the value of knowledge and the importance of its management, they appear unable to evaluate the return on investment in knowledge [15] and, more generally, to estimate the value generated by KM initiatives in terms of impact on business performance.

The inability of companies to understand the impact of KM initiatives on business performance is a major problem because it is important to appreciate the value generated from KM initiatives. Investments in KM often carry significant costs and ineffective KM practices carry indirect costs, such as repetition and 'reinvention of the wheel', or decision-making based on insufficient knowledge. Even though KM cannot be considered as an instrument of monetary effectiveness that allows direct reduction of costs [16], it is a means of business resources optimisation, which impacts on costs. Organisations struggle to understand the value adding benefits of KM initiatives, both in the short-term and long-term, which makes it difficult to justify KM investments [2,15].

The difficulty in valuing knowledge within organisations derives from the difficulty to ascribe value to information and knowledge using conventional accounting methods. M'Pherson [17] argues that if it is difficult to quantify the value of knowledge assets, it is even more problematic to estimate any return on their investments. The evaluation of knowledge and KM activities is complex given that its value creation is often indirect and long-term. The long-term benefits must therefore be translated into the bottom line value that has a direct relation to the enterprise's goals and objectives [18]. This is further complicated by the multi-dimensional nature of the effects generated by implementing KM projects. It is not always possible to identify a direct cause-effect link between KM initiatives and one specific dimension of performance. In fact, an investment in knowledge, even if intended to improve a single dimension of performance, usually produces multiple effects throughout the organisation. For example, an investment aimed to improve knowledge sharing could directly impact the behaviour of individuals, but it could also generate indirect effects on the employees' creativity, on the number of patents, on the company's reputation, and on the brand value, which might directly translate into better share value.

The nature of knowledge is often idiosyncratic and its value is closely related to the context in which it is used. The role of knowledge depends on the organisational and managerial, as well as the strategic features of its context. The knowledge value in a context grows with its level of functional importance. Therefore, the same KM practices, applied in the same organisational knowledge typology in different contexts, produce different impacts on company performance.

The aim of this paper is to define an interpretative model, which explains the links between the investments in KM initiatives and business performance. For this reason, an analysis of the management literature on KM and performance management (PM) was conducted. The analysis of theoretical contributions is used to define a set of assumptions that will make up a theoretical framework, which describes the cause-effect links between KM initiatives and business performance. The framework has a descriptive nature and provides an interpretative theoretical picture useful both to analyse and to drive the implementation of KM practices aimed to improve performance and deliver value.

## **2 Knowledge, competencies and knowledge management**

In the current competitive context, many organisations have realised that the only source of sustainable competitive advantage they can leverage is the effective use of their existing knowledge as well as the fast acquisition and utilisation of new knowledge [2]. Teece [19] argues that

“the competitive advantage of companies in today’s economy stems not from market position, but from difficult to replicate knowledge assets and the manner in which they are deployed.” [19, p.62]

KM mitigates a company’s risk to lose business opportunities. It allows companies to recognise and manage a system of core competencies in order to maximise business opportunities and minimise the risk of missing opportunities [15]. The knowledge based process view interprets the results of KM in terms of improvements in organisational process outputs [20].

Companies are increasingly looking for ways to become learning organisations, aware of the fact that successful companies will be those that value knowledge and have a strategy for systematically managing it [21,22]. According to Wiig, business success is a function of the quality of knowledge content available to create and deliver acceptable product and services, often tailored to specific needs of individual customers [18]. The central value creation role of knowledge, and more generally of intangible resources, has been the subject of several reflections, which can be recognised in different streams of thought. Most notably, the research streams of the Resource-Based View (RBV) [5,23,24] and of the Competence-Based View (CBV) [6,25–27]. These are two relatively recent streams building on earlier work by Penrose [28] and Selznick [29].

In the RBV, resources and the competencies are considered the source of competitive advantage. Amit and Schoemaker [23] define resources as a stock of available assets which the company owns or controls, for example know-how, financial assets, physical assets, human capital, etc. Competencies are defined as tangible or intangible processes, based on information developed in interactions between resources in order to achieve a specific aim. Grant distinguishes resources from competencies [30]. He identifies the former as inputs of the productive process and the latter as the capacity to manage and exploit the owned resources. In particular, competencies are differentiators leading to performance variation between two companies with the same resources and aims. Resources and competencies contribute to a sustainable competitive advantage when they are not perfectly reproducible, not transferable, not replaceable, valuable and rare [24,30].

The CBV can be considered as a subset of the RBV. The CBV considers the company’s capacity to recognise, create, strengthen and increase its ‘core competencies’ [25] as the source of a sound competitive advantage. The company is perceived as a portfolio of competencies and its competitiveness is based on the creation and development of competencies and on the realisation of a strategy able to create a link between aims, resources and competencies [25,31]. This view also includes the concept of ‘Capabilities Based-Competition’ [7,32].

All the above-mentioned research streams are seen to be at the basis of a company’s ability to gain a competitive advantage. Competencies are expressed and conceptualised in the processes a company implements for the development of its organisation [33]. In order to allow competences to continuously develop, it is necessary that organisations manage their competencies over time. In other words, they have to be maintained, recombined and renovated [27]. Moreover, it is important that competence management has a dynamic nature [34] and that it is focused on actions aimed to develop, select, assess, improve, sustain, use, and protect the organisational competencies [25].

This cognitive nature of competencies allows the identification of processes to manage capabilities [11,25,27,35]. Leonard-Barton [27], for example, indicates knowledge creation activities essential for the generation as well as for the maintenance of competencies. Nelson [35] asserts that a company's competencies, together with firm-specific organisational routines, are the result of an internal learning process; along with Prahalad and Hamel [25] who stress the role of the organisational learning process for the development of competencies.

The cognitive competence perspective can be summarised in the interpretation, which defines a company's competence as a combination of all 'knowledge assets' and 'knowledge processes' that allow an organisation to carry out its business processes [11]. This interpretation recognises knowledge assets and knowledge processes as fundamental elements of organisational competencies. This allows us to proclaim that the continuous competence development is related to the company's ability to manage its assets and cognitive processes. It means to manage the organisational knowledge system and allows us to formulate the following assumption:

**Assumption 1:** Knowledge management is at the basis of developing organisational competencies.

In order to understand the meaning and the content of KM processes, it is particularly important to analyse the different interpretations of KM, which have been provided in the managerial literature. Table 1 presents a summary of the main KM definitions.

**Table 1** Definitions of knowledge management

<i>Author (s)</i>	<i>Definitions of knowledge management</i>
Wiig [36]	It is 'hands-on' to understand, focus on and manage systematic, explicit, and deliberate knowledge building, renewal and application, i.e. effective knowledge processes [...] It is a set of distinct and well-defined approaches and processes. The overall purpose of knowledge management is to maximize the enterprise's knowledge related effectiveness and returns from its knowledge assets and to renew them constantly [36, p.401].
Teece [37]	It can be used to describe the panoply of procedures and techniques used to get the most from a firm's knowledge assets [...] The knowledge management requires the development of dynamic capabilities [...] the ability to sense and to seize opportunities quickly and proficiently [37, p.35].
Sveiby [38,39]	It is a dynamic approach to optimally manage critical business knowledge aimed to generate value. The knowledge management is the art of creating value from an organization's intangible assets.
Davenport and Prusak [2]	It consists of processes to capture, distribute, and effectively use knowledge.
Ruggles [40]	It is an approach to adding or creating value by more actively leveraging the know-how, experience, and judgment resident within and, in many cases, outside of an organization [40, p.80].

**Table 1** Definitions of knowledge management (continued)

<i>Author (s)</i>	<i>Definitions of knowledge management</i>
Lee and Yang [41]	It is an emerging set of organizational design and operational principles, processes, organizational structures, applications and technologies that helps knowledge workers dramatically leverage their creativity and ability to deliver business value [41, p.784].
Quintas et al. [42]	It is the process of continually managing knowledge of all kinds to meet existing and emerging needs, to identify and exploit and acquire knowledge assets and to develop new opportunities [42, p.387].
Beijerse [43]	It is the management of information within an organization by steering the strategy, structure, culture and systems and the capacities and attitudes of people with regard to their knowledge. It is the achievement of the organization's goals by making the factor knowledge productive [43, p.165].

From the analysis of the different KM definitions arise two main characteristics of KM. The first characteristic is related to the process nature of KM. All definitions, although in different forms, highlight how KM involves processes. These can take different forms according to the needs and characteristics of the organisational system in which they are implemented. The second characteristic of KM is related to its aim. KM, independently from the process nature, is aimed to create value for the organisation. Therefore the process nature and the value-creation aim are the two characteristic facets of the KM.

Moreover, the analysis of the literature suggests three interpretative dimensions of KM: strategic, managerial and operational. Those correspond to the organisational levels of KM implementation.

### *2.1 The strategic dimension of knowledge management*

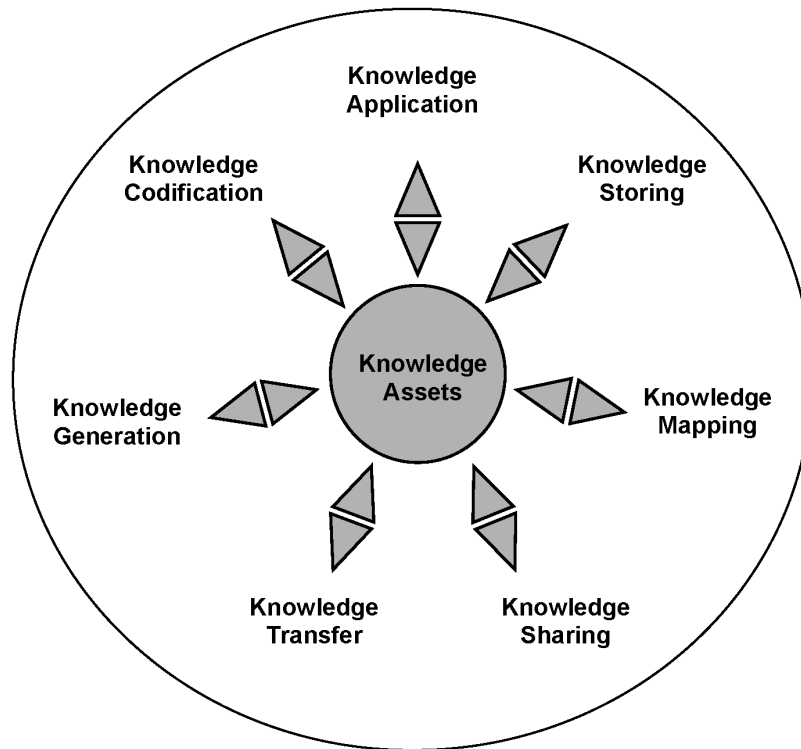
The strategic dimension considers the set of approaches that highlight the strategic importance of knowledge and its management in a company's strategy. This dimension is supported by the Resource-Based View, the Competence-Based View, and more generally, by the Knowledge-Based View [30,44], which consider knowledge as drivers for the definition and development of an organisational strategy.

### *2.2 The managerial dimension of knowledge management*

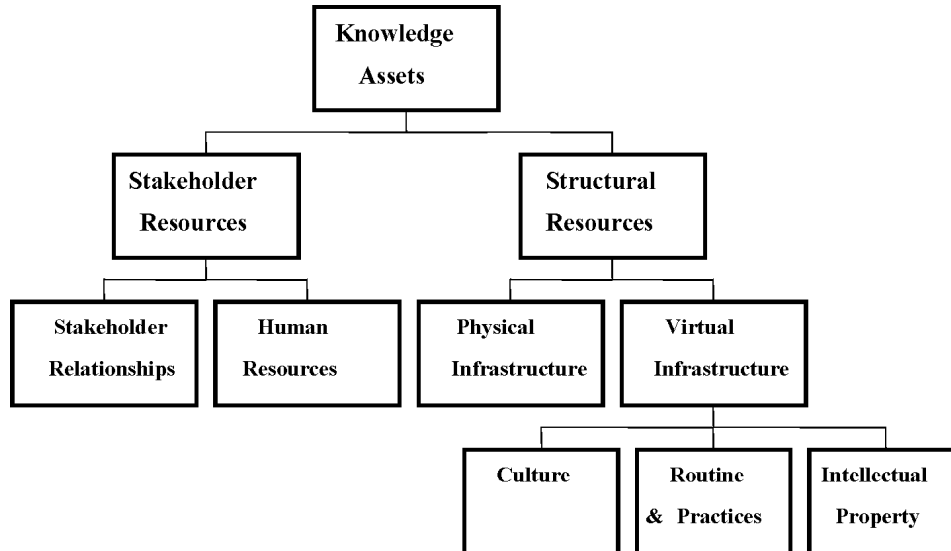
The managerial dimension comprises approaches and methodologies of organisational knowledge assessment and management. This interpretative dimension has involved the development of models which allow managers to drive the implementation of KM processes within the organisation. The analysis of literature reveals two streams of study: knowledge creation and knowledge assessment. The first one, knowledge creation, begins with the seminal work of Nonaka [1] who introduces the concept of the 'Knowledge creating company' and defines KM approaches and models both of descriptive and prescriptive nature. The 'Knowledge process wheel' [11] proposes a taxonomy of KM processes. This model identifies seven main processes of KM: knowledge generation,

knowledge codification, knowledge application, knowledge storing, knowledge mapping, knowledge sharing, and knowledge transfer (see Figure 1). These processes are based on the understanding that the knowledge is dynamic in nature; on this basis they provide guidelines of how to use, transfer, share, develop and renovate the cognitive assets of an organisation [36].

Figure 1 Knowledge process wheel



Knowledge assessment, as the second stream of study, builds on the base of KM and is intended to provide methodological instruments to identify and value the intellectual capital of a company. It was developed out of the desire to account for intellectual capital and was first adopted by Skandia. Since 1996, the literature about the assessment of intellectual capital was enriched by a number of contributions [13,14,45–49]. All of those have highlighted that the assessment of intellectual capital can have different aims. First, companies can be interested in the valuation of organisational knowledge – the intellectual capital – with the aim to communicate the value of the intangible components of the company to external stakeholders of the company, in particular, its shareholders. Second, the valuation can be aimed at identifying and monitoring the level of intellectual capital with the aim to manage the knowledge assets. The ‘Knowledge asset map’ [11] proposes a classification of organisational knowledge assets based on the distinction between stakeholders’ resources and structural resources (see Figure 2).

**Figure 2** Knowledge asset map

### 2.3 The operational dimension of knowledge management

The *operational dimension* of KM includes the set of organisational and managerial activities and projects such as teamwork, meetings, benchmarking of best practices, community of practice, etc. These activities are about the usage and development of intellectual capital. This dimension also includes projects to implement ICT tools designed for development and use of knowledge [50]. These might include intranets, yellow pages, knowledge repositories and libraries, groupware, computer supported cooperative work, etc.

The analysis of characteristics and interpretations of KM allows us to provide the following working definition:

“The KM is a managerial paradigm which considers knowledge as a resource at the basis of a company’s competitiveness, it identifies the capabilities to generate value for a company’s stakeholders with the explicit and systematic implementation of approaches, techniques and tools for the assessment and management of intellectual capital.”

This definition derives from an analysis of the KM literature and highlights the role of KM within organisations. KM is at the basis of the company’s ability to generate value and therefore represents the pillars of competitiveness. In order to further understand the link between the KM and business performance, the PM literature was reviewed focusing on how these models address competencies and practices of organisational KM. The following section presents the key findings of this review.

## 3 The role of knowledge in performance management systems

Performance measurement systems have evolved over the past 20 years from static and history-orientated financial measurement systems to systems that address the increased

complexities of today's business environment. The first PM models introduced in the beginning of the 20th century were dominant until the 1980s; they were designed as tools for monitoring and evaluating economic and financial efficiency in organisations [51,52]. With changing markets and increasing customer demands, financially focused management systems lost their relevance in the 1980s. Organisations started to measure additional facets of performance such as quality and processes of continuous improvement. Management tools were developed that took into account internal efficiency of organisational processes, relations with customers and the ability to manage the innovation process. Numerous models were formulated proposing an integrated and more balanced view of business performance. Among the models suggested in the literature, the Balance Scorecard [53,54], the Business Excellence Model [55] and its US equivalent the Baldrige Award, and, more recently, the performance prism [56] are considered the most significant contributions, which are also widely used by organisations. These are integrated models that also identify intangibles as one of their perspectives to evaluate and manage business performance.

### 3.1 The balanced scorecard

The Balanced Scorecard model [53] balances the financial perspective with the following three non-financial perspectives: customer perspective, internal business process, as well as learning and growth perspective. The logic underlying these four perspectives can be summarised as follows:

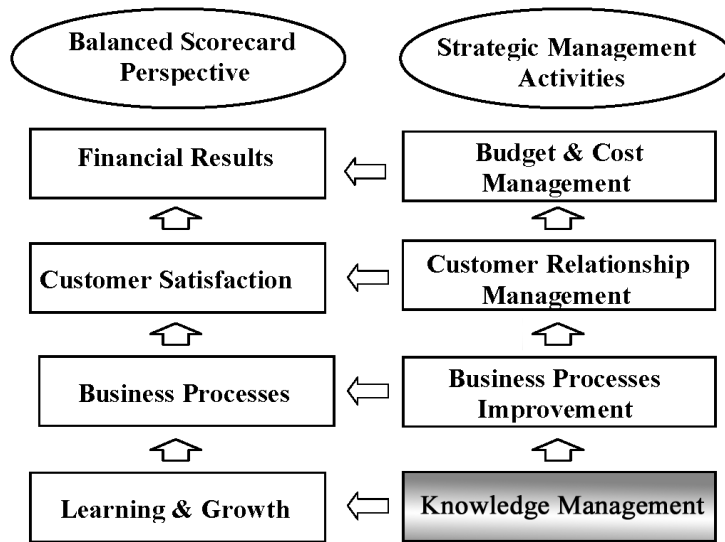
- *Financial.* How does the firm create value for their shareholders?
- *Customer.* What is the firm's value proposition to their customers? How well is the firm fulfilling their value proposition to their customers?
- *Internal business process.* Which processes must the firm excel at to achieve superior value for the customers?
- *Learning and growth.* How can the firm continue to add value?

According to the Balanced Scorecard, any business strategy needs to address each of the four perspectives. Specific objectives and critical success factors can then be developed for each perspective. These critical success factors can then be measured using key performance indicators and initiatives linked to strategic objectives in each perspective. The Balance Scorecard, therefore, leads an organisation to identify links and trade-offs between different factors that affect business performances. According to latest developments in the Balanced Scorecard, any achievement of the strategic goals develops through causal links between the four perspectives [57]. Such links can be drawn in causal maps, which assure consistency between operating decisions and business strategy.

The Balance Scorecard proposes the 'learning and growth perspective' as the fundamental dimension to evaluate and manage intellectual capital. The competitive success of a company is interpreted as a cause-effect chain, which can be drawn in a strategy map. According to Kaplan and Norton [54] the 'learning and growth perspective' is at the basis of a company's ability to generate value, underlying internal business processes which, in turn, impact customer satisfaction and consequently financial results.

Averson [58] associates managerial activities with each of the four perspectives identified in the Balanced Scorecard (see Figure 3). KM is suggested as a strategic management activity in the learning and growth perspective. In fact, the learning and growth perspective provides the infrastructures (e.g. skilled and creative employees) for the realisation of the aims in the remaining perspectives [53,54].

**Figure 3** The role of KM within the balance scorecard.



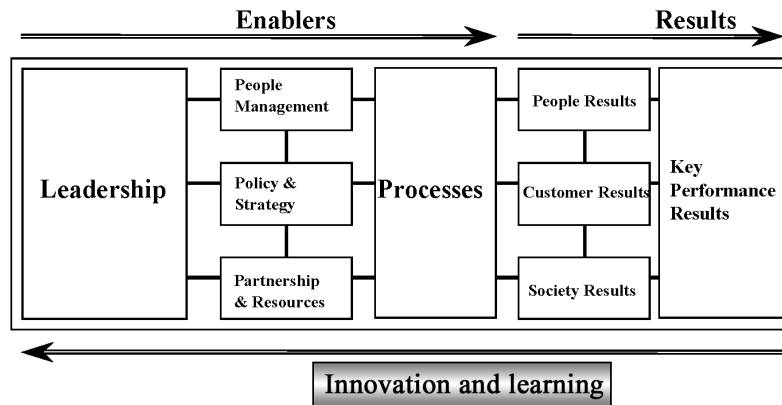
This interpretation shows the role and the link of KM initiatives with financial results. Through the development of intellectual capital, KM sustains the dynamics of organisational learning and improvements of performances in organisational processes.

### 3.2 *The business excellence model*

Also, the Business Excellence Model identifies a perspective that addresses the intangible resources of a company. The Business Excellence Model is a non-prescriptive self-assessment framework based on nine criteria. Five criteria are defined as ‘enablers’ (i.e. leadership, people management, policy and strategy, resources, processes) and four are defined as ‘results’ (i.e. people satisfaction, customers’ satisfaction, impact on society, business results) (see Figure 4). The enablers concern what an organisation does; the results concern what an organisation achieves. Results are caused by enablers. In fact, the enablers are the levers that management can pull to deliver future results.

The enablers and results allow monitoring an organisation’s progress toward sustainable excellence. The elements with a double role of cause-effect are the subject of a periodical evaluation which is developed according to the RADAR logic (Results, Approach, Deployment, Assessment, Review). This logic supports the model and according to the cyclic scheme, connects the delivery of requested results to the planning and development of approaches as well as to the valuation and review of the same approaches and their employment.

**Figure 4** The role of KM within the business excellence model

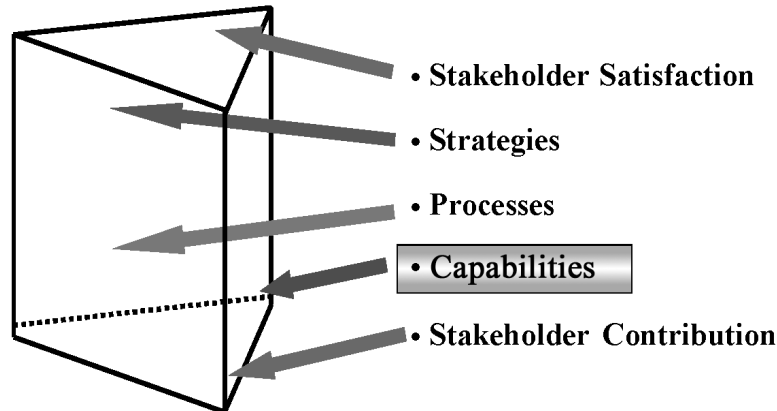


The model explicitly acknowledges the importance of cognitive resource to improve business performance. One of the concepts at the basis of the model is ‘continuous learning, innovation and improvement’. It assumes that organisational performance is optimised through KM in accordance with a culture of continuous learning, innovation and improvement [55]. Therefore, KM is identified as a fundamental driver for the improvement of enablers, which determines the business results [55].

### 3.3 The performance prism

A more recent PM framework is the performance prism [56], which addresses intellectual capital and their management in the ‘capabilities facet’. The performance prism is a three-dimensional performance measurement framework that consists of five interrelated facets: stakeholder satisfaction, strategies, processes, capabilities and stakeholder contribution. Each facet represents a key factor that determines organisational success. The weight given to each facet depends on the strategic direction and the constellation of stakeholders of an organisation.

The performance prism (see Figure 5) adopts a balanced view on stakeholders as well as on their demands and desired contributions. According to the model, all initiatives and activities implemented to pursue the strategy represent enablers to improve the value delivered to the company’s stakeholders. Stakeholder satisfaction is therefore the first performance facet. The second facet is the strategy facet, which must ensure that value is delivered to the stakeholders. In the third facet the organisation specifies the processes in order to execute the strategies and in the fourth facet the capabilities that allows an organisation to perform its processes. Finally, in the fifth facet, the performance prism addresses whether the organisation gets what it requires from its stakeholders (Stakeholder Contribution). The performance prism highlights that on the one side, stakeholders represent the reference point for value creation, and on the other side, the necessary actors for the functioning of an organisation. Unlike the Balance Scorecard and the Business Excellence Model, which focus attention on the role of learning processes and, more generally, on the management of intellectual capital, the performance prism highlights the importance of capabilities. It adopts a competence-based view of an organisation. In other words, the ability of a company to generate a value is based on organisational capabilities.

**Figure 5** The role of capabilities within the performance prism

The above discussion of the three performance measurement and management models show that, even though no model mentions KM explicitly, all identify it implicitly as a fundamental element of business performance. Moreover, the interpretation of performance improvement, which emerges from the analysis of the models, can be understood as a continuous effort of generating value for the stakeholders of an organisation. This moves the focus from shareholders and customers to all the key actors of the system in which a company operates. This links organisational performance with the concept of stakeholder value generation.

The analysis of the PM literature allows us to formulate more basic assumptions. One assumption is about the role of organisational capabilities in the execution of organisational processes. All models, more or less explicit, highlight that organisational competencies and knowledge are at the basis of any processes.

**Assumption 2:** The effectiveness and efficiency of organisational processes depend on organisational competencies.

Taking into account the results of the findings from the literature and the models above enables us to state that the improvement of business performance is closely related to the management of organisational processes. Therefore, it is possible to formulate the following third assumption:

**Assumption 3:** Improvements in business performance depend on effective and efficient processes.

After all, adopting a value-based view, which identifies the company's performance as the value generated by the organisation, makes it possible to formulate a further assumption.

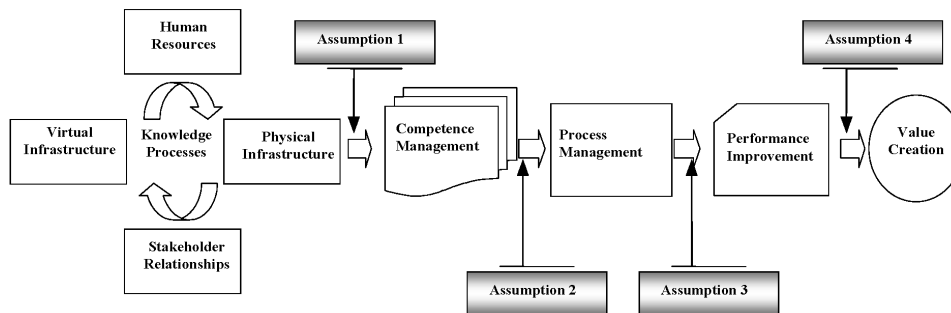
**Assumption 4:** Improvements in business performance equates with an increase in value generated for organisational stakeholders.

Drawing on the insights gained from the analysis of the literature, it is now possible to create the theoretical link between KM and business performance. The next section will summarise this and will present the knowledge value chain as a model linking KM with business performance.

### 3.4 The knowledge value chain

The research presented in this paper allows us to draw the following conclusions. Improvements in business performance equals an increase in value generated for the key stakeholders of an organisation (Assumption 4). The generated value is the result of an organisation's ability to manage its business processes (Assumption 3). The effectiveness and efficiency of performing organisational processes are based on organisational competencies (Assumption 2). KM enables an organisation to grow and develop organisational competencies (Assumption 1). Therefore, the cognitive nature of organisational competencies allows us to state that their improvement takes place through KM and that KM is at the heart of business performance improvement and value creation. All formulated assumptions derive from theory and allow us to define a descriptive model – the knowledge value chain – that provides an interpretative picture of the links between KM and value creation (see Figure 6).

**Figure 6** The knowledge value chain



## 4 Final remarks

Although it is widely recognised that KM plays a central role in sustaining a company's competitiveness, the modalities and impact of KM implementations on business performance still remains a complex issue that requires further investigations [59,60]. This paper aimed to address this gap by reflecting upon the existing management literature in the fields of KM and PM. The analysis of this literature allowed us to deduce four theoretical assumptions, which form the basis of a theoretical framework, which illustrates a possible understanding of the relationship between KM initiatives and business performance. We believe that this theoretical framework offers the basis for empirical research aimed at validating and testing the theory. Furthermore, the knowledge value chain represents the conceptual basis for the development of a more prescriptive model for the definition and the implementation of KM projects oriented to improve the value-generating capability of a company.

We believe that this topic will capture increasing research attention in the future and more organisations will interpret KM initiatives as strategic levers to improve their business performance. This demands that KM initiatives are strategically driven and therefore should start with the definition of the critical knowledge assets that have to be developed. Knowledge assets underlie organisational capabilities, which are necessary to perform critical business processes. We hope that this paper will be the foundation for

more research to disentangle the complexities in the relationship between KM and business performance.

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