Evaluating Knowledge Management Performance

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Abstract: As organisations become increasingly aware that knowledge is among their most valuable strategic assets, they will be forced to re-evaluate the way in which they engage with the source of that knowledge to underpin their sustainable development. This will create a fundamental change to established practice; a change that results in a paradigm shift from the traditional operational approach to a more strategic involvement in knowledge management. This change is promoted by the knowledge management maturity model (KM^3). KM^3 is founded on the idea that successful knowledge management comprises four forms of integration, namely cultural, organisational, procedural and methodical. Despite an emphasis on one of these forms by many organisations, it is understood that all forms of KM integration should be considered in parallel to implement knowledge management practices in an *integrative* manner. Key indicators that measure the performance of knowledge management integration are needed. They need to measure both effectiveness and efficiency. In many cases, organisations having, and actively executing, a knowledge management strategy tend to focus on the efficiency dimension because it can be evaluated more easily than the effectiveness dimension. Yet this path is fraught with danger because, as with many other aspects of business, the management of knowledge has to be effective before it may provide efficiency gains. Nevertheless, organisations require appropriate forms of measurement. Those that are unwilling, or unable, to develop effective measuring and reporting systems are likely to suffer from product or service quality decreases, lower productivity growth and a reduced ability to compete because they will be less successful in acquiring and using relevant knowledge resources. Key performance indicators that are developed to assess the progress of organisations in this compelling activity need to be aligned with one or another of the four forms of integration and may be either qualitative or quantitative in nature. The balanced scorecard concept is used to measure performance of the KM^3 where the balance between the four forms of integration is the prime consideration. Each of these is represented by one segment of the knowledge management monitor (KM^2) to facilitate a better understanding of the cause-and-effect relationships. It does so by providing structured information about an organisation's knowledge resources: how they are nurtured and how they contribute to organisational sustainability. At the same time, use of KM^2 is related to organisational economy. Good economy means good resource management, which for many organisations translates to how they manage individual and accumulated organisational knowledge. This has become so important that they are looking for a more integrated way of managing the three interdependent and complementary pillars of knowledge management, which are organisational learning management, organisational knowledge management and intellectual capital management. Although these three concepts lack a unifying vision, they all relate to each other by informing one another and provide the pathway for a knowledge-based orientation of strategic management.

Keywords: strategic knowledge management, performance measurement, integrative approach

1. Introduction

Since Handy (1996) suggested that managing the knowledge and skills of its employees was a key organisational challenge, each of the management disciplines has contributed to the concept of Knowledge Management (KM) in a rather independent way. Utilising the data collected during a field study of more than 260 participants from over 250 different organisations in various industries in the German speaking region of Europe (Minonne 2008), Turner and Minonne (2009) investigated the lack of a general *integrative*, or synchronised, approach to measuring the effects of KM practices as a foundation for effective corporate strategy development and management decision making. In a further development of that work, this paper considers how it may be possible to measure the performance of KM integration. Using deductive reasoning to argue its practical rationality, a framework is developed that organisations may experiment with to better understand the effectiveness of their *integrative* approach to KM. This has become so important because organisations are looking for a more integrated way of managing the three interdependent and complementary pillars of KM, which are Organisational Learning Management (OLM), Organisational Knowledge Management (OKM) and Intellectual Capital Management (ICM). To this day, these three concepts lack a unifying vision, even though they all relate to each other by informing one another (see this concept displayed in Figure 1) and collectively they provide the pathway for an *integrative* knowledge-based orientation of strategic management.

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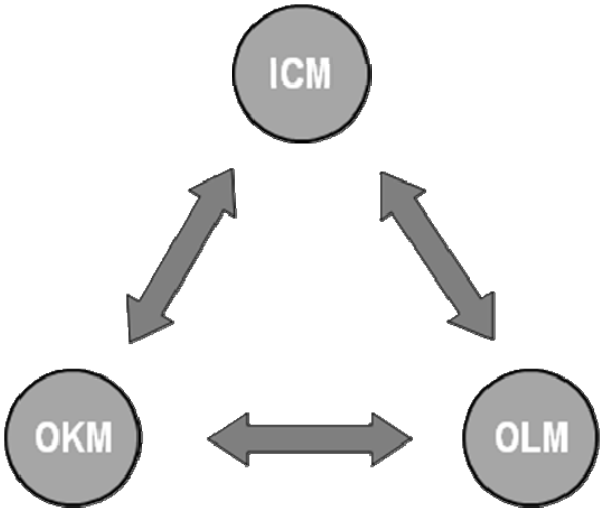

Figure 1: Interrelationship of the three pillars of KM: ICM, OKM, and OLM

The extent to which an *integrative* approach helps an organisation more effectively manage its knowledge assets was examined in depth by Minonne (2008) resulting in the identification of four complementary forms of integration. These are *cultural integration*, *organisational integration*, *methodical integration* and *procedural integration* and they are the conduits of an assessable KM strategy as depicted in Figure 2. Despite an emphasis on one or other particular form of integration by many of the field study's respondents, it is evident that each of the four forms of integration need to be considered in parallel if organisations want to implement KM practices in an *integrative* way.

Cultural integration allows KM to become an integral part of the overall organisational culture. It systematically encourages the exchange of organisational knowledge and its application contributes to high esteem within an organisation. Some common practices in this field are after action reviews, job rotation and communities of practice.

Methodical integration attempts to integrate human and system oriented KM practices into knowledge intensive work processes in such a way as to positively influence organisational performance in terms of quality, productivity, and innovation gains. Some common practices in this field are: skills inventories, mentoring and document management.

Procedural integration aims to integrate KM into business processes throughout the organisations' value chain so that it becomes an integral part of the intra- and inter-organisational work-flows. The aim of such practices typically lies in the implementation of continuous business processes, in the reduction of processing time, and the avoidance of work redundancy.

Organisational integration endeavours to integrate KM into the organisational structure and facilitate dedicated management of the organisational knowledge base. Some common approaches applied in this field are the centralisation, decentralisation, and responsibility (for example revenue, cost, profit, investment) centres.

The study identified several obstacles facing organisations that wish to pursue an *integrative* and assessable KM strategy. One is the apparent difficulty, the root of which is the pursuit of system oriented practices ahead of human oriented practices, in establishing a KM culture. This results in a leaning towards efficiency rather than effectiveness oriented approaches, which should be the first consideration. However, some alignment between both orientations is preferable and there are models available to assist in that regard (see, for example, EIDA in Minonne 2007). Another is an inability to derive pertinent KM targets from overall corporate strategy. A superior appreciation of the four forms of integration should help to resolve this obstacle by establishing appropriate measurable targets that inform strategic direction. Finally, there is the obstacle of performance measurement. In some ways this derives from an inability to set appropriate targets but also arises from an inability to determine appropriate quantitative, preferably, or qualitative key performance indicators (KPIs).

With a greater awareness of the four forms of KM integration allied to the managing and leveraging of human oriented and system oriented KM practices and an appreciation of the optimum proportion of

each, organisations should be better placed to create a performance measurement system that accounts for the *integrative* management of an organisation's knowledge assets. Fundamentally, KPIs that measure *effectiveness* and *efficiency* of an organisation's KM initiatives in each of the four forms of integration are required.

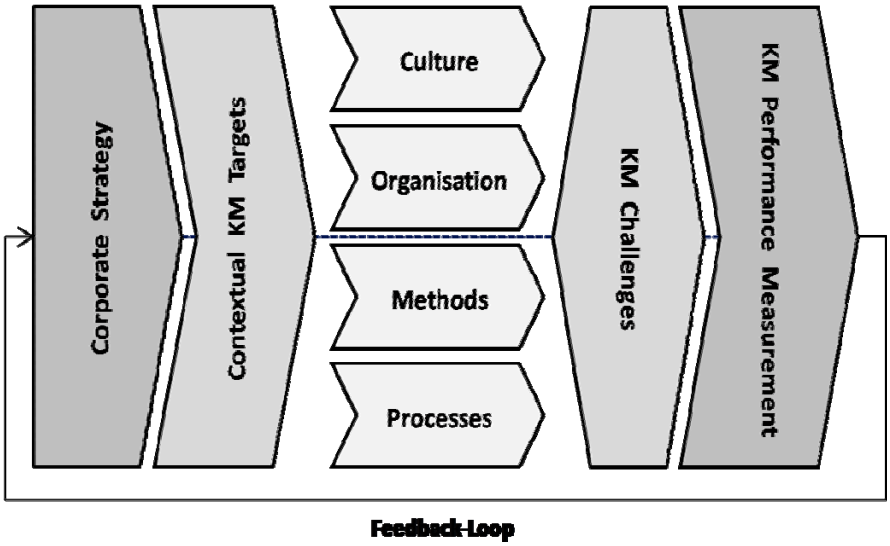

Figure 2: Integrative approach to knowledge management adapted from Minonne (2008)

At present it appears that organisations having a KM strategy and actively managing their organisational knowledge focus, as a first priority, on the efficiency dimension because it can be operationalised more easily than the effectiveness dimension (Turner and Minonne 2009). They go on to suggest that an effective measurement system to assess the effects of organisational KM practices, which includes critical success factors, a mix of financial and non-financial data, and a balance between the four forms of integration is essential.

At all times, effective performance measures have to be congruent with an organisation's strategic objectives as well as easily understood by all employees and should promote intended behaviour within the organisation. However, there is no unique solution to this problem. Uniqueness only arises in the need to have an assessable strategy and this doesn't appear in an instant. Its development is progressive and represents a fundamental paradigm shift from the traditional operational approach to a more strategic involvement in KM. This is supported by the concepts embedded in the Knowledge Management Maturity Model (KM^3). KM^3 is founded on the idea that successful KM requires a recipe comprising different, yet balanced, proportions of the four forms of integration (i.e., cultural, organisational, procedural and methodical).

An appreciation of the progression embedded in KM^3 facilitates the development of the Knowledge Management Monitor (KM^2), which is the objective of this research. KM^2 utilises the underlying principles of Kaplan and Norton's (1996) balanced scorecard concept (BSC). Their model is built on the understanding that cause and effect leads to strategic success. This *cause and effect* hypothesis is fundamental to understanding the metrics that the BSC prescribes and so it is with KM^2, which promotes an understanding of cause and effect linking the four forms of integration. This is considered essential in the effective measurement of KM performance. It will do so by providing structured information about an organisation's knowledge resources: how they are valued, how they are nurtured and how they contribute to organisational sustainability.

2. Assessing knowledge management maturity – the KM^3 Model

The degree of progression in the development and implementation of a KM strategy may be simply explained with a two-dimensional model (see Figure 3). One axis is used to ascertain the *level of implementation* and the other to pinpoint the degree to which implementation is managed, in other words the *level of control*. The question that arises is, which is dependent on the other, that is, which should be shown on the y-axis and which on the x-axis of a graphical presentation. Is the level of implementation dependent on the degree of management or is it the other way around? Which leads and which follows?

Modern day strategic planning should be an exercise in interpolation rather than extrapolation. This means that organisations start with an image of what they want to look like in the future, highlighted in their vision statement. Then they decide on the changes required to develop that image from their current state for inclusion in their mission statement. If this process takes a static view of the future then the level of implementation is decided first and the control system put in place afterwards to identify actual deviations from plans, the causes of the deviations and the appropriate actions to remedy the situation. Thus this type of control system is dependent on the level of implementation.

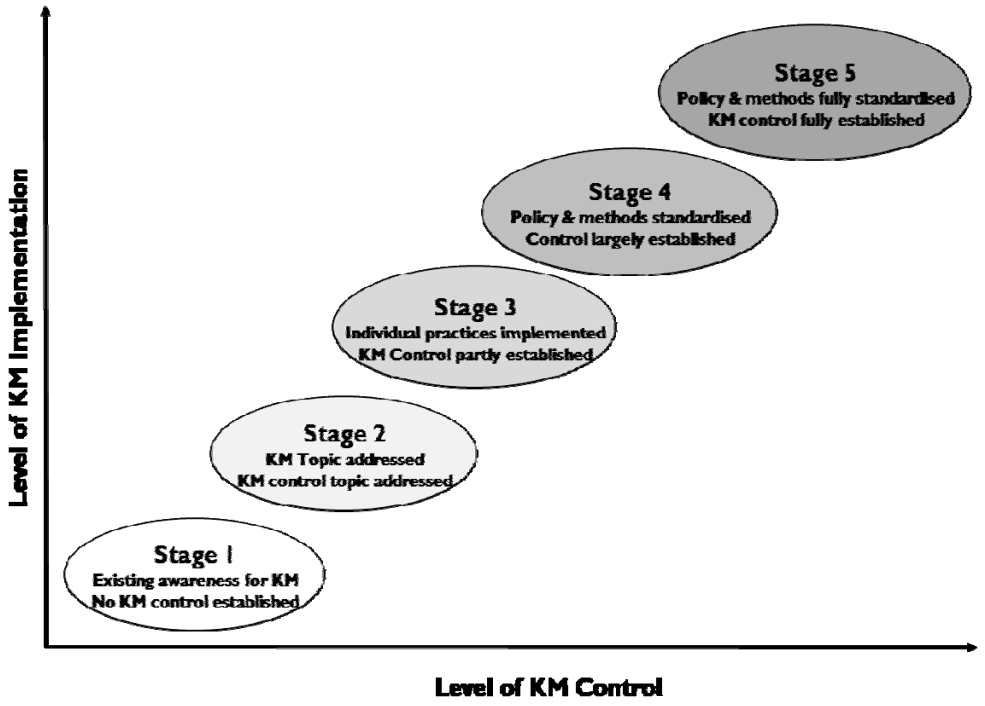

Figure 3: The Knowledge Management maturity model (KM^3)

On the other hand, and this is the perspective we choose to take, the image of the future is constantly changing, like the scenery along the road being travelled, and this requires an altogether different view of the control system. The tracking and checking-up characteristics of the control system remain but, rather than being concerned with what has already happened, they look forward by continually tracking how the future is changing. In much the same way as a global positioning system, the control system is updated frequently to correspond to the shifting reality. As such, the level of implementation is dependent, thereby occupying the y-axis, on the information provided by the control system, which will be reported on the x-axis.

The control system for the effective implementation of KM strategy needs to measure current performance and guide the organisation toward its changing image of the future. To do this effectively a system should include four compulsory elements before control may be fully established. These elements are a predetermined set of targets, a means of measuring current activity, a means of comparing current activity with each target, and a means of correcting deviations from the targets. These targets may be scientifically calculated or set arbitrarily using reasonable or totally unreasonable expectations, good or bad. The control system merely provides a means by which activity is directed toward their achievement. In general, the predetermined criteria should be stated explicitly and for this reason quantitative statements are preferred although not absolutely necessary.

In developing a way to assess the level of maturity in implementing a KM strategy, the control sphere is observed over five stages ranging from *no control established* to *full control established* as depicted in Figure 3. In the very early stages, when no control has been established, an organisation would only have an image of the future with no real way of tracking its path in that direction. As an organisation's KM strategy takes on a more formidable look and character, the degree of control improves up to the point where quantitative metrics of *effectiveness* and *efficiency* have been established to guide the organisation towards its ever-changing image of the future. A summary of the expectations in each of the five stages of the control system are shown in Table 1.

In a similar fashion, Table 1 provides an idea of what might be achieved at each stage of the implementation of an *integrative* KM strategy. A more comprehensive explanation of each of the stages in the process of KM implementation is provided in the following paragraphs.

Table 1: Stages of implementation and control maturity

Level of implementation	Maturity Stage	Level of Control
The basics of KM and the difference between it and information management are understood by some within the organisation. The potential benefits and the use of KM have been discussed in some functional areas.	1	No KPIs other than perhaps some qualitative assessment of efficiency in managing knowledge assets.
An intermediate level of *cultural* integration has been achieved. *Organisational* integration remains at a low level and no meaningful *methodical* and *procedural* integration are yet established.	2	A few qualitative metrics developed to control efficiency in guiding the implementation of KM strategy towards the future.
An advanced level of *cultural* integration and an intermediate level of *organisational* integration have been achieved. Only a low level of *methodical* integration is in place and no meaningful *procedural* integration is yet established.	3	Mainly qualitative, but some quantitative KPIs developed to monitor efficiency and some qualitative KPIs to assess effectiveness in the implementation of KM strategy.
An advanced level of *cultural* and *organisational* integration as well as an intermediate level of *methodical* and *procedural* integration has been achieved.	4	Qualitative and quantitative KPIs in place to monitor the implementation of an effective and efficient KM strategy to take the organisation in the direction of its perceived future image.
An advanced level of all forms, *cultural, organisational*, *methodical* and *procedural*, integration has been achieved. The organisation has reached world class status.	5	KPIs, both quantitative and qualitative, in place to measure changes in the image of the future and frequent reassessment of KM strategy to reflect changes in that image

- *Stage 1*: The basics of KM and the difference between it and information management are understood by some within the organisation. The potential benefits and the use of KM have been discussed in some functional areas.

- *Stage 2*: An executive responsible for the KM program has been named. A virtual team of supporters from across the organisation has been established and an appropriate KM model has been chosen. Knowledge *exploration* ("E" of EIDA, see Minonne 2007) is supported and actively promoted with the aim of identifying appropriate KM practices that enhance *effectiveness*. Furthermore, a structured exploration of the organisation's existing knowledge-base is undertaken with an expectation that additional meaningful and valuable knowledge assets would be uncovered.

- *Stage 3*: Appropriate personnel and monetary resources are made available for current activities and firmly committed for future developments in KM. Knowledge *innovation* ("I" of EIDA, see Minonne 2007) is supported and actively promoted. This fosters increasing *effectiveness* by leading to new ideas, combinations or new applications and thus puts in place a foundation for the development of new products or services.

- *Stage 4*: KM is now an integral part of an organisation's business processes. Knowledge *dissemination* ("D" of EIDA, see Minonne 2007) is supported and actively promoted. This should enhance *efficiency* by focusing on the structured disposition of knowledge assets. Although information systems may be used to achieve a high degree of efficiency in disseminating particular knowledge assets throughout the organisation, human beings play the more important role when it comes to transforming explicit knowledge (meaning information) into implicit

knowledge. However, the main outcome of this phase is to achieve economies of scale in the context of knowledge application.

- *Stage 5*: KM is now an integral part of an organisation's strategy development and execution. Here, a regular and thorough analysis of the first three processes presented in the EIDA model (Minonne 2007) is undertaken to identify potential ways of improving efficiency when either *exploring*, *creating (innovation)* or *disseminating* knowledge assets. Knowledge *automation* ("A" of EIDA, see Minonne 2007), by making use of both system and efficiency oriented channels, is a key outcome of this process leading to economies of scale in the application of knowledge while at the same time fostering improvements in both *efficiency* and *effectiveness* in the management of knowledge assets.

It is now possible, after a detailed examination of the existing KM situation in an organisation, to understand the current degree of maturity in implementing an *integrative* KM strategy. With this position firmly established, an organisation should be able to introduce new and/or improved initiatives that will take them to the fifth and final stage of KM maturity understanding, of course, that the level of KM implementation is dependent on the progress made in the development of the control system. Unless suitable ways and means are found to track and check-up on the development and implementation of an appropriate strategy it will be hard to move forward with any confidence.

3. Criteria for knowledge management performance measures

Organisations are becoming increasingly dependent on knowledge and it has become a fundamental ingredient of what organisations make, do, buy and sell (Stewart, 1997). In every way, the foundation of strategic success relies on the effective management of an organisation's knowledge assets and for this to be successful there needs to be an effective way of assessing performance (Turner and Jackson-Cox, 2002). KM and particularly its performance measurement dimension has become the most important economic task for most organisations. For management accountants, the elevation in importance of knowledge has raised the thorny issue of how to account for its management. They need to establish a set of KPIs that assess their organisation's performance in implementing an *integrative* KM strategy. In doing so, they should resist the temptation to focus only on what is easily measurable, which generally is the *efficiency* dimension of activities and costs (Pfeffer, 1997). Rather, they should focus on measuring outcomes that meet real organisational needs such as innovation, technological development and employee attitudes, experience, learning, tenure and turnover, which are more likely to represent KM *effectiveness* rather than efficiency. While numerous performance indicators may be developed, each is only useful if it allows management to evaluate ongoing performance. As such, it is considered necessary that senior managers who have a comprehensive picture of the organisation's vision and priorities are involved in developing KPIs.

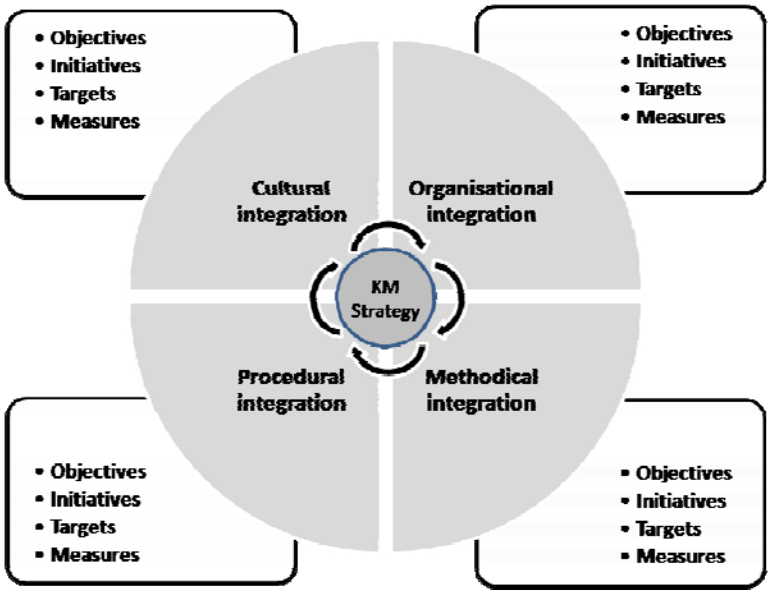

Figure 4: The Knowledge Management monitor (KM^2)

Every KPI, whether it is used to simply clarify the current position, guide the implementation of KM strategy, check the effectiveness of KM strategy or track changes in the image of the future, will affect

actions and decisions. Choosing the right KPIs is critical to success but the road to good indicators is littered with pitfalls. Many seem right and are easy to measure but have subtle, counterproductive consequences. Others are more difficult to measure but focus the organisation on those decisions and actions that are critical to success. In this setting, the task at hand is to consider ways of assessing performance in each of the four forms of integration, which are *cultural*, *organisational*, *methodical* and *procedural integration* in a way that will enable an organisation to assess its KM^3 position. KPIs used to assess the progress of organisations in this compelling strategic activity of *integrative* KM need to be aligned with one or another of these forms of integration. With all of this in mind, work begins on the development of a prospective control framework, the KM^2.

4. Monitoring Knowledge Management progress – the KM2 framework

The control framework that is developed as part of this research and presented in this paper supports the positive progression by organisations through the five stages of KM^3. Yet with all control frameworks, or measurement systems, measuring social phenomena is fraught with difficulty, if not impossible. All measurement systems rely on proxies, such as monetary units or other indicators that often bear little resemblance to the actual events being reported.

Even so, Arora (2002) suggests that organisations can effectively implement KM by developing and applying a KM index based on the BSC. This index is a single number that incorporates key parameters for assessing KM performance in each of the business process, customers, learning and growth, and financial perspectives of the BSC. Each parameter is weighted according to its importance in achieving the organisation's KM strategy and as such the basis of the index will change as often as the KM strategy changes. Nevertheless, it represents a balanced consideration of the impact of KM, which is a similar view to that we have taken in the development of KM^2. The key difference is that Arora's index reflects the progress of KM across the four perspectives of the BSC whereas KM^2, depicted in Figure 4, has its focus on the four forms of integration discussed earlier.

The first task in building a working model based on the KM^2 framework is to define strategic objectives, establish initiatives and construct targets across the four forms of integration. Then, to monitor and measure it is necessary to develop metrics for performance against each of the targets. These will become the KPIs on which the effective implementation of an *integrative* KM strategy will progress.

To start we need some model strategic objectives, initiatives and targets around which KPIs can be developed. These, which have no direct organisational origin and are simply based on the authors' wide business experience, are provided in Table 2. Using this information a set of KPIs to identify the cause and effect of implementing a KM strategy are developed. The measures developed for our working KM^2 model may be either *qualitative* or *quantitative*. Qualitative measures are typically judgement based and are often used when the item to be measured or the attribute of interest does not lend itself to precise or quantifiable measurement. Indeed, they provide a sense of what *is* happening in the sense of the direction, rather than the speed, of change. Quantitative measures are usually integer-based and there are two further divisions: *financial* and *non-financial*.

Table 3 provides some example KPIs for each of the proposed KM targets included in Table 2. They represent a cross-section of qualitative and quantitative measures and financial and non-financial measures. Finally, KM^2 was unintended to promote an understanding of cause and effect linking the four forms of integration, which has been achieved to a large extent with the example KPIs put forward.

5. Conclusions and recommendations

The frameworks proposed in this paper, first KM^3 and then KM^2, join a list of more than 30 other models for measuring intellectual capital that have been developed since the 1970s (Sveiby, 2007). Their purposes have been many and varied yet few have found favour to any great extent among organisations. Some of these models are broader and some more narrow than KM^2, which provides a more integrated way of managing the three interdependent and complementary pillars, that is OLM, OKM and ICM, of KM.

Table 2: Selected objectives, initiatives and targets

	OBJECTIVES	INITIATIVES	TARGETS
CULTURE	KM is an integral part of the organisational culture	Conduct community building by establishing communities of practice (CoP)	Active CoP within each business function and cross-functional CoPs at points of interaction
	KM enables collaboration between experienced and inexperienced personnel	Establish a godparent scheme	All employees with less than five years service to have an experienced godparent
	KM encourages and facilitates the exchange of organisational knowledge	Create an organisation-wide job-rotation scheme	An employee internal job rotation frequency of 2 years
ORGANISATION	KM defines the organisational structure	Create a process-oriented organisational structure throughout the value-chain	Process-oriented organisation structure established and implemented in three years
	KM supports inter-departmental collaboration	Create a KM team comprised of representatives from each business function	Year-on-year increase in employee satisfaction with inter-departmental collaboration
	KM supports the collaboration between employees and managers	Redefine job specifications to diminish managerial hierarchy and cultivate a team ethos within business functions	Year-on-year increase in employee perception of managerial collaboration
METHODS	KM practices are integrated into knowledge-intensive work processes	Create knowledge maps of the organisation to clarify the knowledge-intensive business processes and support them with appropriate KM methods	Annually, identify at least five new KM initiatives that enhance the organisation's knowledge assets
	KM supports the integrative (synchronised) approach to managing implicit and explicit knowledge assets	Identify and synchronise initiatives related to the management of knowledge as well as those related to the management of information	Year-on-year increase in the number of synchronised activities
	KM supports the exploration, innovation, dissemination and automation of knowledge	Create and execute a KM strategy using an integrated model such as EIDA	Year-on-year increase in the stock of knowledge assets
PROCESSES	KM supports the establishment of continuous business processes	Codify the organisation's key process models, analyse their connecting interfaces and optimise knowledge and information exchange through these interfaces	Year-on-year increase in the number of implemented value adding continuous business processes
	KM supports the reduction of work processing time	Conduct an audit of the speed of business processes and initiate appropriate KM practices to make them faster	Year-on-year improvement in the speed of business processes
	KM supports the avoidance of work redundancy	Identify redundant work activities and eliminate them by applying useful KM practices	Elimination of 40% of redundant work activities within five years

Table 3: Indicative key performance indicators

	TARGETS	KPI	LEVEL OF CONTROL
CULTURE	Active CoP within each business function and cross-functional CoPs at points of interaction	Number of CoPs actively producing new KM initiatives at a functional or cross-functional level	1
	All employees with less than five years service to have an experienced godparent	Percentage of employees with less than five years service who have a godparent and percentage of experienced employees who act as a godparent	2
	An employee internal job rotation frequency of 2 years	Percentage of employees engaged in a planned two year job rotation scheme	3
ORGANISATION	Process-oriented organisation structure established and implemented in three years	Percentage of required changes satisfactorily implemented	2
	Year-on-year increase in employee satisfaction with inter-departmental collaboration	Continuously updated on-line employee satisfaction survey, based on a Likert scale, producing an average satisfaction rating	2
	Year-on-year increase in employee perception of managerial collaboration	Continuously updated on-line employee satisfaction survey, based on a Likert scale, producing an average perception rating	3
METHODS	Annually, identify at least five new KM initiatives that enhance the organisation's knowledge assets	Maintain a register of new KM initiatives implemented identifying the projected and actual present value of the initiative	3
	Year-on-year increase in the number of synchronised activities	Maintain a register of new synchronised activities implemented identifying the projected and actual present value of each activity	4
	Year-on-year increase in the stock of knowledge assets	The average, weighted according to organisational significance, of the percentage change in average employee service, average level of education, value-added by KM initiatives and return on investment in information systems	5
PROCESSES	Year-on-year increase in the number of implemented value adding continuous business processes	Maintain a register of new value adding continuous business practices implemented identifying the projected and actual present value of each initiative	4
	Year-on-year improvement in the speed of business processes	Year-on-year change in processing time for a basket of organisational transactions	4
	Elimination of 40% of redundant work activities within five years	Cumulative percentage of identified redundant work practices successfully eliminated	5

Furthermore, over many years, authors have proffered a variety of suggestions about the development of suitable KPIs for the management of knowledge assets (see, for example, Arora 2002, Edvinsson and Malone 1997, Fitz-Enz 1995, Lev 2001, Neely 2002, Sveiby 1997 and Turner

1996) but they have often been focused on the operational, rather than the strategic, aspects of KM. In the frameworks proposed in this paper, which are yet to be tested in practice, the focus is on forward-looking strategic aspects that are embedded in the vision, which provides the standard against which KM is measured.

The road ahead is winding, with many hazards. Further investigation is needed on two aspects. First, we need to have a more comprehensive understanding of the extent of strategic and operational KM in organisational life and how that is managed. Second, we need to investigate why the models developed through research and application are, in the main, rejected by management.

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