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Integrative visualisation and knowledge-enabled value creation

An activity-based approach to intellectual capital

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Abstract *Performance measurement and management in firms where knowledge is the central strategic resource provide composite challenges. Not only are the knowledge resources tacit, collective, complex, deeply rooted in culture and hard to imitate and transfer, but the processes of value creation and their outputs are also of a more or less intangible nature. This paper is an attempt to give an alternative activity-based entrance to the field of intellectual capital and performance management. On the basis of three case studies the paper illustrates the development and utilisation of a new method for linking intellectual capital and value creation based on the three phases of modelling, measuring, and action. In parallel the concepts of resolution, elevation and conveyance are developed and explored as notions giving guidance and evaluation in the process of developing and using a measurement system for intellectual capital management.*

Introduction

Intellectual capital was introduced in the early 1990s as a concept for addressing intangibles in the light of value creation and performance (Edvinsson and Malone, 1997; Roos and Roos, 1997; Stewart, 1997; Sveiby, 1997). The concept has gained a lot of attention in the business world and among academics, and more lately policy makers on a national and international level. Today however, the term intellectual capital has little to do with capital as a monetary resource or intellectual as the ability to think abstractly, even though the term was originally used to characterise the value of the published works of the economist Kalecki (Sveiby, 1998). In the literature we find a spectrum of descriptions and definitions of intellectual capital; it is about "knowledge and knowing capability of a social collectivity" (Nahapiet and Ghoshal, 1998), "packaged useful knowledge" (Stewart, 1997), "Knowledge that can be converted into value" (Edvinsson and Sullivan, 1996) and "Intellectual capital=competence × commitment" (Ulrich, 1998). It is also common to divide intellectual capital into different categories such as human capital, structural capital and relational/customer capital due to risk and ownership of the different components. Even further decompositions can be found in the literature.

From the above we see that intellectual capital has to do with both valuable inputs, the utilisation of these inputs and outcome (value) – whether all three or just one or two – where knowledge and knowing is the enabler. Even though there is no common understanding of how intellectual capital should be described or defined among the



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authors in the field, it should not be controversial to claim that intellectual capital is about identification, mapping, visualisation and management of knowledge generative processes. Roos *et al.* (1997) for instance see intellectual capital as a link between the stream of measurement of the hidden value of the company and the management of knowledge and information.

One of the major challenges regarding intellectual capital measurements is that the most valuable knowledge resources of a firm – tacit, collective, complex, deeply rooted in culture, hard to transfer and imitate – also are the types of knowledge that are hardest to identify, let alone manage (Grant, 1991). Attempts to measure and visualize intellectual capital often fail because of the “slippery” intangibility of knowledge as well as the non-linearity, open-ended (and often loosely coupled) knowledge generative processes and their intangible outcomes. In this paper we present an attempt to traverse this challenge through visualisation of value creating activities. Thus turning the focus on knowledge from something one has to something one does.

This paper hopes to make a contribution to the intellectual capital research field by explicitly exploring parts of the gap in understanding the complex dynamics of how explicit and tacit resources are mobilised into practical, everyday organisational activities, and how these activities can be visualised in a way that in turn, give guidance to collectively improved performance. We discuss concrete business examples, exposing the development and utilisation of our end product, “Value+TM” – an activity based approach to intellectual capital. The paper rests on an epistemology of “complex dynamics of action” (Juarrero, 1999). The main points here are is that:

- the “billiard-ball” or “collision-like” mechanistic understanding of causation is inadequate in theories of action and organizational interaction; and
- the logical behaviouristic view of explanation as deduction (an explanatory framework in most organisational theory) is in the face of complexity wrong.

Organisational activities and processes viewed as complex adaptive systems are characterised by different types of cause and explanation:

... positive feedback processes in which the product of the process is necessary for the process itself ... this circular type of causality is a form of self-cause (Juarrero, 1999, p. 3).

Further, when different agents interact to produce distributed wholes, which in turn affect the behaviour of the agents, there are forms of inter-level causality at work. Interactions produce emergent properties not decomposable to the sum of the parts constituting the emergent level. This inter-level causality can, to a large extent, be ascribed to the operations of context-sensitive constraints that synchronize and correlate previously independent parts in emergent wholes. Context-sensitive constraints embody catalysts, feedback loops, biological resonance and entrainment (Juarrero, 1999).

The research questions are thus, given the complexity of organisational everyday activities; how could the dynamics of this social life be framed, “captured” and conveyed in a meaningful and useful way, giving guidance and direction for shared understanding and more or less collective action? What are the criteria that a measure and management system must be based on and accomplish, and further be judged on behalf of? In this paper we develop and explore the concepts of resolution (rather than flatland modelling), elevation (rather than conventional aggregation) and contextual

conveyance (rather than the “mirror of nature” modernistic paradigm of representation). The focus is on the characteristics and features of measurement models as such, and not so much on variations in situations of use.

The research presented in this paper is part of a considerably larger Norwegian action research programme on knowledge and value-creation (Knowation), which ran from 2000 to 2003, involving seven firms in a co-development and action-oriented mode of research. The programme built on earlier results of measuring and managing intellectual capital, strategic management and “knowledge on knowledge”. The Knowation project addressed the interface of value creation and knowledge, and the visualization and management of it. Our empirical base for this paper is three small to medium-sized Norwegian companies from different sectors and we will present and explore their process and experiences of developing a new process-focused intellectual capital model. Our methodological background is co-generative learning (Greenwood and Levin, 1998), a Scandinavian tradition of co-creation rooted in action research. The project team[1] have followed, discussed and participated in workshops over the three-year development process of Value+, from the testing of the first “traditional” intellectual capital model, via the initial ideas for a new model up to and including today’s version of the model.

Intellectual capital modelling

The Value+ method is mainly inspired from the literature on intellectual capital (e.g. Edvinsson and Malone, 1997; Stewart, 1997), resource-based view of the firm (Wernerfelt, 1984; Peteraf, 1993; Barney, 1991) and knowledge-based view of the firm (Spender, 1996; von Krogh *et al.*, 1994; Grant, 1996). Resource-based theory takes as its point of departure that firms can be viewed as a bundle of resources heterogeneously distributed across firms where resource differences persist over time. On the basis of this resource base firms develop sustainable competitive advantage. Several authors (e.g. Drucker, 1993; Grant, 1996) suggest that knowledge has the characteristics of being a strategic resource or even the strategic asset. It has, however, been argued that the field has some shortcomings in the way that it focuses on intangibles not easily observed and hence does not explain properly how resources are mobilised into activities and create competitive advantage. Teece *et al.* (1997) made a contribution to this debate by introducing the concept of dynamic capabilities focusing on the organisational processes underlying how critical resources are taken into account. More recent contributions (e.g. Eisenhardt and Martin, 2000) argue that dynamic capabilities should be conceptualised as identifiable routines and activities. From a process perspective it could therefore be argued that competitive advantage arises from valuable resources that are mobilised into activities and value creation. However, practical experiences from our project with the relatively abstract theoretical accounts indicate that a proper operationalisation of the insights into concepts, methods and tools should take a different point of departure than resources. We therefore suggest an alternative approach starting with activities and from there its connections to resources and value creation. Even though activities are key we will as the main unit of analysis, introduce the concept of knowledge generative processes denoting ensembles of value creating activities as this raises the analytical level to a meso level where issues like characteristics, connections, interactions and contexts of the value creating environment can be addressed in a productive way.

Enabling processes and value creation prerequisite an overall value creation logic. According to Stabell and Fjeldstad (1998) there are three distinct generic value configuration models:

- (1) the value chain;
- (2) the value shop; and
- (3) the value network.

For businesses where the fundamental strategic resource is knowledge, the value shop seems to be a promising candidate. In the authors' own words the value shop "models firms where value is created by mobilizing resources and activities to resolve a particular customer problem" (Stabell and Fjeldstad, 1998, p. 414), emphasising the cyclical, iterative and continuous aspects of activities. However, the value shop framework is of a generic nature and needs to be translated into a concrete business context to get a diagnosis of competitive advantage.

The existing framework and descriptions of intellectual capital used as a guide for development of measurement methods may focus too narrowly on the static "measurable" indicators and numbers, and on each individual's resources and capabilities. This can be illustrated by the following example we had access to in a preliminary phase of Knowation: a Norwegian telecom consultancy company started a project with the aim of developing a new method for measuring intellectual capital. The basic model for the project was adopted from a textbook on intellectual capital. Intellectual capital was here understood as consisting of human capital and structural capital. A sheet for scoring individual competencies, experiences, attitudes etc. on a scale from 1 to 10 was the level where the measures were obtained. The individual scores became then aggregated (mean values were calculated) for organisational units on all levels. In the end the intellectual capital score (a dimensionless number) of the company as a whole was calculated. The purpose of this process was to increase value creation through developing a tool for stimulating and combining knowledge for innovation, and increase skills to solve new tasks by making knowledge available throughout the organisation.

In this example we can see the fingerprints of the more traditional approach to intellectual capital. Alternatively, in determining how successful a measurement system is in reflecting the complex social dynamics of value creating activities, another focus needs to be brought forth and another set of questions be addressed.

As indicated above, the first main question we should ask is what is the resolution of the measurement system? How close in detailed granularity to the observed activities must the system choose, to capture enough insight to the proposed purpose, and how is this granularity obtained? From mathematical fractal theory we know Mandelbrot's famous question from 1967, "How long is the coast of Britain?". At some point you may count every stone and move around every grain of sand, and his point is of course that Britain's coast gets longer as the granularity of the measurement gets more detailed. In fact, with an infinitely small measurement scale, the coast is longer than any distance you can think of. In our company case study the measurement resolution issue questions the unit of analysis, type of data sources and how the necessary data is obtained (precision, indicators, frequency of measurements, sensitivity, etc.). Just increasing the number of indicators will not necessary increase resolution, but it might give a broader picture.

The second main question is what are the logic and processes inherent in the system for elevation of the measurement results? What is the underlying logic and intentions of the model, what perspectives, connections and contexts are the measures put into? Are there any underlying explicit explanations for the selection of categories, dimensions, decompositions, interdependencies (etc.) done, and last but not least, are the proposed intentions practical and applicable? Sveiby (2001) touches on these issues in a comparison between the intangible assets monitor (IAM) and the balanced score card (BSC). These are both tools that categorise intangibles into three areas and he stresses that indicators should be lifted from the operational to the strategic level of the firm. Further it is the strategy that must be the driver of the metrics designed and he stresses that neither IAM nor BSC are control instruments but rather tools for improving learning and dialogue. One of the main differences between IAM and BSC is that the former is a stock-flow theory while the latter is first and foremost about balancing of perspectives. All of this has to do with the logic and processes for how and why measures are obtained and what they are supposed to influence. This is all part of what we denote as elevation, but elevation goes beyond rhetoric. The practical applicability of the described elevation is one key element in what impact the measurement system will have on managerial practice.

Third, how and in what way are the framing and capturing of the measurement system conveyed, and to whom are they addressed? This could be anything from balance sheet statements and tables of numbers to illustrations, pictures, red or green "smiley face" icons and more or less richly formed stories etc. The point is not what kind of representations are used but the usefulness and relevance in relation to the inquiry, which is based on the given purpose of the measurement system. An important aspect in this sense is if the system is fixed with little degree of freedom or if the system contains flexibility enough to focus on selected issues. Systems for comparison will naturally have less degree of freedom in order to achieve its purpose than a system for internal management where there are more fluctuating agendas. Resolution, elevation and conveyance are interdependent concepts mutually influencing each other and they should not be interpreted as a linear chain of "phases" in the development of a measurement system. They are best understood and described on the basis of the proposed purpose the measurement system is meant to fulfil.

In the example above from the telecom consultancy company we see that the resolution is rather limited. Even though there are a lot of indicators, the translation of rather complex phenomena into numbers gives a quite superficial view. Increasing the number of indicators might give a broader picture, but it will not increase the resolution. The picture will still be a flatland representation. In the example the process of elevation is aggregation wiping out deviations and extremes – often a good indication for where to find future potential or making initiatives for improvement. There is no explicit reasoning why the aggregation of the numbers is done and what it is good for, besides highlighting mean values. The only conveyance in this example is presentation of numbers following the aggregation on all organisational levels. From this set of numbers, managers are intended be able to decide how to improve skills for problem solving and stimulate innovation by combining knowledge. The Value+ method is an alternative approach where knowledge is perceived of in terms of activities (processes) rather than by repositories.

Development and practical use of value+

Møre og Romsdal Bedriftsutvikling AS (hereafter denoted MRB) is a small Norwegian consulting company with 18 employees operating in the field of business development, change management and human resources. MRB specialises in the maritime, fishery, travel and furniture manufacturing sectors.

MRB's interest in intellectual capital started four years ago after/during a seminar with Leif Edvinsson, one of the founders in the field of intellectual capital. Realising that this could be a new business opportunity fitting in well with their existing business, MRB decided to join the Knowation project. After a short period of testing existing methods for assessing intellectual capital, it became clear to MRB that the tested methods were all lacking in several ways. In their experience most of the tools and methods used to measure intellectual capital were developed on basis of an approach towards value creation inherited from the production of more tangible outcomes. This resulted in many attempts to categorise and "measure the measurable", without questioning whether these countable indicators are those that are most important for future value creation. Many of the testing outcomes were reports of aggregated numbers and they gave few indications on which issues should be discussed or how the results could be translated into action plans.

As a consequence MRB saw the need for developing a new tool for measuring intellectual capital focusing on concrete activities in the everyday life of organisations. On the basis of more recent theoretical contributions, as referred to above, some ideas of what one should look for emerged. The "how to" part, however, is to a large degree experimental and not suitable as a part of a "back-office" modelling process. MRB therefore decided to use themselves as a pilot scheme to make sure that they addressed relevant issues.

Phase 1: modelling

In MRB's terminology value creation is a function of resources and processes. Profitable value creation, pre-requisite accessibility to strategic resources as well as effective accomplishment of critical business processes. Value+ focuses on the dynamic aspects of value creation starting with processes and activities and how they are executed. On the basis of the process modelling, the underlying resources necessary to accomplish the activities can be mapped. The Value+ method consists of three phases: modelling, measuring and action. The model phase starts with a mapping and description of the company's critical value creating processes, the steps (or activities) in those and a description of how they are interrelated. The selection of processes and subsequently steps (or activities) are decided on and designed on the basis of discussions within a dedicated project team. In the modelling phase it is quite common to differentiate between core process(es) and support processes. The core processes are the revenue generating processes of the business. The modelling of MRB is shown in Figure 1.

The core process of MRB is the revenue generating "assignment process" where all the projects are defined, accomplished and evaluated. The surrounding processes; "Learning and development process", i.e. the process of developing new concepts and map experiences, "Consultant development process", i.e. the process of individual consultant development, "Customer relations process" and "Network process", i.e. the processes of defining and handling customers and partners, are all influencing the

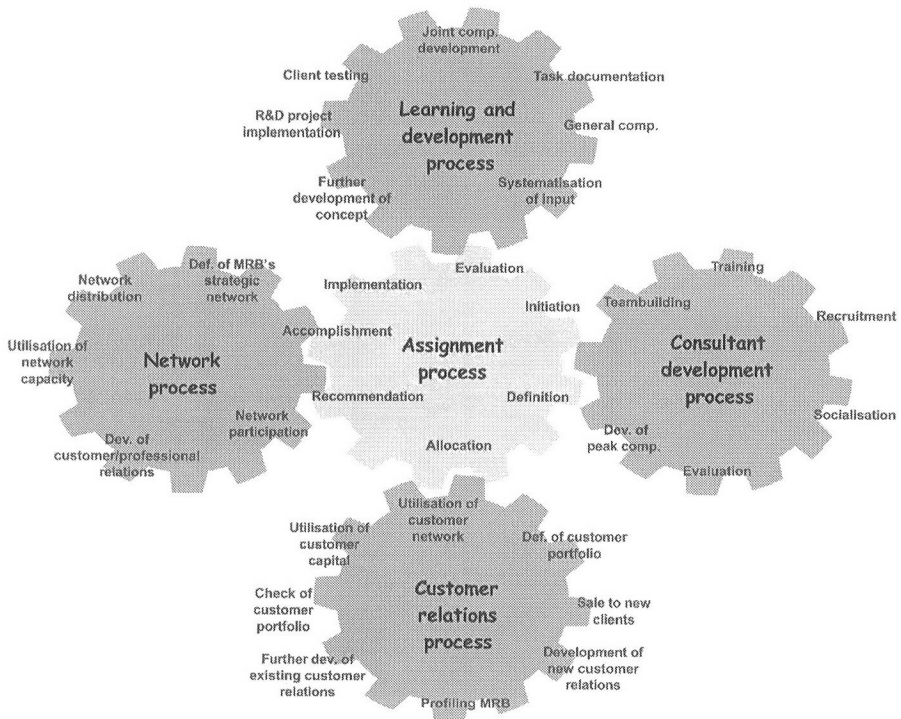


Figure 1.
Value creating processes
of MRB

“Assignment process” and how well it is accomplished. To each step (or activity) a bundle of human and structural capital elements are assigned – in total about 100 elements for the whole modelling.

As the consultants spend 70-90 per cent of their time on projects only a small fraction of their time is available for non-project activities as this use of time can not be invoiced. As a consequence most of the steps in the surrounding processes should also be accomplished through the core process and those that do not must be given managerial attention and receive dedicated time and resources. The model illustrates the integrative dynamics of activities and can thus be used to set the agenda and initiate discussions. The steps (or activities) in different processes are interlinked, but these connections are not made explicit in the sense that there is no attempt to make causal relationships between different steps. However, this is an important issue in the discussions of the results. People see things differently and the modelling and measuring in Value+ is a way of highlighting, talking about and interpreting different opinions. The modelling framework has so far been tested out in three other companies:

- (1) “IN-DEBT” which is a small factoring company;
- (2) “Fisherman’s Goodies” a medium sized manufacturer of fishing equipment; and
- (3) “Cash i/o” a medium sized bank specialising in banking services for the maritime industry.

IN-DEBT. The purpose of the Value+ project in IN-DEBT was to mobilise innovative capability throughout the organisation to increase the company's value creation. The Value+ process was intended to make the potential for improvement visible and increase employee knowledge about the value creating processes and how they are interlinked. In addition there were some expectations as to the outcome, for instance suggestions for further improvements that could be used as inputs to change processes. In short the purpose was to develop a general increased shared understanding among all employees about what contributes most to value creation.

All employees in IN-DEBT were in one way or another to be involved in the Value+ process, but to make the necessary progress a project team of consultants and employees (from all levels) were appointed. This team was responsible for producing the suggestions on important and critical processes and resources for IN-DEBT, which were later discussed and decided on during a weekend when all employees were present. Figure 2 shows the modelling where the core process, not surprisingly, is the "Factoring process".

Fisherman's Goodies. The purpose of the Value+ process in Fisherman's Goodies was quite similar to that of IN-DEBT. The overall target was to increase the long-term value creation and competitive advantage. This was accomplished through developing a shared understanding of important business activities among all the employees in the context of the Value+ framework. This included definition and modelling of the most important value creating processes and underlying resources, in addition to measuring and initiation of improvement initiatives. The project was accomplished in the same

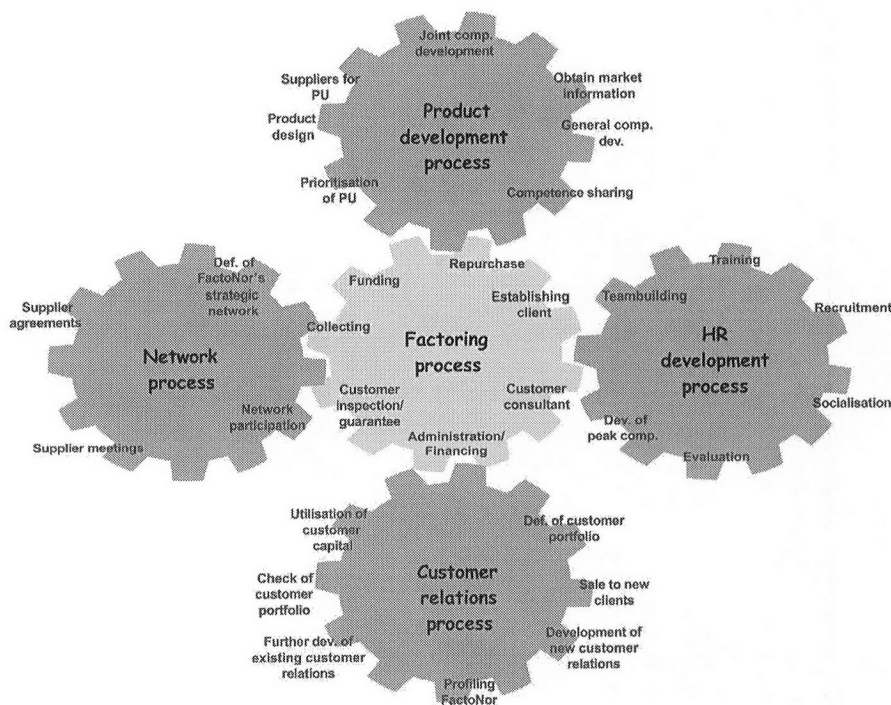


Figure 2.
Process modelling of
IN-DEBT

way as IN-DEBT with a dedicated project team with overall responsibility for the modelling process. Figure 3 shows the outcome from the modelling process.

Phases 2 and 3: measuring and improvements

The second phase of the Value+ process is measurement. Via the modelling phase the most important value driving processes are identified, described and visualised. Now is the time for going more in depth and mapping the underlying resources that are necessary to accomplish the different steps in the modelled processes. To each step a set of resources from the overall resource map are designated. One specific resource can enter several steps. Then the process execution and its underlying resources are scored. A dedicated internal group within the company decides the process execution score.

The principles for the scoring of the intellectual resources are as follows:

- Human capital is scored both individually and of the nearest superior. On the basis of an appraisal interview the final scoring is decided.
- Structural capital and process execution are judged by the project team.

For each step there is a mapping of what intellectual resources, i.e. critical and necessary resources, are needed to give sufficient quality and frequency of the relevant activities. The structure of this mapping is shown in Figure 4.



Figure 3.
Process modelling of
Fisherman's Goodies



Figure 4.
Structure of Value+
mapping

On the basis of the scoring tables spindle webs for visualizing process execution and intellectual resources are made. Figure 5 shows one of several possible plots of the scoring of MRB's assignment process.

The results initiated several important discussions in MRB, and subsequently initiatives were taken to make improvements. Among the issues MRB decided to work on further were the organisation of work and division of labour. With a dominance of clients from four sectors MRB had, over time, developed a gulf between sales and expertise. There were dedicated sales people responsible for each sector in addition to experts independent of sector. This method of organisation was now questioned and made a topic for discussion. Among other issues raised MRB realised that they should

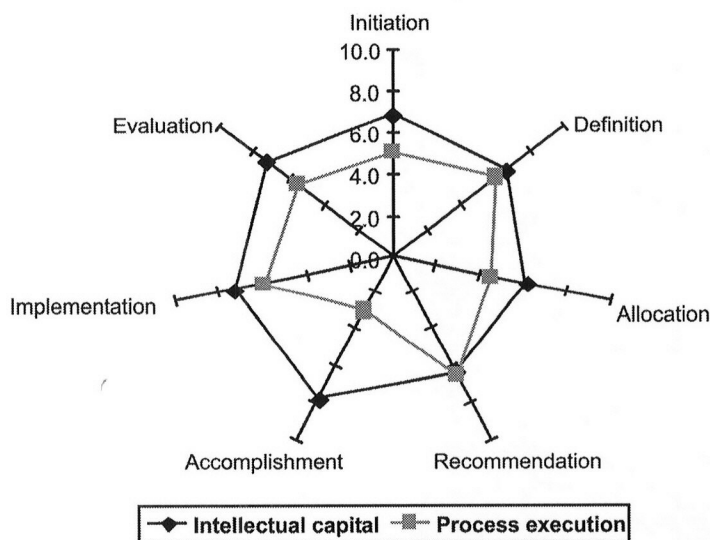


Figure 5.
Scoring of MRB's core
process - the assignment
process

have previously defined a strategic customer portfolio and documented their "best practice" assignments in a better way.

The corresponding spindle web for IN-DEBT is shown in Figure 6.

Not surprisingly this process is the one with the highest total score. Noticeable is that the scoring of process execution is, with two exceptions, higher than the intellectual resources. By looking at the details MRB found that the systemised tasks are performed well and that there is a general potential for improvement, both in human and structural capital. The human capital of the funding process step is low both on knowledge and knowing and there is general potential for improvement on methods, structures and systems for work support.

Discussion: integrative visualisation

Let us now see in what ways the three steps of the Value+ method (modelling, measuring, action) differ between the three case studies and how they relate to our three central concepts of resolution, elevation and conveyance.

As described in the modelling phase, MRB focuses on the dynamic aspects of value creation, a term conceptualized through processes and activities. The task of the Value+ modelling phase is to map the critical value creating processes, activities and steps crucial for the company's business. Also Value+ differentiates between core processes and support processes. In the modelling phase the importance of the question of resolution becomes obvious. How big is your lens inspecting the processes? Do you consider the whole company or just one or some business areas? How do you know you have reached the "core" and the "critical" steps? Here lie the resolution considerations. Watching the models of the three cases we see that they are tuned in a way not to become too finely grained and not too general so that it could be applied to any company. The resolution must be on a usable level. Looking at the three it may be fair

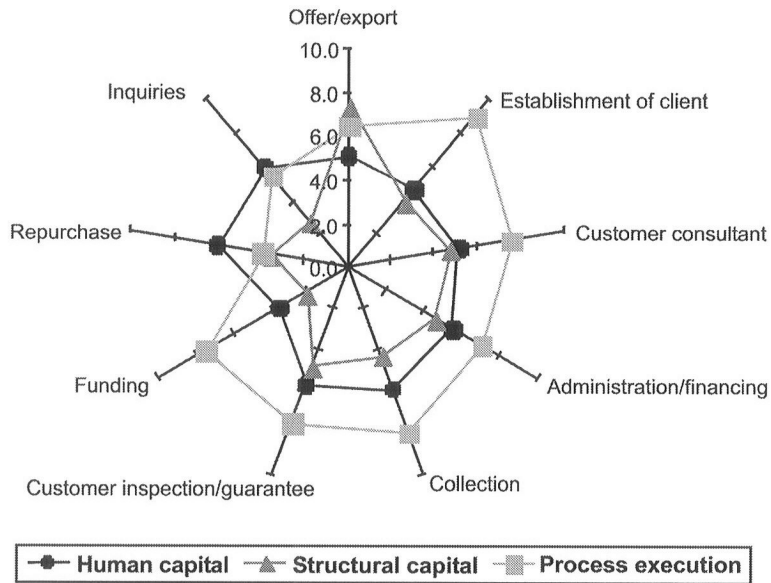


Figure 6.
Scoring of IN-DEBT's core process – the factoring process

to say that the MRB models seem to be the most “coarsely grained”. For example the core assignment process (and steps within it) could easily be applied to all project based companies. If that is the case, it is legitimate to ask the question what value-added the model provides. The answer is not given. Looking at the “support” processes of the MRB model they seem to be of a more detailed level of resolution. A point here is that the core and the support processes are not independent of each other. The relationship between the core process and the support-processes are more of a mutually reciprocal nature. Likewise, they are all modeled in a wheel-like manner, emphasizing the iterative and non-linear aspects of value creating activities. Comparing the different company models also shows that the steps of the MRB and IN-DEBT models are more similar than those of Fisherman’s Goodies. This could be interpreted as a consequence of the types of business the three are examples of. The first two are project-based service providers, while Fisherman’s Goodies is a manufacturing company more closely identifiable with the traditional value chain logic of value creation.

Looking at the measuring phase of the Value+ method, this targets the necessary underlying resources needed to accomplish the value creating activities and steps of the model. As described above, both intellectual resources (human and structural capital) and quality and frequency of process execution are considered. In the case of MRB we see that the process execution on almost all steps has a lower score than the intellectual capital. For IN-DEBT the situation is quite the opposite. Some of the reason for this may be attributed to the fact that the process execution capability is judged and scored by the project team as a whole, while the human capital is judged individually (by oneself and his/her nearest superior). In MRB it is important to have access to competent individuals with education and experience in order to deliver consultancy services, while at IN-DEBT, there is more systemised work and they are dependent on getting things done rather than an individual’s formal qualifications. On the other hand, looking at the factoring process of IN-DEBT where the intellectual capital is broken down to human and structural capital, we see that it is the structural capital, also judged by the project team as a whole, that gets the lowest score on most of the steps. Thus indicating that the reasons for high scores on process execution are not so trivially explained. Nevertheless we claim that this kind of “double-measurement” is able to show “a difference that makes a difference” not easily obtained through “single-measurement” approaches.

An important aspect of the measuring phase of Value+ is its intended visual attractiveness. Rather than having to review a magnitude of numbers and percentages the web-diagrams are immediately accessible for the fast and integral “outline diagnosis” of the company’s crucial value creating activities and the link to the resource-situation necessary to accomplish them. In this way the Value+ method may be labeled integrative visualization, and rather than focusing on measurement (although it is of course a part of it), our preliminary concept of elevation is perhaps more appropriate for describing phase two of Value+, highlighting the patterns that emerge in the material, inviting and triggering important discussions in the company.

This brings us to the third phase of the Value+ method, action. It is fair to say that the Value+ process “prepares the ground” so to speak, for various action plans in the company. Rather than fleshing out in detail what needs to be done for improved performance in the company, the Value+ process lays open the areas where

improvement and actions have huge potential. Also it shows where there is a reasonable relationship between the activities and the resources available. In this way, the model conveys a landscape of adequate resolution, with important elevations of where improvements may have great potential, and triggers discussions in the company to take ownership and effort in determining what exactly those actions should be, and to execute them. Value+ doesn't pretend to "do the job" on behalf of the company, but it does map out and convey the possibilities and gaps for potential improvement. In Value+ the improvements can be done targeted on two areas:

- (1) by improving the resource basis, e.g. through acquisition, alliances, recruitment, redistribution etc. of resources; and
- (2) improvement of process execution through better mobilization and utilization of resources as well as organisational design and collective work practice.

It is nevertheless interesting to note which kinds of initiative are initiated both in the above-mentioned cases and companies in more general on the basis of intellectual capital analysis. To a large degree they are directed at formal structures, development of new or better routines, introducing systems and/or training of people. We have seen few initiatives directed towards improvement of work practice and collectively improved performance initiated on basis of intellectual capital measurements. If we paraphrase a term from computer science[2] we can say that the reason for this could be due to WYMIWYG (what-you-measure-is-what-you-get) meaning that indicators "measuring the measurable", capture the formal and explicit also give conveyance on these kind of issues. The Value+ method has, however, the potential to guide managerial attention to the tacit, collective and complex knowledge resources observable as practice. The methodological entrance through knowledge generative processes enables users of Value+ to evade the measurement challenge referred to in the introduction. However, even if it is a promising approach, only more testing and further development will establish whether the activity approach to intellectual capital will be fertile on a longitudinal scale.

Implications for managers

For firms where knowledge is the fundamental strategic resource, performance measurement and management is not straightforward. Unfortunately, slogan-like phrases as "only what can be measured can be managed", indicating the more that is measured the better, has led many companies into a "measurement trap". Not only has this rhetoric brought forth an "inventory perspective" of intangibles focusing on mapping all sorts of non-physical assets, but aided by the possibilities of information technology it has also led to the self-referential loop of "measuring the measurable", often leaving out the vital question of whether it is important enough or not. There are many examples of companies that have tried this approach to measuring and evaluating their intangibles; very few have (over a period of time) had any success. The link between the bottom line and an employee's guitar lessons in his/her spare time is not obvious – even though it may be relevant at a company Christmas dinner.

The alternative way, that we propose and believe to be more fruitful, is to shift the focus/centre of attention to what actually creates value, i.e. the value generative processes, and to illuminate their internal relations, connections between them and interactions with the external environment. Thus, highlighting organisational

practices and activities and how well they are performed are more closely linked to the bottom line and something that can be managed to some extent (even if it is not measured). However, designing a performance management system tightly aligned with practice is not an easy task. Not only should the system frame and capture business relevant insights at the precise and appropriate level of granularity, for shared understanding among different levels in the organisation, but it should also serve as a basis for managerial impact and collective action and improvements. A visualized way of conveying the measures may help to see and evaluate the contingencies involved in value creating activities:

- think at least twice before you measure;
- your actual control is not increased the more you measure (even though your perceived idea of being in control may increase);
- forget the aggregative logic of economics when dealing with knowledge resources;
- when decomposing your processes into “measurable units” you may completely miss the mark of what actually creates value; and
- to measure only effects might say next to nothing about processes of origin.

Our suggestion for those interested in an activity-based approach to intangibles, enabling knowledge and value creation, is to start to identify and describe the most critical processes for value creation and their interrelated steps. Then identify the underlying resources to each step and finally evaluate both process execution and resource strength. More details about how this might be done can be found in the empirical section of this paper:

- when measuring, be very careful in determining the crux of the matter;
- value creation capabilities are often inherent in wholes (activities or practices) not easily decomposable into single, measurable units;
- make sure the resolution is “optimal” for your business and purpose of measuring. Don’t be too detailed (you might miss reciprocal dependencies) but don’t be too general (if the measurement system can apply to all kinds of different firms, you are not close to identifying your unique value creating activities);
- try different visualizing methods to better capture and convey integrative and holistic phenomena.

Conclusion

This paper argues and illustrates that an activity-based approach to intellectual capital, focusing on the dynamic aspects of value creation, might visualize more of the important and complex knowledge generative processes which opacity tends to grow when decomposed into measurables[3]. In this respect, we have explored the concepts of resolution, elevation and conveyance to describe, guide and evaluate the suitability of a measurement system for intellectual capital.

Notes

1. The project team consisted of six consultants from MRB (Bjørn Gjerde, Leif Magne Klubbens, Einar Aasen, Paul Urke, Thomas Chr. Thomassen, Frank Vedeld) and three researchers from Knowation (Senior researcher Mona Skaret, Research scientist Arne L. Bygdås (both SINTEF) and Professor Hanno Roberts, Norwegian School of Management).
2. We are here referring to WYSIWYG (what-you-see-is-what-you-get) meaning that what you see on the screen is actually what you get on a printout.
3. Somewhat analogous to Heisenberg's uncertainty principle in quantum mechanics, which says the more certain we are about a particle's position, the less certain we are about its momentum, and vice versa.

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