Comparative study, based on metamodels, of methods for controlling performance

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Abstract

The continuing evolution of technology and human behavior puts the company in an uncertain and evolving environment. The company must be responsive and even proactive; therefore, control performance becomes increasingly difficult. Choosing the best method of ensuring control by the management policy of the company and its strategy is also a decision problem. The aim of this paper is the comparative study of three methods: the Balanced Scorecard, GIMSI and SKANDIA's NAVIGATOR for choosing the best method for ensuring the orderly following the policy of the company while maintaining its durability. Our work is divided into three parts. We firstly proposed original structural and kinetic metamodels for the three methods that allow an overall view of a method. Secondly, based on the three metamodels, we have drawn a generic comparison to analyze completeness of the method. Thirdly, we performed a restrictive comparison based on a restrictive set of criteria related to the same aspect example organizational learning, which is one of the bricks of knowledge management for a reconciliation to a proactive organization in an environment disturbed and uncertain, and the urgent needs. We note that we applied the three methods are applied in our precedent works. [1][23]

Keywords: *Balanced Scorecard, GIMSI, Navigator SKANDIA, Comparative study, metamodel, performance, knowledge management, proactivity*

1. Introduction

The company now faces a double threat. An internal threat from the human actor, more and more open to the outside world, he is well informed about his rights and opportunities among other companies. The retirement and voluntary departure to other competitors is a loss of knowledge and skills. To maintain its position in this unpredictable environment, the company must be proactive, it is affecting its environment before it will be affected. This requires a major effort in driving performance and business intelligence. So the problem for policymakers is the choice of the method. Indeed, the method chosen should allow proactive company based management policy and strategy. The choice of method is a crucial step for successful performance management system.

2. Driving proactive performance

To better approach the customer and be ready to compete, companies are now forced to adopt a reactive control, or better yet a proactive control. The company can be passive, it undergoes changes in the environment, without facing any negative effects on it, and so its survival is threatened. It can be reactive, responding quickly and effectively as possible which would avoid the worst consequences of non rapid response. The company preactive, expects changes in the environment and prepares itself to advance steps to minimize the negative effect of environment on it. In the best case, the company is proactive or comes close to being proactive, in which case it operates on the environment and adapts it to its needs and benefit. This sensitive case, any responsible company would like to achieve. The question arises; that same company must put out the tools, methods, budgets to achieve it. Choosing a method of engineering and control performance system is part of this work.

3. Driving performance: Methods and tools

Given the complexity of integrated systems for the organization to be productive or services, it is necessary to use a method to model several aspects of this complexity. The performance of the organization is a necessity to get closer to a desired degree of proactivity. Several authors have proposed methods for controlling performance: ECOGRAI, PRISM, Balanced Scorecard, GIMSI, SKANDIA's NAVIGATOR.... We present successively the three methods that have been the subject of this study.

3.1 The Balanced Scorecard method

The balanced scorecard is a strategic planning and management system that is used extensively in business and industry, government, and nonprofit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals. It was originated by Drs. Robert

Kaplan (Harvard Business School) and David Norton as a performance measurement framework that added strategic non-financial performance measures to traditional financial metrics to give managers and executives a more 'balanced' view of organizational performance.

It provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and results. Kaplan and Norton describe the innovation of the balanced scorecard as follows:

Companies must create future value through investment in customers, suppliers, employees, processes, technology, and innovation." The figure 1 shows that is a method of driving performance that is now under the classic four axes (or views), but with consideration of the strategy of the organization declined in local objectives. A cause-effect links its four axes.
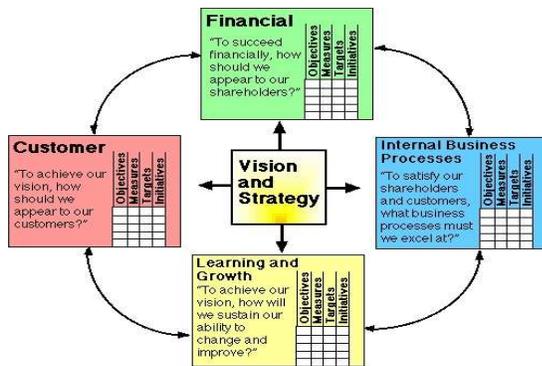

Fig. 1. Axes of the Balanced Scorecard [39]

3.2 The method GIMSI

GIMSI (Generalisation access to decisional Informations based on Methodology of Systemic inspiration facilitating the expression of Individuality of the company)is a method to design decision support systems and more precisely management support with cooperative performance dashboards and performance scorecards[37]

Well structured in ten successive stages, GIMSI is part of a modern management method favoring cooperation and knowledge sharing [42]

It is a method-oriented information technology and communication, based on user participation as a key success factor. We proposed a generic metamodel in (Figure 2), which represent a general view of the method and later we proposed detailed metamodels (Figure 5).
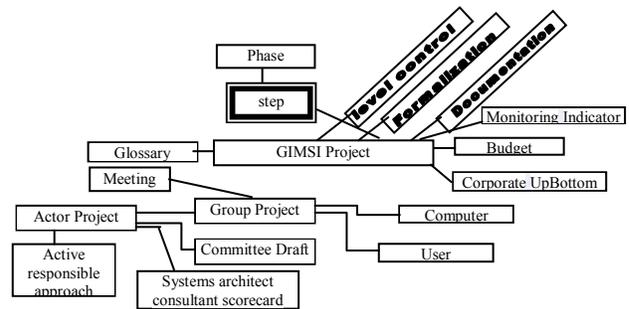

Fig. 2. Proposed generic metamodel for the GIMSI

3.3 The Skandia's Navigator

Skandia navigator is agglomeration of measurements that are critical. It comprises of achievement of goal and all the issues related to performance. There are different areas which are concentrated upon in this navigator: Those are:

Qualities of each person such as his skills, experience and intellectual capacity comes under area that is related to human.

Second area in concerned with the loyalty and the strength of the customer. This includes the relationship's time duration. Third area is concerned with the innovative skills of the producer. It means that how fast one integrates new and unique ideas into services and the final product.

Fourth area measures the extent to the investments which are made in the ability of the work which is under process. It includes automation, standardization and quality programs.

The work of Edvinsson and his team at Skandia has paved the way to apply practically the concepts of intellectual capital and controlling performance human-centered axis (Figure 3).

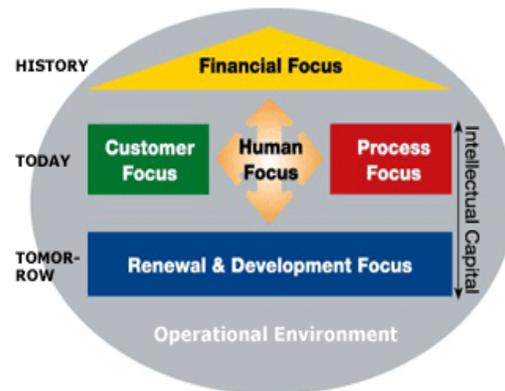Fig. 3. The axes of the SKANDIA's NAVIGATOR [40]

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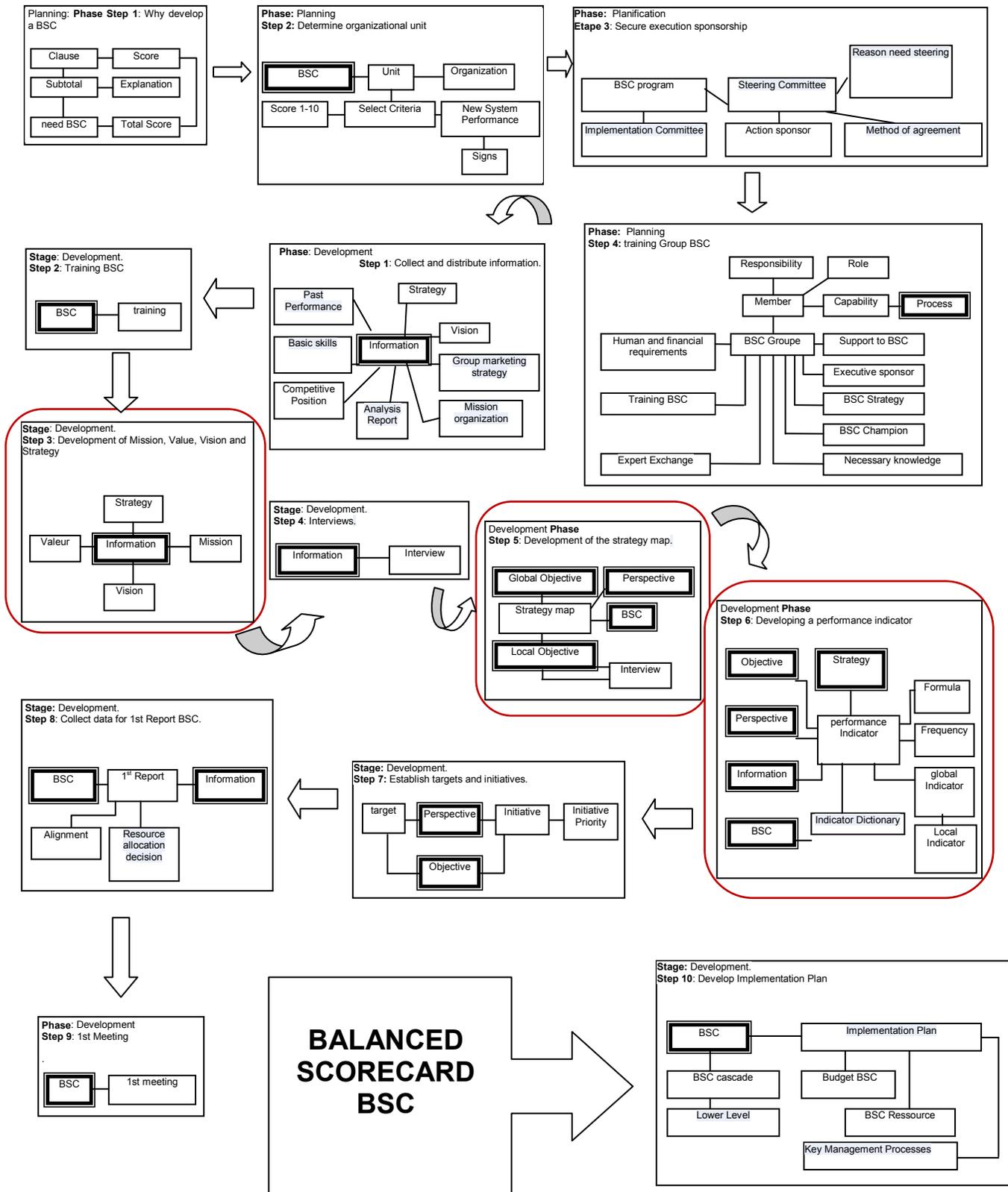
Fig. 4. Nested Structural and kinetic metamodels of the Balanced Scorecard

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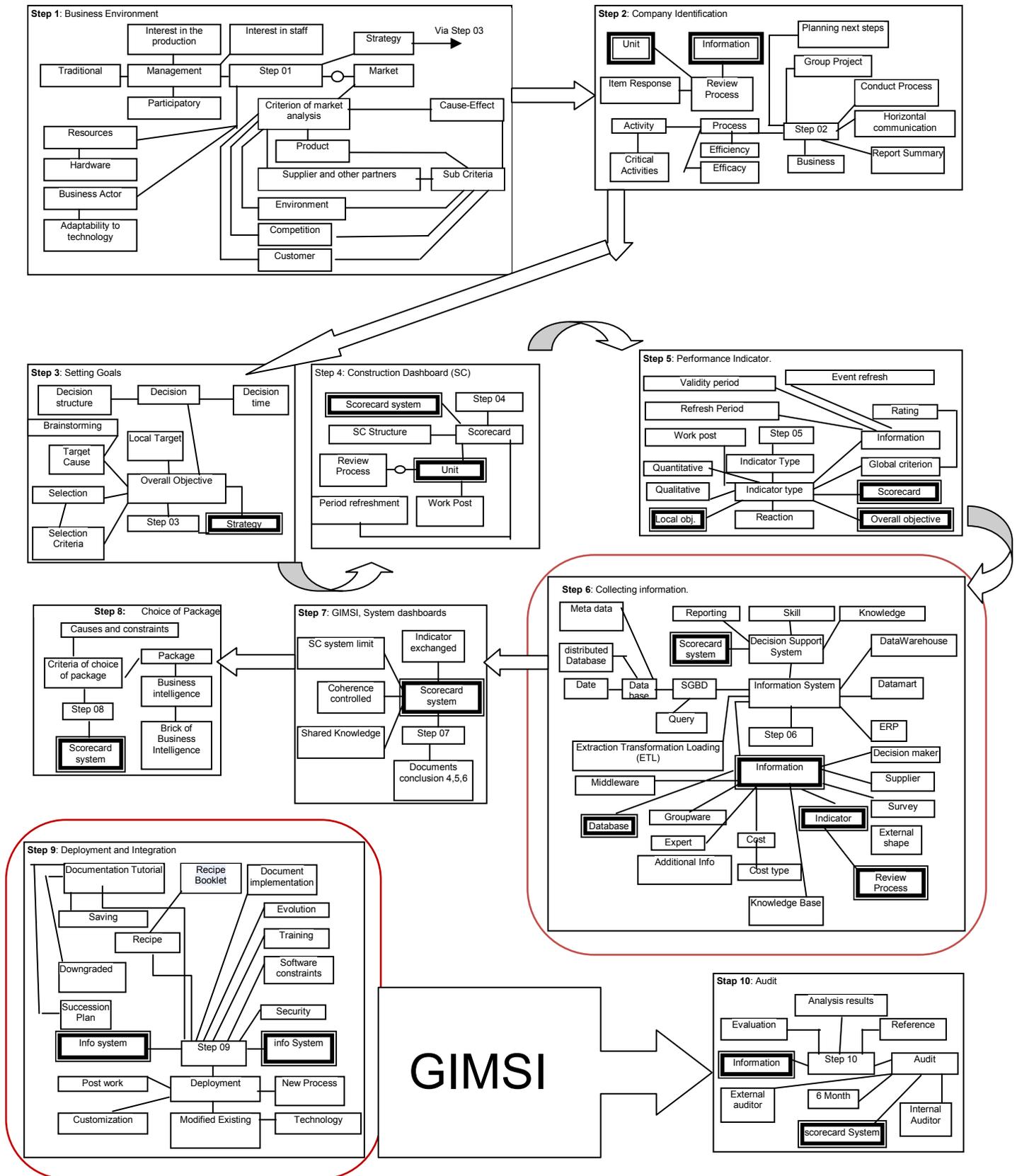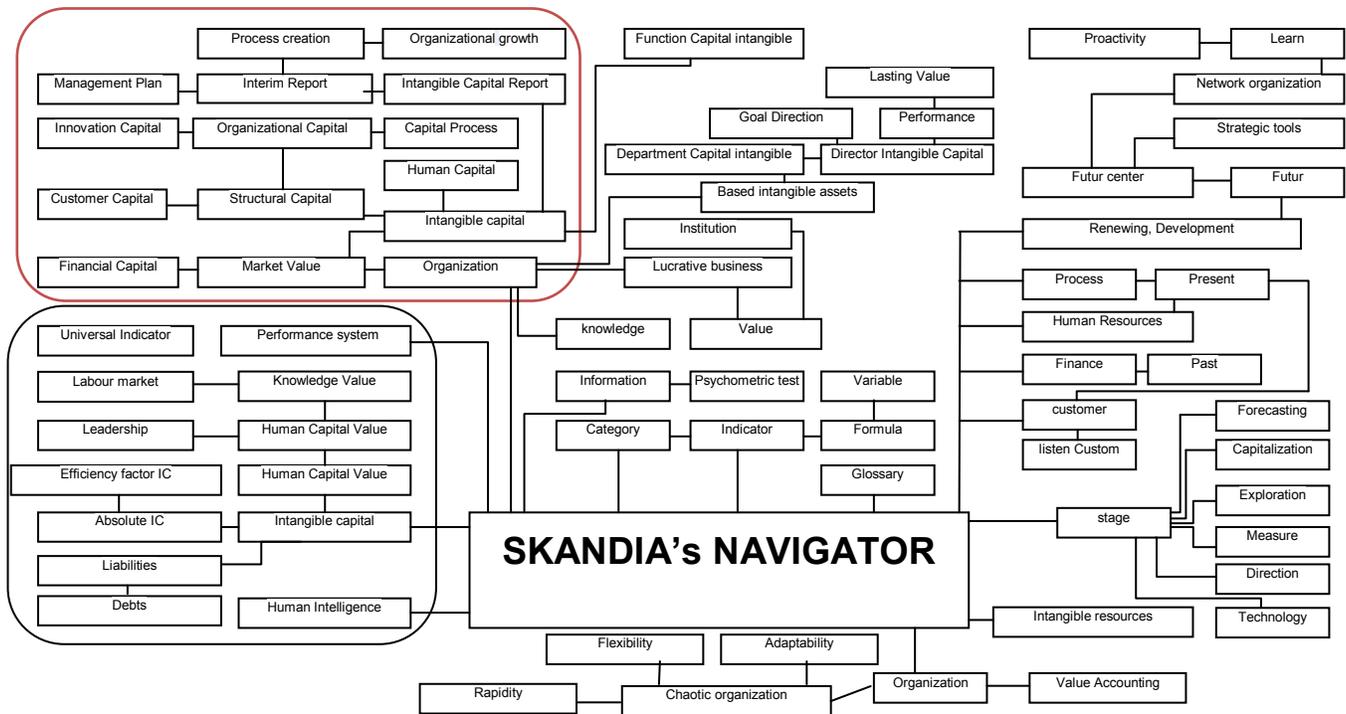Fig. 5. Nested structural and kinetic metamodels of the method GIMSI

Fig. 6. Nested structural and kinetic metamodels of SKANDIA's NAVIGATOR

Table 1. Comparison of methods Scorecard, GIMSI, SKANDIA's NAVIGATOR based on structural and kinetic nested metamodels, using scores (from 1 to 5)

Criterion	Balanced Scorecard	GIMSI	SKANDIA's NAVIGATOR
Continuous Improvement	4	3	4
The areas of importance	4 axes strategy: 4	7 axes: Client: 4	5 axes: human: 5
Strategy	5	3	3
Information Systems	3	5	3
Communication	3	4	4
Human	2	3	5
Finance	4	3	2
Customer	2	5	3
Balancing finances, human (employees), customer	3	4	2
Business Intelligence	2	4	2
Passivity	0	0	0
Reactivity	4	5	4
Preactivity	3	4	3
Proactivity	3	4	3
Quality Management			
Time horizon for audit	1 year : 3	6 months : 4	1 year : 3
Spatial horizon or scope	From the Summit strategic to operational; scorecard cascade: 4	All services at the same time flexible system of scorecard: 5	All At the same level: 5
Internal Audit	3	2	3
External Audit	3	5	3
History (corporate memory)	3	4	Yesterday, Today, Tomorrow: 4
Business process	5	4	5
Control of the transverse (process approach)	3	4	3
User training in the method	3	3	4
Use of ICT	3	5	3
Paper Performance	0	0	0
Reporting	4	3	3
Documentation method	Old 1997: 5	2005 : 3	1999: 2 principle unsuitable
Application on companies	4	2	2
Development cost	Restrained: 3	Moderately known: 3	New: requires a costly accounting revolution: 4

Project Duration	1 year :4	6 months :3	Only 1 year new corporate culture: 5
Standardization of TDB	4	3	4
Customizing the scorecard	2	4	4
Share indicators	3	3	
Consistency scorecard	4	3	
Completeness of information during the construction scorecard	3	4	3
Geographical scope of use (celebrity)	U.S. used in the world: 5	French: used in French speaking countries: 3	Swedish used in Scandinavian countries: 2
Knowledge indicators	3	3	5
Tacit knowledge	2	2	5
Explicit knowledge	3	3	5
Expert systems built into the scorecard	1	1	3
Intellectual report	0	0	5
Knowledge Management System	0	0	2
Watch Knowledge	1	1	2
Change in business	Follows the strategy of the company: 1	Follow it and proposes changes: 3	Revolutionizing the business: 5
Development cycle	2 phases and 16 stages: 2	4 phases and 10 stages: 5	Six generic phases: 1
Lifecycle	Planning, development, and monitoring: 2	Planning Development, implementation Monitoring and auditing: 5	Generic life cycle and unspecified: 1
Value chain	3	3	5
Comparison to the framework GERAM	2	3	1

4. Comparative study based on metamodels

4.1 Definition of metamodel

Metamodeling, or meta-modeling, is the analysis, construction and development of the frames, rules, constraints, models and theories applicable and useful for modeling a predefined class of problems. (Gonzalo, 2009)
A concept map showing all the main classes of concepts and relationships between them. Used for setting up a k-base ontology and templates.

4.2 Proposed metamodels for the method balanced scorecard

We can see on figure 5 that the method is oriented finance supported by the other axes; customer, internal business process, learning and growth. It introduces the concept of strategy map, objectives related and performance. The cause-effect notion exists between the four axes.

4.3 Proposed metamodels for the method GIMSI

On the figure 6, we note that the method encourages the integration of information systems and information and communication technologies.

4.4 Proposed metamodels for the method SKANDIA

SKANDIA is the method centered human capital and all other axes of the business are effects of it as shown in figure 6.

4.5 Comparative study based on metamodels

We developed a comparison based on structural and kinetic metamodels of three methods: Balanced Scorecard, GIMSI and SKANDIA's NAVIGATOR. We consider a joint use of a structural metamodel (components of the method) and a kinetics metamodel (phases of the method), constitutes a complete description of a method. The comparison principle is to use the set of criteria of comparison we have chosen and judged fairly generic for the different aspects of a method for controlling performance. The comparison will be based on a weighting of 1 to 5, it represents the degree of correspondence of the test method related to the weighting. The first comparison (Table 1) is global and can make a total weight (score) on a method to guide our choices. The second comparison is to first select an overall appearance of comparison, e.g. organizational learning (Table 5) and then import the criteria and their scores associated with the desired appearance (from Table 2) and make a sum of these scores. The result of the sum leads us to the method that best meets the desired appearance.

5. Analysis of results

The scores used are not intended to be summed in any direction but only one can sum over a set of criteria rather than contradictory.
In the case where we want to know what is the method that incorporates the most expertise and knowledge

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management (Table 2). We sum the scores of criteria that are linked.

Table 2. Sum of scores on the criteria for integrating the expertise and knowledge management

Criterion	BSC	GIMSI	SKANDIA
human	2	3	4
Business Intelligence	2	4	5 axes : human : 5
Proactivity	3	4	3
Knowledge indicators	3	3	4
Tacit knowledge	2	2	5
Explicit knowledge	3	3	2
Expert systems built into the scorecard	1	1	3
Intellectual report	0	0	2
Knowledge Management System	0	0	2
Watch Knowledge	0	0	2
Value chain	3	3	4
Total Score	**22**	**23**	**36**

The total scores of Table 1 show the sum of the scores of different criteria related to the expertise and knowledge management. We note that the methods Scorecard (score 22) and method GIMSI (score 23) are close in the integration of these principles and are far from the method SKANDIA which has a score of 36. The decision is clear; we choose the method SKANDIA to promote the integration of expertise and knowledge management. A second case may arise, the search method which provides an implementation guide on ICT, we sum over the criteria in Table 2.

Tableau 3. Sum of scores on the criteria corresponding to guide implementation of the method on ICT.

Criterion	BSC	GIMSI	SKANDIA
Information system	3	5	3
Communication	3	4	4
Business Intelligence	2	4	2
Use of ICT	3	5	3
Completeness of information during the construction of scorcard	3	4	3
Development cycle	2	5	1
lifecycle	2	5	1
Total	**18**	**32**	**17**

The total scores of Table 3 shows that GIMSI (score 32) is the method that offers the most comprehensive guide to implementing ICT, and far from it are classified BSC method (score 18) and method SKANDIA (score 17). A third case may be finding a method that adopts the principle of continuous improvement. Table 4 provides a comparison in this sense.

Table 4. Sum of scores on the criteria for adopting the principle of continuous improvement

Criterion	BSC	GIMSI	SKANDIA
Continuous Improvement	4	3	4
The areas of importance	4	4	5
Business Intelligence	2	4	2
Quality Management	2	2	2
Time horizon for audit	3	4	3
Internal Audit	3	2	3
External Audit	3	5	3
History (corporate memory)	3	4	4
Paper Performance	0	0	0
Project Duration	4	3	5
Change in business	1	3	5
Total	**29**	**34**	**36**

The sum of the scores in Table 4 indicates that the method SKANDIA (score 36) and GIMSI (score 34) encourage more the principle of continuous improvement, comes after the method BSC. The choice is not very clear, between Skandia and GIMSI, it remains to support this choice knowing that other criteria SKANDIA revolutionizes accounts which held 5 centenarians. A fourth case is to find the method that promotes organizational learning. The criteria are illustrated in Table 5.

Table 5. The sum of the scores of criteria related to organizational learning

Criterion	BSC	GIMSI	SKANDIA
Information Systems	3	5	3
Reactivity	4	5	4
Preactivity	3	4	3
Proactivity	3	4	3
History (corporate memory)	3	4	4
Use of ICT	3	5	3
Paper Performance	0	0	0
Reporting	4	3	3
Completeness of information during the construction of scorecard	3	4	3
Knowledge indicators	3	3	5
Tacit knowledge	2	2	5
Explicit knowledge	3	3	5
Expert systems built into the scorecard	1	1	3
Intellectual report	0	0	5
Knowledge Management System	0	0	2
Watch Knowledge	1	1	2
Development cycle	2	5	1
Lifecycle	2	5	1
Total	**40**	**54**	**55**

The criteria chosen in Table 5 are those that encourage the preservation of earlier experiments on whether documents or material or in an expert system. The method of promoting organizational learning methods are SKANDIA (score 55) and method GIMSI (score 54). Just after BSC (score 40). This is explained by the advance of GIMSI in ICT and advance of SKANDIA in intellectual capital.

6. CONCLUSION LIMITATIONS AND PERSPECTIVES

The continuing evolution of technology and human behavior puts the company in an uncertain and evolving environment. The company must be responsive and even proactive, therefore, control performance becomes increasingly difficult. Choosing the best method of ensuring control by the management policy of the company and its strategy is a decision problem too.

The metamodels of the three methods allowed a rapid comparison of Balanced Scorecard, GIMSI and SKANDIA's NAVIGATOR to choose the best ensuring to a generic set of criteria.

We also seeked, the method that would promote organizational learning, one of the "bricks" of knowledge management for a reconciliation to a proactive organization in a disrupted, uncertain and urgently need.

We could perform a partial comparison taking in account a set of criteria expressing one compared aspect, to do a choice only relying on the latter.

Whatever our criteria, the comparison is still not exhaustive but only the generic criteria help the designer to quickly choose the method suited to his goals in this set of criteria that affect the majority of the qualities of a method. The list of criteria can be enriched by affinity objective of the designer. A coming work is a comparison with the reference framework GERAM which is currently a standard method on the structural and functional.

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