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PARTICIPATIVE ENTERPRISE MODELLING FOR BALANCED SCORECARD IMPLEMENTATION

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Abstract

Balanced Scorecards (BSC) have been established as a valuable and practicable instrument addressing major management problems in organisations. BSC are commonly IT-supported and found a conceptual basis for management information systems. They are often applied to IT-Controlling, and they are also repeatedly applied to specify requirements towards the corporate IT architecture. However, BSC implementation often struggles when it comes to discovering and documenting organisational knowledge that is not easily accessible or not of sufficient quality. On the other hand, Enterprise modelling (EM) seeks to solve organisational design problems in, for instance, business process reengineering, strategy planning, enterprise integration, and information systems development. Here, participative EM methods lead to improved quality as well as to consensus and to increased acceptance of the business decisions. At this juncture, participative EM can support BSC implementation projects that comprise activities requiring the discovery and documentation of organisational knowledge that is not easily accessible or not of sufficient quality. For that reason, the aim of this paper is to integrate participative EM approaches, taking Enterprise Knowledge Development (EKD) as an example, and BSC implementation. In order to operationalise this conceptual improvement, we will perform a stepwise analysis of BSC implementation processes and identify shortcomings that are able to be addressed with the help of participative enterprise modelling.

Keywords: Conceptual Modelling, Enterprise Modelling, Enterprise Knowledge Development, Balanced Scorecard, Management Information Systems

1   INTRODUCTION

Balanced Scorecards have been established as a valuable and practicable instrument addressing major management problems in organisations (cf., for instance, Kaplan & Norton 1996a, Kaplan & Norton 2000, Kaplan & Norton & Horváth 1997, Olve & Roy & Wetter 1999). An empirical study conducted in major US-enterprises (Kaplan & Norton 1996b) has shown, for instance, that significant deficits exist in actually aligning the business strategy and business operations, that classical financial measures often run too short when it comes to strategic management decisions, or that controlling and reporting systems are often perceived as too complex but insufficient when it comes to ad hoc requests. These and other significant problems in management practice have lead to developing Balanced Scorecards (BSC) as a strategy management and controlling instrument (Horváth 2001). Hence, BSC aims at balancing performance measurement between strategy and operations, taking into account various types of measures, e.g. qualitative and quantitative, and including different stakeholder perspectives, e.g. customer or employee perspectives (Kaplan & Norton 1996b). In practice, BSC is the most widely known and applied performance measurement concept (cf., for instance, Günther & Grüning 2002, Preuss 2003) while its IT support is seen as a major success factor (Buytendijk 2001, Gentia 1998, Günther & Grüning 2002, Maurer & Töpfer 2000). Hence, a BSC establishes a possible conceptual basis for management information systems (MIS) (cf. Buytendijk 2001, Gentia 1998, Olve & Roy & Wetter 1999, Preuss 2003).

However, BSC Implementation repeatedly struggles when it is necessary to discover and to document organisational knowledge that is not easily accessible or that is not of sufficient quality. Essential prerequisite when "building a balanced scorecard [is to] achieve a consensus on the balanced scorecard that will be used by the organization" (Martinsons & Davison & Tse 1999, p. 83). What is often seen as 'just' one of the things one has to assure when implementing BSC, is a major problem in BSC implementation practice. For instance, what are the stakeholders' goals, what are effective measures that should be applied, and what would be the best resources to allocate to? While this organisational knowledge is needed for achieving a consensus and for an effective BSC implementation (Martinsons & Davison & Tse 1999), it is often latent, spread over diverse entities and people, and regularly linked to conflictory beliefs and standpoints. However, at current state, little methodological support is available for systematically discovering this organisational knowledge within the BSC process, especially regarding participative approaches.

Enterprise modelling (EM) seeks to solve organisational design problems in, for instance, business process reengineering, strategy planning, enterprise integration, and information systems development (Fraser 1994). EM is an activity where an integrated and negotiated model describing different aspects of an enterprise is created (cf., for instance, Bubenko & Stirna & Brash 1997, F^3-Consortium 1994, Loucopoulos, et al. 1997, Yu & Mylopoulos 1994, Zorgios 1994).

Participative EM methods (cf., for instance, Bubenko & Persson & Stirna 2001, Bubenko & Stirna & Brash 1997, F^3-Consortium 1994, Loucopoulos, et al. 1997) lead to improved quality as well as an increased consensus and acceptance of the business decisions. The participative modelling process involves a group of stakeholders in order to identify, document, and consolidate their different knowledge and interests concerning the problem modelled. An empirical study (Persson & Stirna 2001) shows that participative EM can successfully support both business development objectives and quality assurance objectives. It also facilitates maintaining and sharing knowledge about the business as well as organisational learning (cf. Mikelsons, et al. 2002, Persson, et al. 2003). Enterprise Knowledge Development (EKD) (Bubenko & Persson & Stirna 2001) is a representative of widely used and accepted participative EM methods developed Scandinavia to which we will refer to in the move of this paper.

In BSC implementation projects participative EM supports activities that require discovery and documentation of tacit organisational knowledge that is not easily accessible or not of sufficient quality otherwise. Usually such knowledge lies in people's heads, opinions, intentions, work routines, experiences, etc. Thus, when it comes to BSC development, for instance, goal development or defining measures, different views and alternatives might evolve. Participative EM suggests that this knowledge needs to be consolidated in order to be elaborated into, for instance, operational goals, measurement indicators, business processes. Hence, the research question is *how to design participative BSC implementation processes in practice*? The line of argumentation addresses the following sub-questions:

What are the principles of the BSC and the steps of the BSC implementation process? (following Section 2)

What is the EKD approach to participative EM and how does it support decision elicitation, acceptance and commitment? (Section 3)

How can EKD contribute to raising the quality and the acceptance of decisions made in the course of BSC Implementation? (Section 4)

Taking an example, how would EKD support BSC implementation in practice? (Section 5)

Addressing this research objective, the method chosen is that of conceptual and argumentative research. We will hence provide theoretical-logical arguments rather than empirical ones. However, our arguments will (where applicable) also refer to empirical research results. Furthermore, we will present additional evidence by giving an example of a BSC implementation based on case study data from a public organisation. We consider the paper to contribute to and to be part of design science research in information systems (cf., for instance, Boland 1989, Hevner, et al. 2004, March & Smith 1995, Rossi & Sein 2003, Simon 1981, Walls & Widmeyer & El Sawy 1992). We will therefore provide a brief summarising assessment of this research, complying with the guidelines for evaluating design science in IS research (cf. Hevner, et al. 2004), within the concluding section.

2   BALANCED SCORECARD IMPLEMENTATION

Balanced Scorecard (BSC) is a performance measurement instrument which aims at balancing strategy and operations, including various types of measures, e.g. qualitative and quantitative, and taking into account a variety of stakeholder perspectives (cf., for instance, Kaplan & Norton 1996a, Kaplan & Norton 1996b, Kaplan & Norton 2000, Kaplan & Norton & Horváth 1997). In practice, BSC is the most widely known and applied performance measurement concept (cf., for instance, Günther & Grüning 2002, Preuss 2003). It has been developed as a response to the discovery that, for instance, significant deficits exist in actually aligning the business strategy and business operations, that classical financial measures often run too short when it comes to strategic management decisions, or that controlling and reporting systems are often perceived as too complex but insufficient when it comes to ad hoc requests (Horváth 2001, Kaplan & Norton 1996b). BSC aims, as the name of the concept reflects, at maintaining a balance "between short- and long-term objectives, between financial and non-financial measures, between lagging and leading indicators, and between internal and external performance perspectives" (Kaplan & Norton 1996a, p. viii).

The BSC implementation process can be regarded as a course of action comprising several phases, each of them rendered by a specific task and concern. In order to further demonstrate the concept of BSC, we seek to not only offer a general conceptual understanding, but also to indicate how BSC implementation can be carried out in a project setting in practice. While literature provides us with a multitude of BSC implementation approaches (see, for instance, Burghardt 1995, Kaplan & Norton 1996b), often featuring different granularity and practicality levels. We will here describe a schematic and archetypal BSC implementation procedure which takes into account the most common process features (see also Figure 1):

(1) *Identify and Select Stakeholder Groups.* BSC seeks to balance between diverse stakeholder perspectives, including external and internal stakeholders (Kaplan & Norton 1996a). Starting the implementation process, it has to be decided upon which stakeholder perspectives ought to be taken into account, meaning which perspectives ought to become part of the performance system and, thus, functions as starting point for corporate goal definition. Financial perspective ('How to deliver value to the shareholders?'), customer perspective ('How to satisfy the customer needs'?), internal business perspective ('Are we working effectively and efficiently?'), or innovation and learning perspective ('What opportunities and challenges are emerging?') are frequently taken into account (Horváth 2001, Kaplan & Norton & Horváth 1997, Martinsons & Davison & Tse 1999). However, when it comes to, for instance, BSC in a political context, often the political or the citizens' perspective are considered as equally essential (Gottbehüt 2002, Scherer 2002). The group making the decision regularly consists of top management and BSC project management representatives.

(2) *Define the Vision.* The corporate vision is the first step towards policy within BSC: How does the organisation picture itself in a positive scenario in the long run? The vision functions as reference point for policy making, e.g. for defining strategic goals. Also with regard to the selected stakeholder groups, the goal here is to create a vision that is agreed on and widely accepted within the organisation. Thus, the group defining the corporate vision regularly consists of top management, BSC project management, and stakeholder representatives. The discussion which often involves very different opinions and viewpoints can be supported by a facilitator.

(3) *Identify Strategic Goals in Stakeholder Perspectives.* With regard to the corporate vision, policy making is taken one step further by identifying and discussing strategic goals that ought to be pursued by the organisation. Here, the different stakeholder perspectives regularly frame the discussion of strategic goals, meaning: What are the strategic goals held by stakeholder group X (implicitly and explicitly) with regard to the organisation? So-called goal landscapes for each stakeholder perspective can facilitate the discussion. Management, BSC project management, and stakeholder representatives are usually involved in the discussion which can also be supported by a facilitator.

(4) *Select Strategic Goals from Stakeholder Perspective.* Based on the strategic goals identified within the stakeholder perspectives, certain goals have to be discussed, aligned, and selected to become part of the organisational policy. Often the goals identified are conflicting. However, some goal conflicts

can be solved via discussion while other goals remain conflictory. These conflicts of interest being a regular case in most organisational settings, often management and also stakeholder representatives (e.g. employee representatives) decide upon the goal selection. BSC project management and facilitators can be involved in the discussion as well.

(5) *Define Measures*. BSC also features controlling characteristics. Thus, the definition of suitable measures for measuring if and how well particular goals have been achieved is the next step. As these measures are also sought to provide a motivational aspect, not only management representatives, but also employees responsible for achieving the goals are involved in defining them.
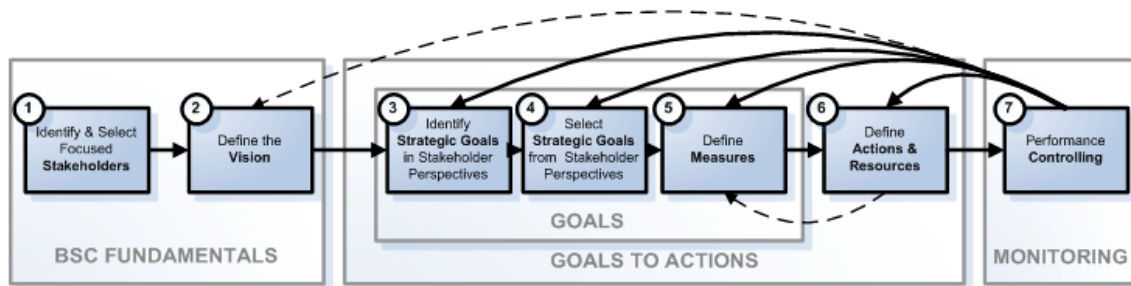

Figure 1:   Schematic Balanced Scorecard Implementation Process

(6) *Define Actions and Resources*. Defining measures and actions heavily depend on each other. Certain actions can efficiently be measured in only a certain way, some measures cannot be considered, if there is no data available. Therefore, a feedback loop is commonly recommendable. The group deciding upon actions and resources is often the same that defines certain goal measures. However, deciding upon what should be the 'right' things to do and what should be the 'right' resources for that is regularly a critical issue. Views and standpoints often differ significantly, but can be solved through an integrated discussion in many cases. Involving a facilitator has proven as a valuable option here.

(7) *Performance Controlling*. BSC aims at continuity. Therefore, a continuous performance controlling analyses if and how well the goals have been achieved according to the measures defined. Mostly in cases with problems occurring, for instance, the measures have not been met, the resource limits have been exceeded, or the strategic goal has proven to be questionable, a problem analysis seeks to stimulate improvements. This often results in redefining goals, measures, actions, or resources. Besides these problem-driven improvements, proactive steps can also be taken, for instance, in terms of analysing and discussing on a regular basis if the strategic goals are still suitable or if environmental circumstances have changed. Not only the management, but also controlling staff can be involved here. BSC project management will often be involved, in case the changes to be made are more fundamental.

The tasks to be performed within a particular phase of the BSC implementation are often interconnected with each other so that several feedback loops are compulsory. Furthermore, the parties involved within the particular steps vary, however, stimulating and guiding a discussion among these parties is constantly the critical but often the least methodologically supported concern.

3   EKD FOR PARTICIPATIVE ENTERPRISE MODELLING

Enterprise Modelling (EM) is a method for developing, acquiring, and communicating early, enterprise knowledge, such as strategies, goals, or requirements, by a structured, iterative, working and modelling approach (Bubenko & Persson & Stirna 2001). The Enterprise Model consists of set of structured, goal/problem - driven models to be used for structuring and representing organisational knowledge. The modelling process is guided by a set of guidelines for conducting the knowledge acquisition, analysis, and representation process. The basic assumption is that knowledge acquisition is strongly participatory, i.e. all involved actor and stakeholder types in an organisation are assumed to actively contribute.

In Scandinavia, Business or Enterprise Modelling was introduced in the eighties by Plandata, Sweden (Willars 1988), and later refined by Swedish Institute for System Development (SISU). A significant contribution was the notion of business goals as part of an Enterprise Model, complementing traditional model component types such as entities, relationships, and processes. The SISU framework was later extended in the ESPRIT projects F3 – "From Fuzzy to Formal" and ELEKTRA – "Electrical Enterprise Knowledge for Transforming Applications". The current framework is denoted EKD – "Enterprise Knowledge Development" (Bubenko & Persson & Stirna 2001, Bubenko & Stirna & Brash 1997, Loucopoulos, et al. 1997). For more details see (*Bubenko et al 2001*). Apart from the "Scandinavian" strand of EM, a variety of other methods have been suggested (see, for instance, Bajec & Krisper 2005, Castro, et al. 2001, Dobson & Blyth & Strens 1994, Fox & Chionglo & Fadel 1993, Yu & Mylopoulos 1994, Zorgios 1994).

*The Enterprise Model is the **product of Enterprise Modelling** and contains several interrelated sub-models which each represent a particular view on the subject in focus (see Table 1 as well as Figure 2).*

	Goals Model (GM)	Business Rules Model (BRM)	Concepts Model (CM)	Business Process Model (BPM)	Actors and Resources Model (ARM)	Technical Components & Requirements Model (TCRM)
Perspective	Vision and strategy	Policies and rules	Business ontology	Business operations	Organisational structure	Information system needs
Issues addressed	What does the organisation want to achieve or to avoid and why?	What are the business rules, how do they support organisation's goals?	What are the things and "phenomena" addressed in other models?	What are the business processes? How do they handle information and material?	Who are responsible for goals and process? How are actors related to each other?	What are the business requirements to the IS? How are they related to other models?
Modelling components	Goal, problem, external constraint, opportunity	Business rule	Concept, attribute	Process, external process, information set, material set	Actor, role, organisational unit, individual	IS goal, IS problem, IS requirement, IS component

Table 1:   Overview of the sub-models of the EKD framework

The ability to trace decisions, components and other aspects throughout the enterprise is dependent on the use and understanding of the relationships between the different sub-models (see Figure 2). For instance, statements in the GM are clarified by defining different concepts in the CM. An *inter-model link* is then specified between the corresponding GM component and the concepts in the CM. Likewise, goals in the GM motivate particular processes in the BPM. The processes are required to achieve the goals stated. A link therefore is defined between a goal and the process. Links between models make the Enterprise Model traceable. They show, for instance, why certain rules, processes and information system requirements have been introduced.

*During the **EKD modelling process** different ways of working are applied in order to elicit and develop the knowledge of business stakeholders or domain experts.* Typical examples for ways of working are facilitated group sessions and interviews.

The Sub-models are developed iteratively and in parallel, meaning that they are on different levels of "completeness" at a certain point in time. In the participative approach to EM the stakeholders collaboratively develop Enterprise Models in facilitated group sessions. This type of participation is *consensus-driven* in the sense that it is the stakeholders who "own" the model and hence decide upon its contents. In contrast, *consultative* participation means that analysts create models and that stakeholders are then consulted in order to validate the models. In the EKD EM method the participative approach to EM is preferred.

*Regarding the **applicability of EM**, Person and Stirna (2001) have argued and shown that EM can be used for a number of purposes.* The two main types of objectives are (1) developing the business, e.g. developing business vision, strategies, redesigning the way the business operates, developing the supporting

information systems, or (2) ensuring the quality of the business, e.g. sharing the knowledge about the business, its vision, the way it operates, or ensuring the acceptance of business decisions by committing the stakeholders to the decisions made.
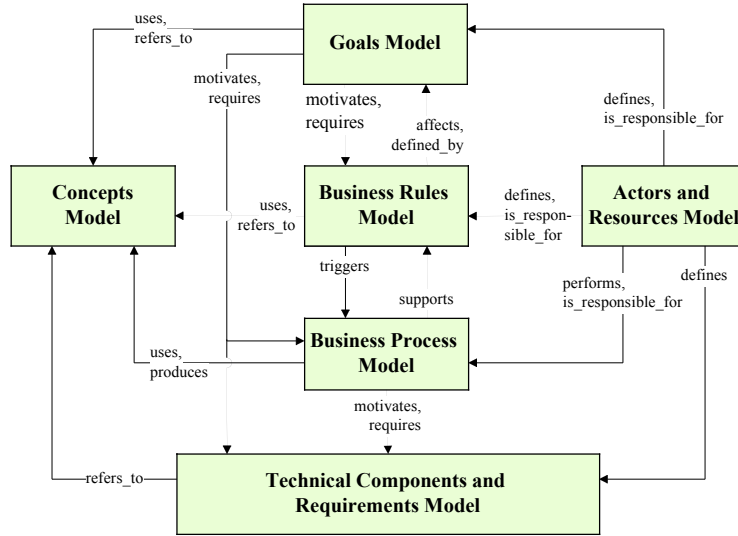

Figure 2:   Sub-models comprising the Enterprise Model.

Earlier research (Persson & Stirna 2001) shows that the applicability of the participative approach depends on the existing organisational culture, which defines how people communicate among each other. Two types of culture have been identified – consensus oriented cultures and authoritative cultures. In *consensus oriented cultures* subordinates can question higher managers, the dialogue between levels of the organisation is open and direct and reward systems encourage initiatives from all levels. In *authoritative cultures* management is by directives only, the dialogue is indirect and initiatives from different levels of the organisation are not encouraged. In an authoritative culture it is extremely difficult to achieve a "good" modelling result, since hidden agendas and fear of retaliation obstruct the creative effort. Our advice is *against* using a participative EM in authoritative cultures.

EM has proven to be useful in a variety of contexts and in different organisations. Versions of methods from the "Scandinavian" strand of EM have been successfully applied in six EU funded R&D projects and in numerous European organisations, e.g. British Aerospace (UK), Capital Bank (UK), Public Power Corporation (Greece), Sema Group (France), Telia (Sweden), Vattenfall (Sweden), Volvo (Sweden), Verbundplan (Austria), Riga City Council (Latvia).

4   EKD FOR PARTICIPATIVE BSC IMPLEMENTATION

EKD contributes to improving the quality and acceptance of business decisions made as part of the BSC implementation projects. This section explains how EKD helps to solve problems associated with BSC implementation projects (see Section 2). Therefore, the section is organised according to the phases of a BSC implementation process (see Section 2 and Table 2). Here, firstly, typical problems of each BSC process step are discussed and, secondly, arguments for and perspectives on EKD support are given:

(1) *Identify and Select Stakeholders: The main problem at this phase is the need to identify stakeholder groups that are relevant to the organisation's vision*. EKD does not specifically address this issue. On the other hand, the EKD process also requires identifying relevant stakeholders and organisational actors to be later involved in the modelling seminars. We recommend that the top management and the BSC Project management perform this phase together with the modelling facilitator.

(2) *Define the Vision: Problems at this phase are the difficulty to identify and balance distinct concerns about the organisation's long-term vision as well as lack of management's acceptance of and com-*

mitment to the strategic vision and goals. Usually the organisation's vision is defined in broad terms, which often leads to different ways of understanding and executing the vision. The vision might also consist of short and somewhat ambiguous statements which need to be interpreted within the company and related to top level strategic goals of each division. In addition there might be a gap between what is to be done in order to achieve the vision and what the different top-level managers believe they should do.

We address this issue by organising a participative modelling seminar devoted to modelling the organisation's vision and to refine the vision into top level strategic goals. The aim is to elaborate the overall vision into a number of concrete strategic goals that the top level management and stakeholders agree upon. At the modelling seminar the group should discuss and incorporate views of individual managers and stakeholders. Conflicting views and opinions should also be discussed and resolved. The *tangible result* of this phase is an initial version of a Goal Model. The *intangible result* is top management's increased understanding of the vision, consensus about how to reach the vision in terms of explicitly formulated strategic goals, as well as commitment to these goals.

(3) *Identify Strategic Goals in Stakeholder Perspectives: The problems at phase 3 relate to the difficulty elicit and document goals for different stakeholder groups as well as to deal with conflicting goals.* To do this only with interviews and questionnaires is time consuming and finally the analyst still has to interpret and consolidate the results. Conflicts discovered afterwards are difficult to analyse and to resolve without additional input from the stakeholders.

Within this phase, we organise a series of participative modelling seminars, minimum one with each stakeholder group, in order discover the problems that they face and to formulate goals to solve those problems. If conflicting goals are uncovered they are either resolved during the modelling seminar or documented explicitly in the model. In the later case, the BSC implementation team has to address the conflicts later, e.g. by formulating appropriate operational goals, measures, or business processes. The *tangible result* of the modelling seminar is one Goals Model per each stakeholder group – goal landscapes. The *intangible result* is the BSC implementation team's increased understanding about various problems that the stakeholders wish to address as well as their needs and goals. In addition, the stakeholder representatives are directly involved in the BSC implementation process which stimulates their interest in and acceptance of the actions and processes decided upon and then subsequently implemented.

(4) *Select Strategic Goals from Stakeholder Perspective: The challenge at phase 4 is to identify and manage dependencies between organisation's vision, strategic goals and goal landscapes of the different stakeholder groups.* Difficulties in this process are caused by the facts that (a) not all goals in the goal landscapes can realistically be fulfilled, because some of them would conflict with the organisation's vision and/or strategic goals, and (b) some goals in one goal landscape conflict with goals in an another goal landscape.

A participative modelling seminar aims at integrating the different goal landscapes and at operationalising organisation's top level strategic goals in accordance to the goals of the stakeholder groups. The modelling group which includes top management and BSC Project Management should review the goal landscapes and identify conflicting goals. On the basis of this knowledge they should then decide on the alternatives their organisation should develop. More specifically, they should develop operational goals for the strategic goals documented in the initial Goal Model developed at phase 2. These strategic goals should be in accordance with the stakeholder goals documented in the goal landscapes. The *tangible result* of this phase is a more detailed Goal Model which now includes operational goals. The *intangible result* is top management's and BSC implementation team's consensus and commitment to operational goals as well as explicit and shared knowledge about stakeholders' goals.

(5) *Define Measures: The problems at this phase are associated with the need to identify the "right" measures in order to connect the operational goals to actions and business processes.* The challenge is to balance diverse perspectives on measuring systems and to decide upon the measures that fit the organisation's culture, leadership as well as management needs and style.

Within this phase, the main objective of the participative modelling seminar is to review the existing Goal Model and to develop measurable goals. This can be done by either reformulating the existing goals in the goal hierarchy, or extending the goal hierarchy "downwards" by asking questions like "how" for each goal. The measurement indicators should also be discussed and decided upon at this stage. They should be connected to the business goals thus ensuring that they provide information useful for management control. The *tangible result* is a refined version of the Goal Model containing SMART goals (goals that are Specific, Measurable, Accepted, Realistic, and Time framed) and a set of associated measurement indicators. The Goal Model in essence is the documentation of how to implement the vision in operational terms. The *intangible result* is further increased commitment to and acceptance of the business goals and measures.

Phase	Who is involved?	What are the issues?	What are the problems?	How does EKD address these problems?
(1) Identify & Select Stakeholders	▪ Top Management, ▪ BSC Project Management	▪ How to identify and select the relevant stakeholder groups?	▪ How to identify stakeholder groups that are most relevant to the organisation?	▪ EKD does not support this activity. Is required as part of the preparation for the subsequent modelling activities.
(2) Define the Vision	▪ Top Management, ▪ Stakeholder Representatives, ▪ BSC Project Management, ▪ Facilitator	▪ How to define a long-term and sustainable vision for the organisation?	▪ How to identify and balance distinct concerns? ▪ How to create acceptance for the vision?	▪ Participative modelling seminar – top level strategic goals ▪ Acceptance and commitment through participation
(3) Identify Strategic Goals in Stakeholder Perspectives	▪ Management Representatives, ▪ Stakeholder Representatives, ▪ BSC Project Management, ▪ Facilitator	▪ What are the goal landscapes for each stakeholder group?	▪ How to identify, structure, and document the goals? ▪ How to deal with conflicting goals?	▪ Participative modelling seminar – landscape of strategic goals for each stakeholder group
(4) Select Strategic Goals from Stakeholder Perspective	▪ Top Management, ▪ BSC Project Management, ▪ Facilitator	▪ How to select the strategic goals that should be pursued?	▪ How to identify and manage interrelationships between different goals? ▪ How to select the goals a.t.b. of different stakeholder interests?	▪ Participative modelling seminar – decision and integration of the different goal landscapes of each stakeholder group ▪ Elaborate operational goals
(5) Define Measures	▪ Management Representatives, ▪ Employees involved in the processes ▪ BSC Project Management, ▪ Facilitator	▪ What are suitable measures to monitor the goal achievement?	▪ What are the "right" measures to connect goals and actions? ▪ How to deal with the diverse perspectives on the measuring systems?	▪ Participative modelling seminar – develop measurable goals ▪ Elicit measurement indicators
(6) Define Actions & Resources	▪ Management Representatives, ▪ Employees involved in the processes ▪ BSC Project Management, ▪ Facilitator	▪ What is to be done in order to achieve the goals? ▪ Who does it and which resources are to be used?	▪ What are the "right" actions and processes? ▪ How to deal with the diverse views on the actions to be taken?	▪ Participative modelling seminar – modelling processes and actors
(7) Performance Controlling	▪ Management ▪ Controlling ▪ BSC Project Management	▪ Are the goals achieved? ▪ What problems occurred? ▪ Where to aim improvements?	▪ Is it the goals, the measures or the actions that were not suitable? ▪ How to solve the problems?	▪ Modelling and analysing problems and linking them to goals, measures, and/or actions.

Table 2:   EKD in BSC Implementation Steps

(6) *Define Actions and Resources: The problems at this stage are associated with the need to decide on the actions and business processes that fulfil the organisation's intentions.* Often the management

needs to analyse various alternative scenarios for achieving *goals*. We also need to integrate and consolidate different suggestions and views of different organisational actors, e.g. top management, operational management, process owners, etc.

Within this phase, a series of participative modelling seminars is organised in order to develop business processes that fulfil the business goals as expressed in the Goal Model. Since several business processes will have to be designed, more than one seminar is usually necessary. Some processes may also be designed in parallel to shorten the time of the BSC implementation project. The modelling teams should include actors who will eventually be responsible or perform the processes being modelled. The way of working at this phase is to review the Goal Model and for each operational goal to ask questions such as "how to fulfil". In some cases the team might also decide to model the organisational structure and resources needed for performing the business process. Phase 6 is considered complete when each operational goal is linked to some business process which fulfils it. The *tangible result*s of this phase are Business Process, Actors, and Resources Model providing organisational designs of how to reach organisation's strategy as specified in the Goal Model. The *intangible result* is an improved quality of the process designs and acceptance of the processes because employees with direct interest in them have been involved in their design.

(7) *Performance Controlling: At this stage two types of problems need to be solved: firstly, business problems hindering the achievement of the business strategy and goals and, secondly, various weaknesses in the BSC design or implementation.* Examples of business problem types are new kinds of business problems emerging in the organisational environment or the BSC implementation team had overlooked some earlier problems hence they are not addressed in the Goal Model and Business Process Model. Examples of BSC implementation problems are incomplete goal refinement into operational goals or processes, the alternatives chosen are not the most efficient ones, or measurement indicators do not provide adequate means for control.

When new or unknown problems are suspected the EKD framework may first help to identify the problems and then analyse *potential solutions and their impact on the organisation's vision, goals, business processes and measures.* A modelling seminar might be required, if the problem and the required solution is significantly complex and/or requires knowledge contributions from various actors to be addressed/solved.

5   EXAMPLE– EKD FOR BSC IN PUBLIC ADMINISTRATIONS

This section shows an example from an EKD-supported BSC implementation in a public administration, based on the data of an empirical case study. The case setting is a public administration in Europe which employs about 2000 employees. Here, major objectives of the BSC project (which has undergone the process steps as schematised in Section 2) were, for instance, strategy development, linking operations to strategy, performance measurement, and also stimulating the organisational culture. Also in this project, typical problems occurred (see Table 2). While it is possible to provide only an extract of the project case within this paper, the goal, measure, action, and resource definition (steps 4 to 6, see Figure 1 and Table 2) are included in the example of an EKD model (see Figure 3). The figure shows a fraction of the GM about strategic goals concerning fighting drug abuse in the city. The top level strategic goal (goal 1) is then refined into a number of sub-goals, some of them expressed in measurable states and linked to business processes that fulfil them. The model also defines which actors are responsible for which goals and which actors are performing which processes. This model can be further elaborated in a number of ways. E.g. the refine goal 3 in to a hierarchy of sub-goals, further analyse goals 4-8 and define additional operational goals that support them, define specific measurement indicators for these goals.

A major experience which was made: organisational culture awareness is a key success factor. Balanced Scorecards are often used to stimulate organisational culture development, for instance, towards strategic thinking or towards performance orientation. However, their successful implementation often depends on that they develop, not revolutionise the core of the organisational culture (cf., for instance, Sackmann 1991, Sackmann 1992). This means that the discrepancy between the cultural assumption of BSC and the

actual organisational culture very much influences the project success. At this juncture, applying EKD as a problem solving method (in general terms) within the organisation at a certain point of time before the BSC project starts can be a feasible option.
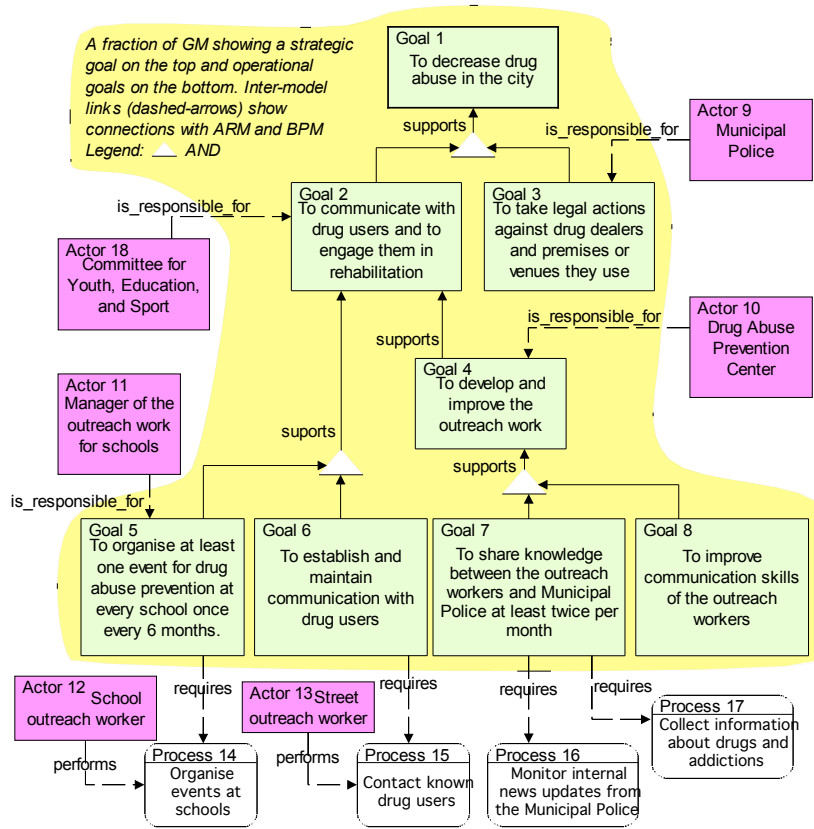

Figure 3:   Integrated EKD Model based on the case study example

6   CONCLUSIONS AND FUTURE RESEARCH

BSC implementation needs participative Enterprise modelling (EM). Participative EM methods lead to improved quality as well as to consensus and to increased acceptance of the business decisions. On the other hand, though BSC being a widely applied management instrument, BSC implementation often struggles when it comes to discovering and documenting tacit knowledge or knowledge that is not easily accessible or not of sufficient quality. Participative EM can address this challenge and support BSC implementation projects by providing means for knowledge discovery and analysis as well as for deliberations about the management decisions.

The EKD approach is well capable of supporting the BSC implementation process. We integrated participative EM approaches, taking EKD as example, and BSC implementation and operationalised this conceptual innovation by performing a stepwise analysis of BSC implementation process and matching it with participative EM support. The procedural model developed facilitates carrying out the new approach in terms of a project setting in practice. The empirical example, taken from the data of a public administration case study, demonstrated the feasibility of participative EM for facilitating BSC implementation processes. At this juncture, a brief paper self-assessment seeks to bring further clarity to presenting our research findings and follows Hevner et al.'s (2004) guidelines for design science research evaluation (see Table 3).

Guideline	Addressed by the paper
Epistemological Positioning	▪ The epistemological position taken is that of linguistic interpretivism. Assuming that a real world' exists, the perceptions of it are influenced by the subject (Weber 2004). The reason for such subjective perceptions of reality is assumed to be language differences, as languages not only provide representative means, but also form perceptions and constitute a differentiation instrument. As a consequence, an aim is to create a language community relating to the issue of interest (for more details see Becker & Niehaves. 2006; Kamlah et al. 1973).
Addressing a relevant problem	▪ BSC implementation often struggles when it comes to discovering and documenting organisational knowledge that is not easily accessible or not of sufficient quality ▪ Often little acceptance for and commitment to decisions introduced in a top-down manner among passively affected employees (also lower management) ▪ Little systematic and methodological support for strategy development and decision making in the context of BSC which involves diverse parties
Making a research contribution	▪ Stepwise analysis of the BSC implementation process and detailed analysis of repeatedly occurring problems ▪ Integration of BSC implementation and participative enterprise modelling (EM), taking Enterprise Knowledge Development (EKD) as an example ▪ Procedural model of the integrated concept which facilitates application in practice
Choosing an adequate research method	▪ Conceptual and theoretical-argumentative method has been chosen and confirmed valid for conceptually integrating BSC implementation and participative EM
Addressing the question of research rigour	▪ It was sought to rigorously apply the conceptual and theoretical-argumentative method by remaining a very high clarity of argumentation. Here, for instance, the core arguments commence each paragraph and are high-lightened in italics.
Designing an artefact	▪ The procedural model for EKD-supported BSC implementation is an artefact of a socio-technical design procedure. The need for this artefact has indeed emerged in BSC-based IT development projects, also conducted by the authors.
Research evaluation	▪ The first steps of research evaluation, applying the integrated concept on the basis of data from a public administration case study, yet indicated its feasibility. However, further evaluation is necessary.
Adequate communication of research	▪ Clarity of argumentation was primary goal for research communication (see above) ▪ ECIS has been chosen as publication outlet due to it being a European conference with a strong design background, especially regarding socio-technical approaches.

Table 3:   Design Science Research Assessment (cf. Hevner et al. 2004, also Becker & Niehaves 2006)

Future research on the topic is necessary. In addition to EKD, other approaches to EM (see, for instance, Bajec & Krisper 2005, Castro, et al. 2001, Dobson & Blyth & Strens 1994, Fox & Chionglo & Fadel 1993, Yu & Mylopoulos 1994, Zorgios 1994) should also be assessed in the context of BSC implementation. Furthermore, additional case applications will allow more insights into the feasibility but also into possible problems regarding the integrated concept of BSC implementation and participative enterprise modelling.

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