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The use of the Balanced ScoreCard (BSC) in the Model for Investment and Evaluation of Medical Information Systems.

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Abstract. This paper describes the use of the Balanced ScoreCard (BSC) in the MIEMIS meso-model (Model for Investment and Evaluation of Medical Information Systems). The scope of the MIEMIS model is to integrate the evaluation process into the whole lifecycle of an information system using both a prospective and a retrospective approach.
We conclude, that the MIEMIS-model has benefited from implementing the BSC into the model due to the fact, that the BSC can support the project management work. This approach helps ensuring, that the new information systems are fulfilled according to the plan and with a balance between the four perspectives (financial, customer/user, internal, and innovation/learning perspective) to avoid that the financial aspect is the driving force in developing and implementing a new information system, for example.

1. Introduction

The scope of the MIEMIS project is to develop a Model for Investment and Evaluation of Medical Information Systems - the MIEMIS model. The philosophy is to move from a traditional independent evaluation process to an integrated approach, where the evaluation process is integrated into the lifecycle of an information system with identifiable elements each characterised by a set of well defined prerequisites. In the dimension of generality the model is divided into three layers - the macro or high level model, the meso or intermediate level model, and the micro or detailed level model [1,2]. This paper focuses on the meso layer of the model.

The background of the work is the fact that many projects in the health care sector have failed in the past due to mainly three reasons [3]:

1. Technical shortcomings
2. Project management shortcomings
3. Organisational shortcomings

We have constructed a model that helps managing reasons 2 and 3 leaving the managing of technical shortcomings to other approaches. Of course there are still problems with the technical issues, but compared to earlier the technical issues are not the most important areas any more.

2. The MIEMIS-model

The scope of MIEMIS (Model for Investment and Evaluation of Medical Information Systems) can be divided into a prospective and a retrospective part. The prospective part should develop a better methodology for ensuring that the expectations from a medical information system are fulfilled during the implementation. The retrospective part should ensure that not only systems with a short financial pay-back time are evaluated positively, but also systems with a large impact on elements like quality, interpersonal relations, job motivation / job enhancement and other issues, that are difficult to measure in figures [4].

The MIEMIS-model has three levels: macro, meso and micro. Moving from macro to micro is a process where macro is described in mostly theoretical oriented and micro mostly empirically oriented, whereas the meso model is a combination of theory and empirical methods.

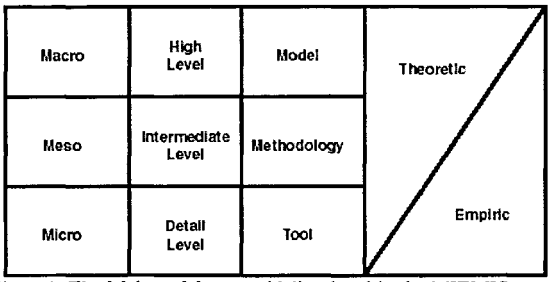

Figure1: The Makro-, Meso- and Microlevel in the MIEMIS-model.

2.1.The Macro level

The macro level is the high level in the model. This level gives an overview of the MIEMIS-model, and shows how the individual elements of the model are related to each other.

2.2.The Meso level

The meso level is the more detailed level, where methodology transforms theory into useful procedures for implementing information systems. The meso level specifies metrics, costs and benefits for the new information system.

2.3.The Micro level

The micro level is the lowest level in the MIEMIS-model and it fully describes tools for all the details in the MIEMIS-model. The tools will be defined so that they can be used directly in the empirical settings where the new information system will be developed and implemented.

3. The MIEMIS meso model for the Benefit Management Process

The MIEMIS meso model for the Benefit Management Process - in the following referred to as the meso model - is a three-dimensional model. The first dimension covers seven phases in the information system lifecycle from idea through strategy/planning, context definition, content definition, application development, system implementation to use and maintenance. The second dimension is related to each phase in the information system's lifecycle and covers process, technology, people, skills & competencies,

organisation and culture. Moreover, we have included a review part that is a method to ensure the quality and content of each phase in the lifecycle, and to ensure the integration of the seven phases. The third dimension is inspired from Kaplan and Norton and their Balanced ScoreCard (BSC) and is the topic of this paper [5,6].

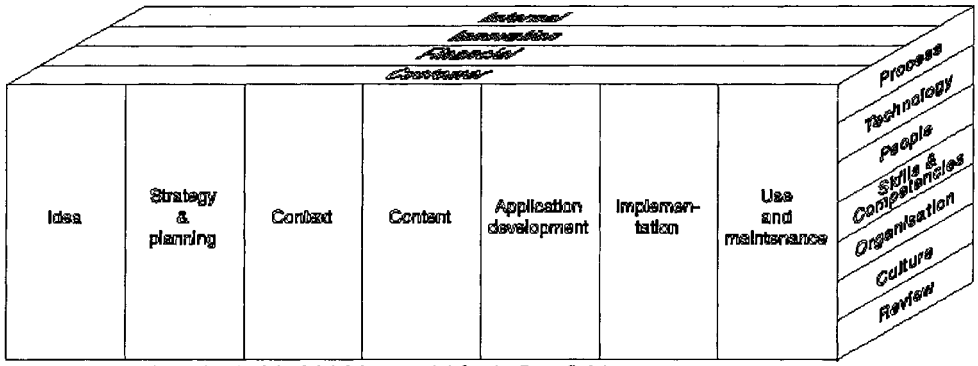

Figure 2: The MIEMIS Meso-model for the Benefit Management Process (BMP).

3.1. Definition of the Balanced ScoreCard (BSC)

According to Kaplan the BSC is organised around four different perspectives - the financial perspective, the customer perspective, the internal business perspective and the innovation and learning perspective. The term 'balanced' indicates the balance to be achieved between short- and long-term goals, between financial and non-financial measures of performance, between lagging and leading indicators and between external and internal performance perspectives [6]. By using the four different perspectives in the BSC and balancing them to each other the above mentioned balanced should be achieved.

3.2. Use of the Balanced ScoreCard in the meso model

The MIEMIS-model uses the BSC in the project management process during the seven phases in the information system lifecycle and to ensure the balance between the four perspectives. In relation to the management process an important aspect is to include the different user-groups in the development of the contents of the four perspectives. In that way the BSC form the common basis of the whole information system lifecycle because nearly every person who participate in the project during the information system lifecycle will know the content of the BSC and during the formulation of the contents he or she has at some level committed him or her to the content of the BSC. In that way the BSC will be a tool to ensure that the participants in the project have a common understanding of the objectives of the information system.

We also use the BSC as an active part in the meso model. The first outcome is during the formulation of the vision and idea of the information system, which could be more precisely defined if the BSC is completed and updated during the information system life cycle using the feedback coming during the fulfilment of the phases in the lifecycle. At the same time the BSC will be a tool to ensure that the visions and ideas are fulfilled during the system life cycle because the visions and ideas are clearly formulated and communicated to the involved persons and therefore they could have a better understanding of the visions and ideas.

According to statements mentioned above the BSC can be used in the project management process to plan and to determine goals and to focus on those parts, which are

under the estimated level - or maybe ignored. Another approach could be to check the measures in the BSC and to list the degree of fulfilment for each measure. The project management approach can be different, but at least two main approaches can be used:

- focus on the measures with the lowest degree of fulfilment
- focus on the measures which are fulfilled or almost fulfilled

Normally we would prefer the first approach, but in some cases the latter would be preferred, e.g. if it is impossible to find a pattern in those measures that are not fulfilled or if it is of minor importance for the fulfilment of the information system project. Figure 3 shows an example of the information that a project manager can get from the BSC. In this example the score for the financial and for the innovation and learning perspective are much higher than for the two others, and therefore the project manager has do decide what to do. In this way he can use this simple graph in his management work, and as a visualisation tool for the workgroups in the project.

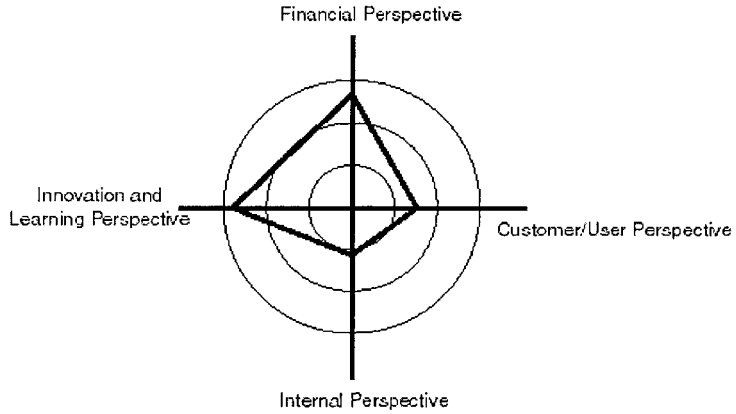

Figure 3: The Balanced ScoreCard - an example of a BSC-profile.

The feedback to the different workgroups will be a way to optimise the outcome of their work and to give them an opportunity to learn from their previous work to become better to do their job in the future. It is important that the project manager motivate the different workgroups to learn from their former work - not only to change the outcome of their work (single-loop learning), but also to change their way of working (double-loop learning) [7,8].

3.3. The benefits from the use of the Balanced ScoreCard

The use of the BSC in the meso-model will result in a reasonable tool which can form the basis for improving the quality of work in all the phases of the information system lifecycle and as an input to improve the implementation of the learning organisation and the double-loop learning concepts. The scope and content of an information system is normally justified during the development and implementation phases due to change in the surroundings or in the users awareness about the context and content of the information system. Several projects have shown that the traditional project management methods have difficulties in handling these adjustments. We claim that the BSC will be a useful part of the project management process and will give the project manager a dynamic and event driven tool to optimise the benefit from the information system and to show the consequences even in a changing environment. Balance is the keyword in this process, because without a balance between the financial perspective, the customer perspective, the

internal business perspective and the innovation and learning perspective it will be difficult to achieve the maximum benefit from an information system.

4. Conclusion

Finally we can conclude that the MIEMIS-model have benefited from implementing the BSC into the meso-model. We use the ideas in the BSC to develop and implement an information system to ensure, that the processes regarding the new information systems are fulfilled according to the plan and with a balance between the four perspectives to avoid that for example the financial aspect are the driving force in developing and implementing a new information system.

5. Future work

The future work on the MIEMIS-model is concentrated on the development of content and tools in the macro model, and to implement additional tools for project management. The three dimensions in the meso model will be extracted into concrete tools for every combination of the three dimensions. The tools for project management will be integrated into all levels of the MIEMIS-model to ensure that the information system is fulfilled according to the user expectation stated at the beginning of the information system lifecycle and updated during the lifecycles.

6. Practical use

In the forthcoming months the MIEMIS-model will be tested on the implementation of an electronic nursing patient record at three hospitals in the county of Northern Jutland.

Acknowledgements

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