


Position Paper on Developing Standardized Modelling Approaches for the Management of Healthcare Organizations

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ABSTRACT

Healthcare organisations are continually forced to rethink and redesign their processes and procedures due to internal and external requirements and occurrences. The best way to test new procedures would be through real-life experiments and/or simulations based on real-time data. However, experiments are only rarely possible in a service provision environment which is highly complex and safety and security driven, and so data are sometimes not available in the required quantity (yet). The application of models provides an alternative. However, to serve as a solid foundation, such models need to fulfil certain criteria: they need to be consistent, complete, accurate, and without redundancies, and they also have to provide the basis for a common understanding for stakeholders from different backgrounds, thereby making it possible to choose from multiple perspectives.

KEYWORDS

BIM, Building Information Modelling, Healthcare Organizations, Security Driven, Standardized Modelling Approaches

INTRODUCTION

Services provided in healthcare organisations are of a very complex and multidimensional nature, involving different professions, disciplines, roles and perspectives. If procedures need to be redesigned due to whatever reason (e. g. moving to a new facility, reorganisation of roles, need for optimisation, new regulations or quality requirements), there are limited options for conducting real-life experiments within the occupational routine of healthcare organisations because, for instance, the safety and security of patients have to be ensured at all times, operational interruption is usually not possible and complex simulations based on real-time data currently fail due to a lack of necessary data or the high cost programming such simulations can cause. To be able to discuss future scenarios and their advantages and disadvantages as a transparent basis for prioritisations as well as for a systematic further development, models can be an alternative of great value. However, in order for models to

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be purposeful, they need to fulfil several criteria to ensure a goal-oriented discussion and sensible decision making.

What Are Models (For?)

According to Stachowiak (1973), a pioneer in the development of the model theory, the word “model” evolved from the Latin “modulus”, mainly comprising the meanings of measuring, standardising, defining, forming, specifying. Models can thus be used to e. g.

- visualise and explain certain contexts, relationships and interdependencies.
- structure knowledge/information.
- help reduce complexity, increase manageability and support decision-making.
- establish a knowledge base for stakeholders in a specific context and reach a common Understanding.
- develop scenarios.
- help to optimise resource allocation.

Models in a business and management (research) context

- are commonly understood as immaterial/graphical representations, simplified (re)constructions or abstract interpretations.
- show elements which can be tangible or intangible things, reveal their interdependencies and/or behaviour of a real-life setting at a certain point or period of time.
- can include different levels and perspectives.
- can be formal using a specific modelling language (e. g. Business Process Modelling Notation, Event-driven Process Chains or flow charts) or informal using freely defined drawing elements.
- can show different degrees of abstraction

(see e. g. Becker et al., 2012; EABPM, 2014; Pidd, 2009, Prilla, 2010; Rosemann, 1996).

In the literature, many different types and differentiations of models are mentioned, such as static models, semantic models, normative models, explanatory models and many more. It becomes clear that the model type has to be chosen wisely according to the specific context and objective. In business and management (research), the modelling perspectives or views mostly include processes, performance or functions/organisations/structures. So typical business and management models are process models, procedure models or enterprise models.

Modelling: How (Not) To

When using the wrong approach or when not adapting a model properly, modelling can be counterproductive, leading to deterioration and frustration. In information systems modelling, a profound debate about good modelling principles has been taking place, leading to an understanding that good models are characterised as

- being consistent, complete and accurate.
- having no redundancies.
- trying to reach a common understanding

(Becker et al., 2012; Frank, 2007; Prilla, 2010, Rosemann, 1996).

This implies that modellers should, in order to ensure the model quality,

- have the corresponding and adequate practical and theoretical knowhow and competencies, including choosing and applying the adequate modelling tools, techniques, types and notations.
- be able to correctly transfer tacit knowledge of involved stakeholders in a visible form.
- be capable of prioritizing the relevant perspectives and elements.

In a complex, multi-disciplinary surrounding like healthcare organisations, those qualifications are difficult to find as a combination in individuals.

Examples of Different Models in the Healthcare Organisation Management Context

As I had dealt with this theoretical background, I also applied this knowhow in research and development projects taking place in the context of healthcare organisation management. Hereafter I will present three examples.

With the goal to support ICT departments of healthcare organisations for a better alignment of non-medical support service applications, a procedure reference model was developed, using the formal Business Process Management Notation (see Figure 1).

To provide a basis for a common understanding in non-medical service provisions in healthcare organisations and thereafter to have a common understanding to define key performance indicators, a process model was developed. First, a meta model was set up, based on the PDSA-cycle as shown in Figure 2. Here, an informal graphical approach was chosen.

For the model for a holistic, interdisciplinary and interprofessional recovery-focussed service provision in health organisations shown in Figure 3, again, an informal graphical representation was chosen. The colours refer to previous project outputs, such as the Service Allocation Model for non-medical Support Services in Hospitals (Gerber, 2016).

The extent to which these examples fulfil all the criteria of good modelling principles mentioned above can of course be discussed, however, this is not the goal of this article. What I realised, and what I want to demonstrate, is that these models might well be useful to illustrate written text in articles or to discuss certain contexts, however they have limited use as a basis for practical development of scenarios due to their two-dimensional nature. Several investigations were conducted to find easy to use tools in order to transfer the above-mentioned modelling principles into a third dimension, following the example of Building Information Modelling which have been turning paper-based architectural plans into 3D models. The fact that I cannot present any such result in the management context indicates that for this context no purposeful, manageable and financeable solution was found.

Arguments Against 3D Modelling

Modelling critics could argue that the main purpose of people working for healthcare organisations is to focus on patients and not on implicit matters such as incomplete and thus potentially unrealistic models. This argument however neglects the fact that 3D models are applied in medicine as well, focusing on certain human organs or medical disciplines. It could also be argued that a context such as healthcare organisations which deal with a great number of unplannable circumstances with many interlinked physical and emotional health topics as well as human interactions is simply too complex to be modelled. However, other complex contexts such as meteorology have been going through the development of modelling large numbers of quickly changing, mutually influencing parameters. In addition, with the ongoing digital transformation and new possibilities to apply artificial intelligence, complexity is increasingly modellable in any context. Another argument against sensible, adequate 3D modelling in the healthcare organisation context could be that it is simply not possible to find (and pay) individuals who have the very different necessary qualifications, combining the practical and theoretical modelling competencies, the healthcare organisation insight as well as the necessary broad stakeholder access. In fact, this is a challenge if we talk about one individual in one organisation. With a combination of experts from different contexts in adequate teams and by establishing an overarching organisational form, this challenge could be met.

Figure 1. Procedure reference model for the alignment of non-medical support service applications in hospitals (Gerber, 2019, p. 134)

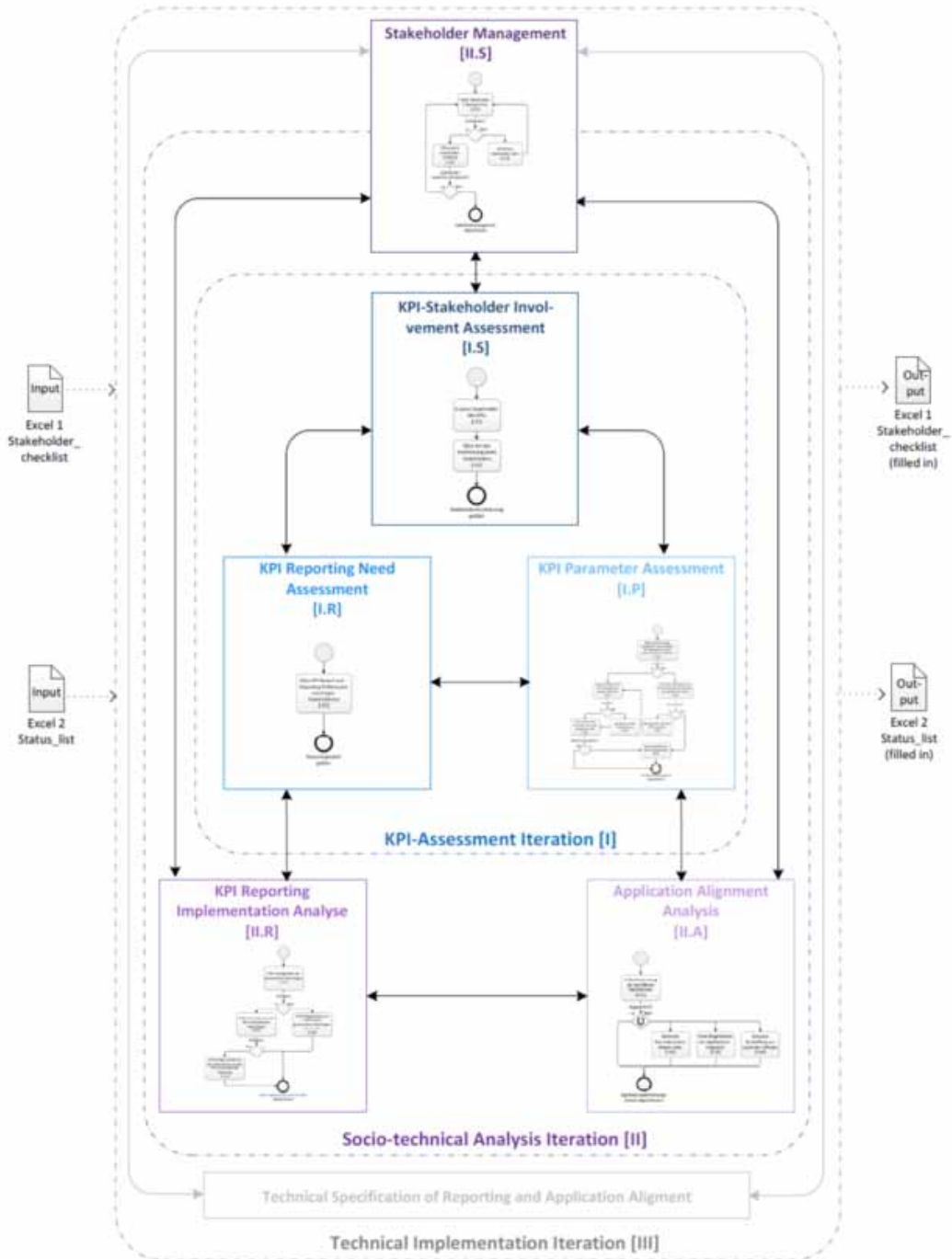


Figure 2. Process Meta Model with KPI Measuring Points (Gerber et al., 2017, p. 12)

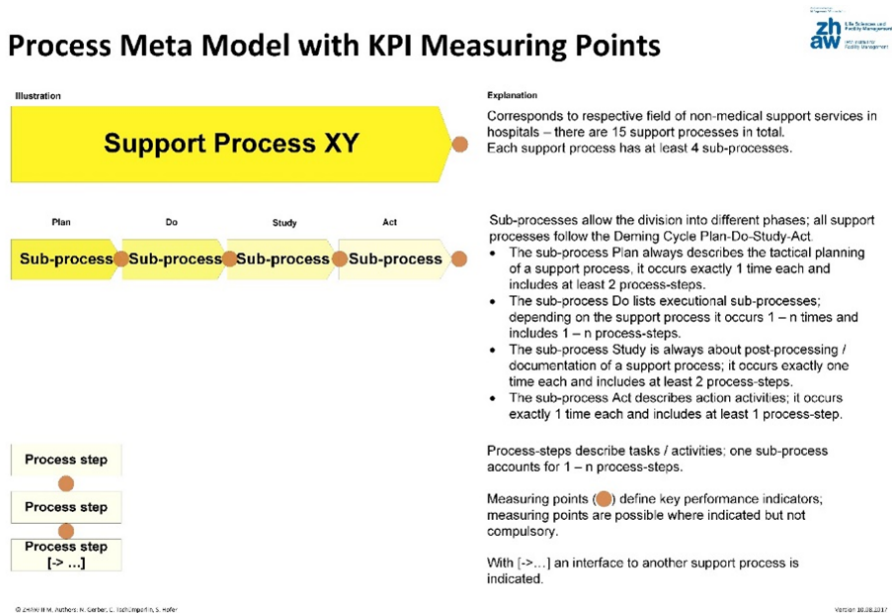
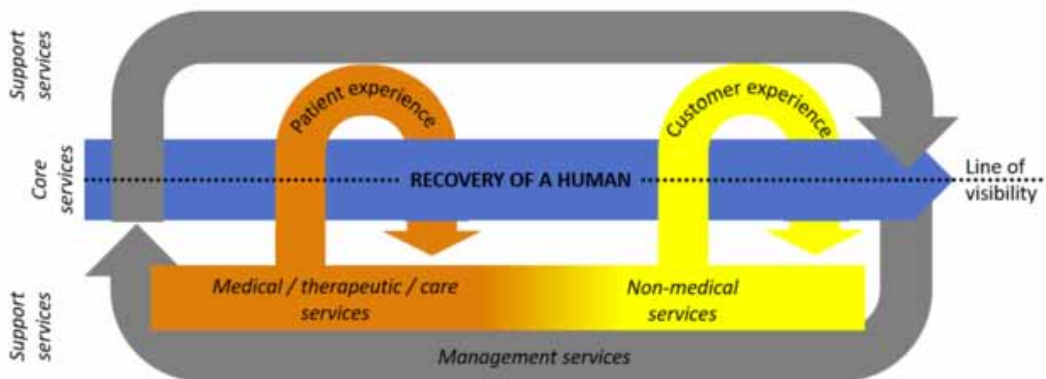


Figure 3. Model for a holistic, interdisciplinary and interprofessional recovery-focussed service provision in health organisations (Gerber, 2021, p. 5)



PROPOSITION

I would therefore like to reach out to the international standardisation community and suggest taking up the topic, starting the dialogue on how we could enable standardised, purposeful multi-dimensional modelling in order to support decision makers in healthcare organisations in wisely redesigning and adapting processes and procedures according to continually occurring needs. In the construction context, during the past few years, it was possible to evolve from the 2D paper-based plans to a multi-perspective 3D view thanks to collaboration by, and the contributions of, many professions and disciplines. Why should we not be able to learn from this example and get inspired with the vision to support decision makers in healthcare organisations in adapting their procedures in daily business towards an optimal service provision for patients and customers by a standardised modelling approach?

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