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Value Modeling in Healthcare

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Politicians, healthcare managers, and systems designers need new instruments for managing the complexity of today's healthcare systems. One of the most promising instruments is a recent enterprise modelling technique called value models. A value model is a graphical representation of a network of cooperating actors that together create value through resource exchanges and transformations. Value models have their origin in commercial contexts, where they have been used for analysing the economic viability of networks and their participants. Value models can be extended to cater for the special requirements of healthcare networks, thereby facilitating the design of new forms of collaboration in healthcare as well as innovative healthcare services.

A main reason for these problems is the complexity of the healthcare sector; many healthcare providers, with different responsibilities, terminologies and IT systems, need to collaborate in order to provide high-quality care for their patients. At the same time, politicians, patient organisations, insurance companies and other stakeholders attempt to influence the structure of the healthcare sector resulting in ever more complex relationships, incentives, organisational forms and regulations.

In order to manage the complexity of today's healthcare systems, every healthcare organisation needs to acquire effective instruments for managing knowledge about itself and its environment. Towards this, many organisations have turned to enterprise models as an instrument for improved communication between healthcare professionals, decision makers, systems designers and other stakeholders. An enterprise model is a representation of the structure, processes, information, resources, people, and constraints of an organisation. As enterprise models are usually shown as graphical diagrams, they become easy to understand and manipulate for any stakeholder, thereby facilitating shared understanding. At the same time, enterprise models are so precise that they can be used as a basis for designing healthcare systems and services.

From Enterprise Models …

Some of the most well known enterprise models in healthcare are Health Level 7's Reference Information Model (RIM) and CONTSYS – which are healthcare information models, Health Informatics Service Architecture (HISA) – which describes core healthcare services and their relationships, and SAMBA – which specifies core healthcare processes.

Though enterprise modelling has seen widespread application in the healthcare area, it still suffers from limitations in its scope. It has often taken an internal perspective focusing on business processes, information flows and communication within an organisation. Furthermore, the use of enterprise modelling has in many cases addressed low level issues, like data and terminology analysis, which are primarily of interest for the design and construction of IT supported systems.

However, to manage the increasing complexity of healthcare, enterprise models need to move outwards, i.e. towards the environment in which the organisation is embedded. Enterprise models also need to move upwards, i.e. from IT systems design and implementation towards organisational analysis and design. For handling these needs, a novel type of enterprise model has recently been proposed, so called value models (or business models).

… to Value Models

A value model gives a high level view of the actions taking place in and between organisations by identifying actors, resources and the exchanges of resources between the actors, i.e. a value model focuses on the what in business. Thereby, a value model can be used to describe a network of cooperating actors that together create value through resource exchanges and transformations.

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For illustration, we introduce three different value models describing alternative ways of organising healthcare in a society.

Figure 1 shows the simplest possible value model for a healthcare network, consisting of two actors, a citizen and a care provider, where the care provider offers care to the citizen in return for a monetary fee. Obviously, this model is not acceptable in a European welfare society as some citizens would not be able to carry their healthcare costs.

A more realistic value model is shown in Figure 2, where the government redistributes costs for healthcare - citizens pay taxes to the government, which offers a budget for care providers, who provide care to the citizens. In other words, citizens do not pay directly for their healthcare but indirectly via taxes to the government. In this model, funding of the care provider is not linked to the number of care services offered. Instead, a fixed yearly budget is set. A problem in this model is that care providers do not have any incentives to satisfy citizen demands for healthcare as their funding is not dependent on actual services provided. Furthermore, citizens may be inclined to overuse healthcare services, as they do not need to pay any fee for them.

Such concerns are addressed in the value model of Figure 3, where care providers are reimbursed by the government only for services they have actually carried out. This reimbursement is realised through vouchers issued by the government to citizens, who can use these for acquiring care (in the form of examinations or treatments) from care providers. These can in turn exchange the vouchers for money from the government. Furthermore, the model includes a fee that is paid by the citizens directly to the care providers in order to discourage overuse of care services. It should be noted that this model is oversimplified in the sense that it does not specify why and how a citizen receives vouchers for care; typically a citizen gets unconditional access to primary care, which acts as a gatekeeper to specialist care through issuing referrals, which is a kind of voucher.

Advantages of Value Modelling in Healthcare

Value models offer a number of advantages over other types of enterprise models when it comes to understanding the context of a healthcare organisation. They provide a compact view of the environment of an organisation by focusing on its value aspects and disregarding procedural ones. Value models can therefore be easily understood by healthcare professionals, providing an effective instrument for communication and shared understanding. Furthermore, they are expressed in notions that are directly relevant for healthcare professionals, thereby making them more accessible for domain experts and top management.

Though value models bring many benefits to representing and understanding healthcare systems, they often have a somewhat restricted scope due to their origin in commercial and business applications. In particular, value models typically focus on economic resources, i.e. resources that can be traded between actors, such as goods and services. In a healthcare scenario, this would mean that a value model could include resources like medicine, examinations, treatments, and other services. However, a value model restricted to economic resources is only able to provide a partial picture of the values offered in a healthcare network.

The Role of 'Soft' Values in the Model

For healthcare networks, it is also important to include softer values such as knowledge and experiences internal to an actor, or relationships shared between two or more actors. A value model for a healthcare scenario should, therefore, be able also to include resources like feeling of safety, trust between care takers and care givers, and knowledge about health conditions. Being able to capture these kinds of softer values illustrates one of the main challenges of modelling in healthcare, the fact that we need to represent vague and fuzzy concepts and situations. This is reflected also in other kinds of enterprise models, e.g. process models that in healthcare cannot be as rigid and procedural as is common for industrial applications. In figure 3, we have included (within parentheses) a number of softer values that are acquired as a result of receiving and using resources. For example, a citizen receiving an examination service will thereby acquire an increased feeling of safety as well as an increased knowledge of her health state.

To conclude, value models offer several benefits compared to other enterprise models. They enable healthcare stakeholders to easily get an overview of their complex systems. They can be used to describe the rationale of a network and analyse its sustainability. They can support the analysis and design of different types of network architectures. Finally, value models can be used as a starting point for identifying business processes and services needed for realising the interactions of a healthcare network. We envisage that value modelling will become an even more important instrument in the future, as citizens are no longer only passive consumers but active co-producers of value in a healthcare network. In such networks, a flexible cooperation between multiple healthcare providers and other stakeholders is needed in order to provide tailored solutions for each individual citizen. The role of healthcare organizations will be to continuously reconfigure networks of healthcare providers, citizens, and other stakeholders.

In a follow-up article in the next issue of Healthcare IT Management, we will show how value models can be used as a starting point for designing healthcare services, in particular e-services, that take into account the needs and wants of citizens as well as the goals and constraints of healthcare providers.

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