The Quest for Know-How, Know-Why, Know-What and Know-Who: Using KAOS for Enterprise Modelling

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Abstract. While the field of information systems engineering is largely focussed on developing methods for complex problems and larger enterprises, less is done to specifically address the needs of smaller organizations like small and medium sized enterprises (SMEs), although they are important drivers of economy. These needs include a better understanding of the processes (know-how), why things are done (know-why), what concepts are used (know-what) and who is responsible (know-who). In this paper, the KAOS approach is evaluated as not only useful for developing software projects, but with the potential to be used for developing a business architecture or enterprise model. An example of KAOS is given, by way of illustration, and KAOS was applied in a case study by an SME's CEO, which resulted in a set of questions for further research.

Keywords: Requirements Engineering, Business Process Management, Small and Medium Sized Enterprises, Goal Modelling, KAOS, Business Architecture, Enterprise Architecture, Enterprise Modelling

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Smaller organizations, like small and medium sized enterprises (SMEs), require proper systems to fulfil their information and automation needs, but their first concerns are organizational issues, with IT as a means for achieving business objectives. While most of the effort in the field of information systems engineering is focused towards complex problems and larger enterprises, the specific needs and problems of smaller enterprises are often forgotten.

The problems we specifically look at in SMEs are the need for a better documentation, understanding, and analysis of the processes (know-how), why things are done (know-why), what concepts are used (know-what) and who is responsible (know-who), taking into account the specific characteristics of SMEs that may impose constraints on potential solutions.

In this paper, the goal oriented requirements engineering technique KAOS is proposed as a solution to document SMEs' know-how in process models, know-why

in goal models, know-what in object models and know-who in responsibility models, and to make sure these models are aligned to achieve internal consistency and traceability. The paper describes the relevant characteristics of SMEs and their CEOs and evaluates KAOS in terms of how well it addresses these specific characteristics and needs of SMEs. An example illustrates how KAOS can be used in an SME and a case study gathers questions of an SME's CEO regarding KAOS and its tool Objectiver while building his own models.

The example given for an existing SME delivered some insights. First, the KAOS goal model enables SMEs to document their know-why by asking why-questions (justification) and how-questions (refinement). Alternatives can be expressed by OR-refinements, conflicts by conflicting goals, and obstacles can be analysed and resolved to make the goal model more robust. Second, SMEs' know-how can be expressed by means of a KAOS operation model, which has the extra advantage that the rationale behind the processes can be expressed by linking the operation model with the goal model via operationalization links. In this way, bi-directional traceability between problem and solution spaces is being assured. Third, an SME can make an internal or external agent responsible for goals and for performing operations. Fourth, the KAOS object model provides a common glossary.

This example showed that KAOS, as it was originally developed to be used in software system development projects, has the ability to document and analyse an SME's business architecture.

In the case study, the SME's CEO was very satisfied with the way in which KAOS and Objectiver enabled him to analyse his enterprise and to document both know-how and know-why. However, when building his model, he had some questions that provided us with material to work on in further research.

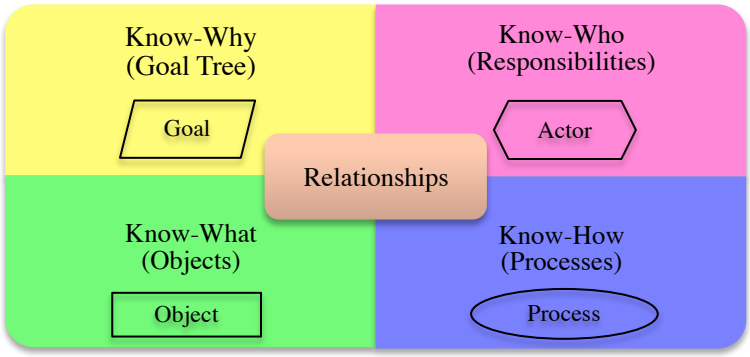

Figure 1: Structure of the four submodels of CHOOSE

After the publication of this paper, the results have lead to the development of the CHOOSE approach (Figure 1), which will be published in the special issue of *Informatie* on architecture in November, 2011[1].

[1] To be published as Bernaert, M. (2011): De Zoektocht naar Know-How, Know-Why, Know-What en Know-Who: Architectuur voor Kleinere Bedrijven in Vier Dimensies. In: Informatie, Sdu Uitgevers bv (2011), http://www.informatie.nl/