Model Based Selection of Organization Specific Improvement Instruments

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I. MOTIVATION

Organizations have to improve their processes continuously. There is a variety of collections of best practices known as maturity-, process- and quality-models as well as standards, norms, etc. that can be used. We call them *improvement instruments.* Organizations have to decide which of these instruments they want to use. Should an organization select CMMI or SPICE? Is COBIT perhaps the right improvement instrument? CMMI-SVC or ITIL?

However the selection of such instruments raises three major problems:

- **Improvement instruments are not transparent enough and hard to compare.** Organizations should consider as much instruments as possible. Although there is information about each single instrument and there are some comparisons between two such instruments, there is no integrated solution that makes a collection of improvement instruments more transparent and supports a selection.
- **Improvement instruments have to fit to an organization.** The organization needs have to be considered. The selection decision is mostly taken or influenced by consultants. However, consultants do not know the organizations closely and the decision can be influenced by other factors. An objective selection process is often missing.
- **Improvement instruments cannot be applied completely.** As the organization needs have to be considered, often only subsets of different improvement instruments are the best choices. The application of entire improvement instruments can be counterproductive.

II. OVERVIEW OF THE SOLUTION

The aim of our research is to develop a model based approach that provides an objective and semiautomatic selection of subsets of improvement instruments that best fit to an organization (see Figure 1). In the following we will describe the elements of our model based approach.

Based on the improvement instruments we want to build an *improvement repository* to achieve transparency of the improvement instruments and support the selection. This repository contains *components* of the considered improvement instruments and further elements that are important for the selection. Components are mostly defined by the internal structure of an instrument and address a certain topic. Otherwise we will create these components. To achieve transparency and support the selection the components are compared and analyzed if they are overlapping. Selection does

not only mean to find the proper components but also to provide for organizations more information about the selected components in order to further use these components. With the comparison organizations gain this information: they will be aware of redundancies and will know to which components or to which improvement instruments, respectively, they can be compliant.
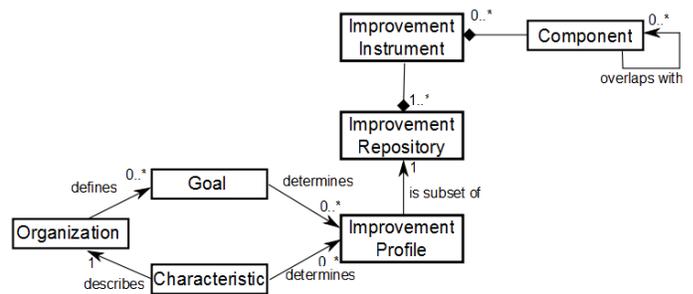

Fig.1 Model based selection

To select the best suited components for an organization we have to consider its internal processes, wishes, culture, environment etc. The selected components have to address the improvement potentials of the internal processes and the organizations' wishes. These are reflected by the goals of the organization. In addition the selected components have to match the culture and the environment of the organization described by the characteristics. Therefore we concentrate on the organizations' *goals* and *characteristics* for the selection of the components.

According to goals and characteristics we can select from the improvement repository a set of components of one or more improvement instruments. These and further elements that provide information about the differences between components constitute the so called *improvement profile* of the organization.

III. CHALLENGES

The determination of an improvement profile for an organization raises the following challenges:

- How can more specific goals from the organizations' overall goals be derived since these are quite general and cannot be directly used for the selection?
- Which characteristics of an organization are important for the selection?

- How can specific goals and characteristics be used to select components?
- What information the improvement repository has to provide to allow a comparison of components?
- How can different improvement instruments (e.g. process, capability models) be modeled in order to compare their components?
- How can new or changed improvement instruments be integrated in the improvement repository to allow a better selection?

IV. VISION

As already mentioned we want to develop a model based selection of components by modeling the improvement instruments and organizations' goals and characteristics.

As comparison of components is needed for the selection we categorize components within the improvement repository to address the different topics of different improvement instruments. A component is associated to a category if it addresses the category's topic. The strength of the association depends on the degree of overlapping between a component and a category. This way, categories allow a first rough comparison, since all components of a category are overlapping to a certain degree.

A detailed comparison of components within a category needs a normalization. Therefore we have to consider the components' elements, the best practices. As best practices are described in natural language they have to be formalized in order to be automatically compared. Hence, there is a need to create a new dedicated language to formalize components and best practices.

However there is a major hindrance to effectively compare components since components of improvement instruments can vary in their level of detail. To cope with different levels of detail we distinguish between concrete and abstract components: Concrete ones can be applied directly while abstract ones firstly need to be specialized by an organization. Obviously, abstract components cannot be compared with concrete ones.

Categories are the central concept to select components (see Figure 2). I.e. categories are determined according to the organization's goals and their related components are
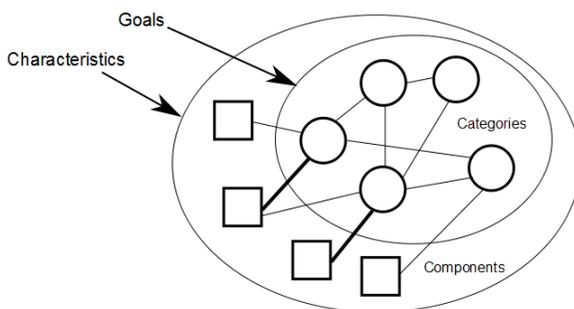

Fig.2 Selection of components according to goals and characteristics

improvement candidates of the organization. This set of candidates needs to be further reduced according to the organization characteristics. The resulting components are the ones that best suit an organization.

A goal based selection of components requires a mechanism to derive specific goals from generic ones. Some decomposition methods like Function Analysis Systems Technique ([1]) and Six Sigma's Y-to-x ([2]) are mentioned in the literature. We have to analyze existing approaches, choose and adapt one or more for our purpose. Applying goal decomposition we can build up a hierarchical model of the goals. Based on this model we also define a mapping to the categories for an automatic selection of the categories.

To find the best suited components we additionally have to parameterize the selection with the relevant organization characteristics. To derive the relevant ones from the set of all characteristics we analyze components for properties that match organization characteristics (e.g. SCRUM practices are suited for organizations having small teams). Therefore modeling the characteristics and the properties allows a selection of best suited components.

Finally the categories allow an easy integration of new or changed components since these components have only to be categorized. It is no longer necessary to compare them against all other components resulting in a very strong coupling. For integration purposes the improvement repository can be used like a "black box" with explicitly defined "extension points", the categories.

V. RELATED WORK

The integration of improvement instruments is also addressed by SEI in an article series. SEI suggests organizations to use the goals and to mix these instruments to get more value out of them [1]. However the provided information is quite general. On the contrary we want to deliver a concrete solution to an organization by not only using the goals but also its characteristics. SEI also proposes a taxonomy of some instruments, which allows a comparison of the instruments. We enhance it by comparing the instruments with respect to their components. We also believe that selecting only components and not entire instruments brings more benefit and make the improvement more efficient.

VI. CONCLUSION

By developing a model based approach we support a semiautomatic selection of best practices for the improvement of organization's processes. Furthermore we develop a system that integrates the improvement instruments and makes them more transparent. This supports organizations to make the first step on to their long journey of improvement.

VII. REFERENCES

[1] SEI - Carnegy Mellon University, Process Improvement in Multimodel Envirnoments (PrIME), SEI. Available at http://www.sei.cmu.edu/process/research/prime.cfm

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