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Preface

Enterprise engineering is an emerging discipline that studies enterprises from an engineering perspective. Enterprises are studied as being purposely designed and implemented systems. Enterprise engineering is rooted in both the organizational sciences and the information system sciences. The rigorous integration of these traditionally disjoint scientific areas has become possible after the recognition that communication is a form of action. The operating principle of organizations is that actors enter into and comply with commitments, and in doing so bring about the business services of the enterprise. This important insight clarifies the view that that enterprises belong to the category of social systems, i.e., its active elements (actors) are social individuals (human beings). The unifying role of human beings makes it possible to address problems in a holistic way, to achieve unity and integration in bringing about any organizational change.

Also when regarding the implementation of organizations by means of modern information technology (IT), enterprise engineering offers innovative ideas. In a similar way as the ontological model of an organization is based on atomic elements (namely, communicative acts), there is an ontological model for IT applications. Such a model is based on a small set of atomic elements, such as data elements and action elements. By constructing software in this way, the combinatorial effects (i.e., the increasing effort it takes in the course of time to bring about a particular change) in software engineering can be avoided.

The development of enterprise engineering requires the active involvement of a variety of research institutes and a tight collaboration between them. This is achieved by a continuously expanding network of universities and other institutes, called the CIAO! Network (www.ciaonetwork.org). Since 2005 this network has organized the annual CIAO! Workshop, and since 2008 its proceedings have been published as *Advances in Enterprise Engineering* in the Springer LNBIP series. From 2011 on, this workshop was replaced by the Enterprise Engineering Working Conference (EEWC). This book contains the proceedings of the third EEWC, which was held in Luxembourg.

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Enterprise Engineering – The Manifesto

Introduction

This manifesto presents the focal topics and objectives of the emerging discipline of enterprise engineering, as it is currently theorized and developed within the CIAO! Network. There is close cooperation between the CIAO! Network (www.ciaonetwork.org) and the Enterprise Engineering Institute (www.ee-institute.com) for promoting the practical application of enterprise engineering. The manifesto comprises seven postulates, which collectively constitute the *enterprise engineering paradigm* (EEP).

Motivation

The vast majority of strategic initiatives fail, meaning that enterprises are unable to gain success from their strategy. Abundant research indicates that the key reason for strategic failures is the lack of coherence and consistency among the various components of an enterprise. At the same time, the need to operate as a unified and integrated whole is becoming increasingly important. These challenges are dominantly addressed from a functional or managerial perspective, as advocated by management and organization science. Such knowledge is necessary and sufficient for managing an enterprise, but it is inadequate for bringing about changes. To do that, one needs to take a constructional or engineering perspective. Both organizations and software systems are complex and prone to entropy. This means that in the course of time, the costs of bringing about similar changes increase in a way that is known as combinatorial explosion. Regarding (automated) information systems, this has been demonstrated; regarding organizations, it is still a conjecture. Entropy can be reduced and managed effectively through modular design based on atomic elements. The people in an enterprise are collectively responsible for the operation (including management) of the enterprise. In addition, they are collectively responsible for the evolution of the enterprise (adapting to needs for change). These responsibilities can only be borne if one has appropriate knowledge of the enterprise.

Mission

Addressing the afore-mentioned challenges requires a paradigm shift. It is the mission of the discipline of enterprise engineering to develop new, appropriate theories, models, methods and other artifacts for the analysis, design, implementation, and governance of enterprises by combining (relevant parts of) management and organization science, information systems science, and computer

science. The ambition is to address (all) traditional topics in said disciplines from the enterprise engineering paradigm. The result of our efforts should be theoretically rigorous and practically relevant.

Postulates

Postulate 1

In order to perform optimally and to implement changes successfully, enterprises must operate as a unified and integrated whole. *Unity* and *integration* can only be achieved through *deliberate enterprise development* (comprising design, engineering, and implementation) and *governance*.

Postulate 2

Enterprises are essentially social systems, of which the elements are human beings in their role of *social individuals*, bestowed with appropriate *authority* and bearing the corresponding *responsibility*. The *operating principle* of enterprises is that these human beings enter into and comply with *commitments* regarding the products (services) that they create (deliver). Commitments are the results of *coordination acts*, which occur in universal patterns, called *transactions*.

Note. Human beings may be supported by technical artifacts of all kinds, notably by ICT systems. Therefore, enterprises are often referred to as socio-technical systems. However, only human beings are responsible and accountable for what the supporting technical artifacts do.

Postulate 3

There are two distinct perspectives on enterprises (as on all systems): *function* and *construction*. All other perspectives are a subdivision of one of these. Accordingly, there are two distinct kinds of models: *black-box models* and *white-box models*. White-box models are *objective*; they regard the construction of a system. Black-box models are *subjective*; they regard a function of a system. *Function is not a system property* but a relationship between the system and some stakeholder(s). Both perspectives are needed for developing enterprises.

Note. For convenience sake, we talk about the business of an enterprise when taking the function perspective of the customer, and about its *organization* when taking the construction perspective.

Postulate 4

In order to manage the complexity of a system (and to reduce and manage its entropy), one must start the constructional design of the system with its *ontological model*. This is a fully implementation-independent model of the *construction* and the *operation* of the system. Moreover, an ontological model has a *modular*

structure and its elements are (ontologically) *atomic*. For enterprises the meta-model of such models is called *enterprise ontology*. For information systems the meta model is called *information system ontology*.

Note. At any moment in the lifetime of a system, there is only one ontological model, capturing its actual construction, though abstracted from its implementation. The ontological model of a system is comprehensive and concise, and extremely stable.

Postulate 5

It is an *ethical necessity* for bestowing authorities on the people in an enterprise, and having them bear the corresponding responsibility, that these people are able to *internalize* the (relevant parts of the) *ontological model* of the enterprise, and to constantly validate the correspondence of the model with the operational reality.

Note. It is a duty of enterprise engineers to provide the means to the people in an enterprise to internalize its ontological model.

Postulate 6

To ensure that an enterprise operates in compliance with its *strategic concerns*, these concerns must be transformed into generic functional and constructional *normative principles*, which guide the (re-)development of the enterprise, in addition to the applicable specific requirements. A coherent, consistent, and hierarchically ordered set of such principles for a particular class of systems is called an *architecture*. The collective architectures of an enterprise are called its *enterprise architecture*.

Note. The term "architecture" is often used (also) for a model that is the outcome of a design process, during which some architecture is applied. We do not recommend this homonymous use of the word.

Postulate 7

For achieving and maintaining unity and integration in the (re-)development and operation of an enterprise, organizational measures are needed, collectively called *governance*. The *organizational competence* to take and apply these measures on a continuous basis is called *enterprise governance*.

May 2013 Jan L.G. Dietz

Organization

EEWC 2013 was the Third Working Conference resulting from a series of successful CIAO! Workshops over the years, the EEWC 2011 and the EEWC 2012. These events were aimed at addressing the challenges that modern and complex enterprises are facing in a rapidly changing world. The participants in these events share the belief that dealing with these challenges requires rigorous and scientific solutions, focusing on the design and engineering of enterprises.

This conviction led to the idea of annually organizing an international working conference on the topic of enterprise engineering, in order to bring together all stakeholders interested in making enterprise engineering a reality. This means that not only scientists are invited, but also practitioners. Next, it also means that the conference is aimed at active participation, discussion, and exchange of ideas in order to stimulate future cooperation among the participants. This makes EEWC a working conference contributing to the further development of enterprise engineering as a mature discipline.

The organization of EEWC 2013 and the peer review of the contributions to EEWC 2013 were accomplished by an outstanding international team of experts in the fields of enterprise engineering.

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