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Revised Papers

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Preface

This book contains the revised papers of the 9th Enterprise Engineering Working Conference (EEWC 2019), held in Lisbon, Portugal, in May 2019, by the CIAO! Enterprise Engineering Network (CEEN), a community of academics and practitioners who strive to contribute to the development of the discipline of enterprise engineering (EE), and to apply it in practice. The aim is to develop a holistic and general systems theory-based understanding on how to (re)design and run enterprises effectively. The ambition is to develop a consistent and coherent set of theories, models, and associated methods that: enable enterprises to reflect, in a systematic way, on how to realize improvements; and assist them, in practice, in achieving their aspirations.

In doing so, sound empirical and scientific foundations should underlie all efforts and all organizational aspects that are relevant should be considered, while combining already existing knowledge from the scientific fields of information systems, software engineering, management, as well as philosophy, semiotics, and sociology, among others. In other words, the (re)design of an enterprise and the subsequent implementation of changes should be the consequence of rationalized decisions that: take into account the nature and reality of the enterprise and its environment; and respect relevant empirical and scientific principles.

Enterprises are considered to be systems whose reality has a dual nature by being simultaneously, on one hand, centrally and purposefully (re)designed, and, on the other hand, emergent in a distributed way, given the fact that its main agents, the humans that are the "pearls" of the organization, act with free will in a creative and responsible (or sometimes not) way. We acknowledge that, in practice, the development of enterprises is not always a purely rational/evidence-based process. As such, we believe the field of EE aims to provide evidence-based insights into the design and evolution of enterprises and the consequences of different choices irrespective of the way decisions are made.

The origin of the scientific foundations of our present body of knowledge is the CIAO! Paradigm (Communication, Information, Action, Organization) as expressed in our Enterprise Engineering Manifesto and the paper "The Discipline of Enterprise Engineering." In this paradigm, organization is considered to emerge in human communication, through the intermediate roles of information and action. Based on the CIAO! Paradigm, several theories have been developed, and are still being proposed. They are published as technical reports.

The CEEN welcomes proposals of improvements to our current body of knowledge, as well as the inclusion of compliant and alternative views, always keeping in mind the need to maintain global systemic coherence, consistency, and scientific rigor of the entire EE body of knowledge as a prerequisite for the consolidation of this new engineering discipline. Yearly events like the EEWC and associated Doctoral Consortium are organized to promote the presentation of EE research and application in practice, as well as discussions on the contents and current state of our body of theories and methods.

Since 2005, the CEEN has organized the 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 EEWC.

This volume contains the proceedings of the 9th EEWC that received 22 submissions. Each submission was reviewed (double-blind) by three Program Committee members and the decision taken was to accept eight full papers and three short papers which were carefully reviewed and selected for inclusion in this volume. Following the spirit of ours being a working conference, we decided to publish post-proceedings after the event, where the papers that were presented and made available to conference participants were revised and extended by the authors taking into account the discussions hapening at the conference, the feedback of the reviewers, and new developments that might have taken place in the research during/after the conference.

EEWC aims at addressing the challenges that modern and complex enterprises are facing in a rapidly changing world. The participants of the working conference share a belief that dealing with these challenges requires rigorous and scientific solutions, focusing on the design and engineering of enterprises. The goal of EEWC is to stimulate interaction between the different stakeholders, scientists, as well as practitioners, interested in making EE a reality.

This year's event was organized in Lisbon in honor of José Tribolet becoming Emeritus Professor at the end of 2019. We remember his vast contribution to the development of the EE discipline and the highly valuable support given to our community.

We thank all the participants, authors, and reviewers for their contributions to EEWC and hope that you will find these proceedings useful to your explorations on current EE challenges.

May 2019

David Aveiro
Giancarlo Guizzardi
José Borbinha

Organization

EEWC 2019 was the ninth working conference resulting from a series of successful EEWC conferences over the past few years. These events are 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 has led to the effort 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. Moreover, 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 2019 and the peer review of the contributions to the conference were accomplished by an outstanding international team of experts in the fields of enterprise engineering. The following is the organizational structure of EEWC 2019.

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