Interoperability and Adaptability in Networked Organisations of the Future: TC 5.3 open invited track proposal for the 20ᵗʰ IFAC World Congress

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Abstract: We are welcoming papers to this open invited track from and Informatics, Complex Adaptive Systems, Enterprise Information Systems and Knowledge management point of view.

Keywords: Systems interoperability; Enterprise networks design and implementation; Future Internet Enterprise Systems
Invited *session identification code*: **q7gx1**

1. INTRODUCTION

The dynamics of today's business is driven by customer demands that require fast response and individualised production, increased competition, and increased complexity of products, services, the engineering processes as well as production / service-delivery processes.

To enable adaptability in the system network structures are created. Engineering and research work around networked shop floors are found under keywords like Cyber Physical Production Systems, Industrial Internet of Things, Industry 4.0.

Various aspects of (organisational) networks on business level are researched in the past few years using terms like Virtual Enterprise, Virtual Breeding Environments, Collaborative Networks.

The point where both strands of research meet is a complex adaptive system. However, future information systems (including the technical as well as the human aspect of information systems) need to be able to maintain interoperability of its sub-systems with the variability, flexibility, complexity and dynamics of these systems.

2. DETAILED DESCRIPTION

``Enterprises should be addressed as complex adaptive systems, stimulated by extensive and resilient sensorial capabilities that are able to detect physical and virtual stimulus, recognizing the context of specific situations and responding and/or reacting accordingly." (Panetto 2015, p15)

The ``network" becomes the dominant structure, where enterprises collaborate in business networks, data is collected from connected devices, cyber physical systems exchange information, and human decision makers have instant access to knowledge. Networks, in contrast to hierarchies, provide a higher level of adaptability but also increase complexity.

The network systems need to be able to provide features like self-organisation, self-repair, and model interoperability across all levels of the enterprise, requiring a seamless interoperation between the subsystems and also between the virtual and physical world (Monostori 2014, Weichhart 2015).

To enable systems, capable to realise the required adaptability and flexible data/information/knowledge flows as well as systems that are interoperable in the face of complexity, novel approaches are required (Weichhart 2016, Agostinho 2015b, Agostinho 2015, Jardim-Goncalves 2013, Weichhart 2014e).

Of interest are not only information systems (including human as well as artificial sub-systems) themselves, but also aspects addressing the design and (re-)engineering of such systems.

We are looking for papers that cover one or more of the following aspects:

- Knowledge-management and Enterprise Interoperability
- Integration and Interoperability in Virtual Enterprises and Enterprise Networks
- Interoperability in Organisations as Complex Adaptive Systems
- Evolution and Learning of Organisations
- Interoperability between Product and Service Systems

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