Requirements Engineering for the Digital Transformation: An Industry Panel

Christof Ebert
Vector Consulting Services
christof.ebert@vector.com

Carlos Henrique C. Duarte
Brazilian Development Bank, BNDES
carlos.duarte@computer.org

Abstract– **Industry and society as a whole are facing radical changes due to fast growing digital technologies and their penetration of practically all areas. Products and services will increasingly augment and integrate the real world with the digital world. This digital transformation has reached all business areas. The role of Requirements Engineering is therefore changing in becoming even more ubiquitous: Changing value chains and production processes, as well as new business models and innovative IT and software systems, need to be developed and operated in even shorter time frames. No wonder that project managers and IT departments feel unable to cope with the challenges on their own. We propose a panel in order to look into the role of requirements engineering in making digital transformations successful. It will address process, culture and technology dimensions.**

Index Terms– **Digital transformation, Requirements Engineering, Software Industry.**

I. INTRODUCTION: MOTIVATION AND OBJECTIVES

Markets, professions and our society as a whole are facing a fast and radical change due to the maturation of digital technologies and their ubiquitous penetration of practically all industry domains and markets. These technologies range from those in the visible and tangible world, such as robots and digital imaging equipment, to those that are intangible or invisible, such as connected micro devices and advanced pattern recognition and artificial intelligence software [1].

Products and services will increasingly augment and integrate the real world with the digital world. This digital transformation has reached all business areas. Companies – and their customers – expect to obtain innovation, market penetration, cost reductions and more flexibility [1,2]. The reported trends in industry are the full digitization of companies, the complete redesign of products and services, and the establishment of closer interactions with customers and suppliers.

The digital transformation has reached all business areas. Digital offers and services are increasing and change not only our behaviors as consumers and society, such as communication, shopping, entertainment or health. It also impacts the way we are doing business and how we improve our business processes in companies. Fig. 1 illustrates that it is not digitization per se, as we have seen it for decades of IT, but rather the flexible and ubiquitous configuration of products, digitization and services which create value.

The driving force behind all these foreseeing transformations is software and its engineering. Software has long been recognized as main sources of competitive advantage of corporations, industries and nations. No matter what business you are in, you are also in the software business. Software and IT have been an important shaper of industries and consumer behaviors for many decades. Digitization – though a buzzword today – has been used in IT a long time to frame the move of traditional technologies and processes towards software-driven approaches.

What is different today is the speed and impact of how software fundamentally changes, disrupts, and creates industries, business models, and sources of competitive advantage. Software is the thread that stitches together what we call the "digital economy" a digital environment that enables virtual communities, seamless business processes, open and fast-changing market places, sharing eco-systems and the ability to use big data and connect and engage with customers anywhere and at any time.

Changing value chains and production processes as well as new business models and innovative IT and software systems need to be developed and operated in even shorter time frames. Not all stakeholders and companies are prepared for these rapid changes. And not all software and IT disciplines and education programs are really considering the underlying methodological disrupts. Efficiency and complexity are seen as major threats [1,3]. No wonder that project managers and IT departments often feel unable to cope with the challenges on their own. This holds specifically for requirements engineering, the discipline closest to the application domains and user needs, while at the same time the discipline with most interfaces and rather imprecise artefacts along the IT value stream.
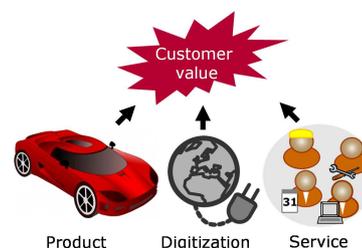

Fig.1: Customer value is created by products, digitization and services – in flexible configurations

We propose a discussion panel in order to look into how requirements engineering as a discipline is impacted by the digital transformation – and how improved requirements reengineering will help companies succeed in their digital innovations and transformations. It will address process, culture and technology dimensions:

- **Stakeholders**: All stakeholders (people directly interacting with a system; people that are affected by the system; people that perceive itself to be affected by a decision, activity, or outcome) must be involved with the digital transformation.
- **Value**: Value creation and new business and user requirements have to be elicited over iterations to evoke implicit knowledge, user needs, and business rationales. Business requirements have to be synchronized with organizational business goals along the value stream.
- **Requirements**: Dependencies of functionalities have to be identified in advance to allow an appropriate interaction and user experience. Quality requirements, specifically security, usability and performance have to be specified and consistently implemented.
- **Processes**: Workflows, services, connectivity needs and users' tasks have to be elicited properly as the system represents a tool to support the users in fulfillment of their tasks and goals.
- **Architecture**: Consistency over the user interface objects have to be ensured using reusable software components. The systems' architecture has to be as flexible as possible to react on changed as well as on new added requirements.
- **Validation**. Software functionalities have to be validated using simulations, models and prototypes as early as possible.
- **Integration**: Usability and human factors are an integrated aspect of a software engineering method rather than be a parallel activity.
- **Continuity**: Business continuity and risk mitigation, such as in case of cyber-attacks or fast changing business climate need to be anticipated and implemented in the underlying IT infrastructure.

The Requirements Engineering Conference, which involves researchers and practitioners with diverse backgrounds from different parts of the world is the ideal forum to discuss the growing impact of RE on the digital transformation – and vice versa.

Specific questions to be addressed by the panel include: What are the pivotal needs of the digital transformation towards requirements engineering from elicitation to validation? Are there relevant past experiences that would enable widespread dissemination? Which stages of the software technology life cycle are covered? What are the major thresholds to overcome? What are the recurring success factors? How does digital transformation affect the chance of success of a project?

II. PANEL FORMAT AND STRUCTURE

The panel will involve researchers and practitioners in order to discuss the impact and relationship of RE and digital transformation with industry and research. The panel is expected to run for nearly 60 minutes, divided into rounds, each of which clearly indicated and guided by the projection of a single theme slide. Each of the rounds is described in more detail below:

1) Introduction (10 minutes): The participants (panelists and organizers) briefly introduce themselves, by providing their affiliation and background, as well as their overall views on the subject.

2) Experiences and Critical Success Factors (20 minutes): The panelists are asked to describe their experiences with digital transformation and critical success factors.

3) RE challenges and resolutions in digital transformation (2 minutes): Panelists are requested to comment on the effectiveness of RE methods and on their possible connection in making digital transformations successful.

4) Closing session (10 minutes): The organizers allow the audience to present remaining questions and comments. Finally the panel will be closed with an outlook on what we learned.

III. ORGANIZERS AND PANELISTS

We expect to have four panelists in order to ensure an interesting debate during the panel. The invited panelists will have a background in Requirements Engineering and experience with Digital Transformation across industries. We will choose half of the panelists to be working mainly in industry and half working mainly as researchers.

The panel organizers have experience from both industrial practice and research. Their background will be used to facilitate the discussions and moderate the debate during the panel.

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Christof Ebert is managing director at Vector Consulting Services headquartered in Germany.
Carlos Henrique Cabral Duarte is a Member of Technical Staff at the National Bank of Social and Economic Development (BNDES) in Brazil.