Lecture Notes
in Business Information Processing

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Welcome to the proceedings of the 6th International Conference on Software Business!

Universidade do Minho (UMinho) hosted the 6th International Conference on Software Business (ICSOB 2015) held during June 10–12, 2015, in Braga, Portugal. Founded in 1973, UMinho is currently among the most prestigious institutions of higher education in Portugal, and it has also gradually come to assert itself on the international scene. The recent Times Higher Education Ranking 2013 included only two Portuguese universities, listing UMinho as one of the top 400 universities in the world. The Times Higher Education 100 under 50 years University Ranking 2015 ranked UMinho in 64th position worldwide. UMinho is also the best Portuguese university in the CWTS Leiden Ranking 2014.

Minho is a former province of Portugal with its capital in the city of Braga and 23 municipalities. The area included the districts of Braga and Viana do Castelo. Minho has substantial Celtic influences and shares many cultural traits with the neighboring Galicia in Spain. The region was a part of the Roman Province and early medieval Kingdom of Gallaecia. Historical remains of Celtic Minho include Briteiros Iron Age Hillfort, the largest Gallaecian native stronghold in the Entre Douro e Minho region, in north Portugal.

Braga is considered the oldest Christian archdiocese in the country and one of the oldest in the world. Under the Roman Empire, known as Bracara Augusta, the settlement was the center of the province of Gallaecia. Guimarães, located in the district of Braga, is one of the country’s most important historical cities and is often referred to as the “birthplace of the Portuguese nationality” or “the cradle city.” Its historical center is a UNESCO World Heritage Site, making it one of the largest tourist centers in the region.

ICSOB was first launched in 2010 to address contemporary issues emerging in the intersection of software and business domains and to bring together researchers interested in the software industry, with a specific focus on the business of software. Since then, ICSOB has been established as a series of annual conferences. Previous conferences were held in Boston (USA), Brussels (Belgium), Jyvaskyla (Finland), Paphos (Cyprus), and Potsdam (Germany).

This year, we selected as the conference theme “Enterprising Cities” to focus on a noticeable spillover of software within other industries (e.g., manufacturing, entertainment industry) enabling new business models: Companies bundle their physical products and software services into solutions (e.g., using subscription models or in-app purchases) and start to sell independent software products in addition to physical products.

Software business carries many inherent features with other international knowledge-intensive businesses making it a challenging domain for research. In particular, software companies have to depend on one another to deliver a unique value proposition to their customers or a unique experience to their users. This year, the conference attracted researchers and practitioners who are concerned with software business in different ways.
as well as the start-up community, which is increasingly focusing on mobile and social software. The main theme of 2015 focused on addressing the challenges that modern cities face regarding the innovative software products and services.

This year’s two exciting keynotes spanned both the reach and the new developments in the software business economy:

- “One Size Does NOT Fit All – Software Product Management for Speedboats vs. Cruise Ships,” by Hans-Bernd Kittlaus, InnoTivum Consulting, Germany
- “Trends and Lookout of the Automotive Software Industries,” by Christoph Gaertner, Bosch Car Multimedia Portugal

The conference received 42 submissions. Each submission was reviewed by at least two, typically three, Program Committee members. The committee decided to accept 16 full, five short, and three doctoral symposium papers. For full papers, this gives an acceptance rate of 38%. The accepted papers follow various methodologies, and represent the diversity in research in our community.

The papers span a wide range of issues related to contemporary software business—from strategic aspects that include external reuse, ecosystem participation, and acquisitions to operational challenges associated with running software business, e.g., the effects of workaround, communication in global software development, or business modeling and experimentation. The strong presence of software ecosystem papers confirms its importance and influence on software business. At the same time, we observed interesting emerging topics, e.g., open innovation as a form of leveraging external innovation sources, continuous customer validation, and the usage of customer feedback data. Finally, (Lean) start-up and innovation also appeared among the topics for this year’s program. We arranged the program into eight sessions that together provided a good insight into current software business research. The industry papers are included at the end of the proceedings.

We acknowledge the following institutions for the support, sponsoring, and cooperation they kindly established with ICSOB 2015: Universidade do Minho, Blekinge Institute of Technology, InvestBraga, Startup Braga, ISPMA, and Young Minho Enterprise. Last, but not the least, we also want to show appreciation for the work of those who created and maintain the EasyChair conference system. It has definitely eased our work.

We would like to extend our warm thank you to the members of the Program Committee, who did a fantastic job in reviewing the papers, ensuring the quality of the conference, as well to the local organization team, whose engagement was essential in making this event a special experience. Furthermore, we extend our heartfelt thanks to Anna-Lena Lamprecht from the University of Potsdam and Tobias Tauterat from the University of Stuttgart for managing the ICSOB 2015 Doctoral Consortium.

We sincerely trust that your participation in the ICSOB 2015 conference was a rewarding experience.

April 2015
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Keynotes
Trends and Lookout of the Automotive Software Industries

Christoph Gaertner

Software Development Department for Bosch in Braga, Portugal

Abstract. Modern low-end cars have embedded more than 30 to 50 so-called Electronic Control Units (ECUs), featuring around 50 million lines of code (LOC). At commercial rate, it represents $1,500 Mio (1.5 billion/milliard). However, a modern high-end car features around 100 million LOC, and this number is planned to grow to 200–300 millions in the near future. As a comparison, a F-22 fighter jet features less than 2 million LOC and a Boeing 787 around 14 million LOC. This presentation focuses on the Automotive Software Development market, the value chain in this market, and how to be part of it. Upcoming new trends as autonomous driving and the car as part of the Internet of Things lead the future automotive software development. Software engineers play an important role in the automotive industry to build up more sophisticated and added-value technology. I will talk about the balance act between being predictable by using processes conform to ASPICE and the need to be cost efficient and agile in the fast changing environment pushed by the influence of Consumer Electronic and Internet Services. I will be discussing the AUTOSAR approach as the upcoming industry standard in this business area, mentioning safety requirements and the ISO 26262. This talk will be interesting to professionals and students who intend to understand and know more about Automotive Software, and to clarify concepts of the car industries.

Christoph Gaertner is responsible for building up a Software Development Department for Bosch in Braga. He is working for Bosch since 2008 and before coming to Portugal he was a section head at Bosch Car Multimedia in Leonberg developing augmented reality solutions for the car driver. He was leading Software Projects for developing display based Instrument Cluster for a German premium car brand. He was an Software Developer and Architect for Head-Unit System at Harman Becker.

He started his career in a consultancy company during the new economy hype end of the 90ies where he already researched and developed smart appliances for the connected home. He has a Diploma in software engineering from the University of applied sciences Esslingen, Germany.
Abstract. A product manager responsible for an established licensed software product that is used by hundreds or thousands of enterprise customers in regulated industries feels hopelessly old-fashioned when she listens to a Silicon Valley consultant talking about his latest experiences. Multiple releases per day? “Very funny! We are happy if our customers install one release per year.” So there is certainly business justification for different scenarios. Which scenarios do we need to consider? Which factors influence the way SPM needs to be implemented and applied so much that they define the scenarios? Which SPM approaches and methods fit which scenario best? The presentation will provide a taxonomy of relevant scenarios with their defining characteristics and suggest appropriate SPM approaches for the scenarios based on practical experience in different customer environments.

Keywords: Software product management · Software product scenarios

Hans-Bernd Kittlaus is the owner and CEO of InnoTivum Consulting (www.innotivum.com) which he founded in 2001. Before he was Director of SIZ GmbH (Computing Center of the German Savings Banks Organization, Germany) and Head of Software Product Management and Development units of IBM. His main focus area is software product management. Hans-Bernd has been working as a trainer, coach and consultant for both corporate IT organizations and companies in the IT industry. He has published numerous books and articles, his latest being “Software Product Management and Pricing” [1]. He is Diplom-Informatiker (corresponds to M.S. in Computer Science) and certified as ISPMA Certified Software Product Manager, Certified Scrum Product Owner (CSPO), and PRINCE2 Practitioner. He is a member of ACM (Association for Computing Machinery, USA), GI (Gesellschaft für Informatik, Germany) and board member of ISPMA (International Software Product Management Association).

Over the last ten years, the software industry has seen an increasing heterogeneity in a large spectrum of aspects, from hardware and software platforms through development methodologies to business models. This makes life more difficult for everybody, be it customers, vendors, researchers or consultants. It does not mean that proven methods and techniques do not work anymore, but we need new approaches for the classification of scenarios and we need to study the applicability of methods and techniques in these scenarios. This talk is focused on software product management (SPM) and
is intended as food for thought by providing some ideas based on extensive consulting and training experience with a large number of different companies.

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**Fig. 1. Software Product Scenarios**

Fig. 1 suggests a classification by using two types of runtime environments and two life cycle phases. Vendor-controlled means that the software vendor decides which changes are made when in the runtime environment. This is typical for rather unregulated environments like B2C internet platforms and SaaS or B2C license products that offer automated maintenance over the internet. In this scenario continuous agile development has become a de-facto standard, usually at a high frequency of incremental small releases, and often without a traditional project management structure. Trial-and-error approaches, known as customer discovery, are common.

If customers want to be in charge of the runtime environment, often for quality and/or regulatory concerns, we use the term customer-controlled. This is typical for a lot of B2B software license products, and also for software provided by corporate IT organizations. In this scenario, a broad range of development methodologies continue to be in use, from waterfall through iterative to agile, usually combined with a traditional project management structure. Releases tend to be bigger and less frequent.

It also makes a difference whether we consider the initial development of a new product or the evolutionary development of a product that already exists and has customers. With new product development, there is a high level of uncertainty and risk, and the focus is on releasing a minimum viable product as fast as possible. Once the product is rolled out, the focus shifts to extending the product scope and target market while compatibility and migration aspects become relevant. In this paper, we do not consider later phases of the life cycle.

Combining these two classification criteria leads to four scenarios that we can now analyze from a software product management perspective:

**Powerboat:** SPM is focused on defining the minimum viable product for the first customers. This requires a close link with development, often by assuming the product owner role (in Scrum terminology), and extensive prototyping. In parallel SPM needs to work on positioning and pricing with Marketing. Investments need to be justified
based on a more strategic perspective, i.e. business model (one-page canvas), business plan (aggressive), product vision (aggressive), product strategy (very high-level), and roadmap (high-level). Release planning is not applicable, requirements engineering is more experimental than analytical.

Speedboat: SPM is focused on extending the product scope and thereby increasing the target market. This requires ongoing analysis of the actual usage of the product, of the market and competition. Depending on the organization’s size, SPM and product owner roles may be separated, but closely linked. Product strategy and roadmapping become more important in combination with life cycle management. Release planning continues not to be applicable, requirements engineering is a mix of analysis and experimentation through customer discovery. If the organization does not implement some governance functions like Architecture things can become messy very quickly. Aspects like governance, compatibility and migration tend to slow the organization down a bit compared to the Powerboat phase.

Icebreaker: SPM is focused on defining the minimum viable product for the first customers. This requires extensive domain analysis as a basis for requirements engineering and planning of the first release with special emphasis on regulatory requirements. If a pilot customer is involved a major SPM task is making sure that requirements are sufficiently generalized so that the first release does not become totally customer-specific. The interface between SPM and Development depends on the chosen development methodology. Product strategy and roadmap already need some focus not only for internal investment decisions, but also since B2B customers want to understand the longer-term perspective before they make their investment decisions.

Cruiseship: SPM is focused on extending the product scope and thereby increasing the target market. Since customers do not want to test and install new releases often, the frequency of releases is rather low, often one or two per year. As a consequence, the new and changed contents of these releases is more significant and requires thorough release planning based on analytical requirements engineering. Product strategy and roadmap continue to be important as is life cycle management.

The increasing heterogeneity of the software industry poses challenging new opportunities for research. Do we need different criteria for defining scenarios? Do we need to differentiate more scenarios?

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