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# University Education as a Networked Service for Competence Co-creation

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**Abstract.** Our societies need game changers that have the competencies to develop emerging business ecosystems based on digital data. We claim that these competencies can be taught through a networked education service process between students, companies of the emerging ecosystem, and university teachers. We present a case study of two university courses in Industrial Management that deal with networked business process development and management, and co-development intervention methods. Both courses include student assignments on an emerging ecosystem case. The assignments were integrated into the studying process through co-creative workshops with the case representatives. According to the results, all actors in the networked education process received value. First of all, the students accumulated competencies and expertise in developing business ecosystems. Facilitated by the students, the company representatives co-created in the workshops a shared understanding of their collaborative service process and service model, which triggered real-life innovations. The teachers realized their new roles and tasks as the “process owners” of the education service. - The results support the networked service approach in university education for competence co-creation. More experimental case and action research applying this approach is clearly worthwhile in all disciplines where students need to co-create competences in interaction with external actors that represent the field in practice.

**Keywords:** Ecosystem, Competence, Education, Service, Co-creation

## 1 Introduction

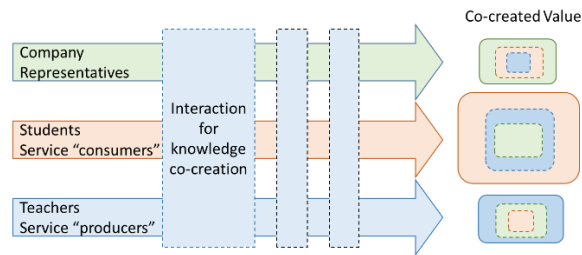
Our societies are currently transforming, with digitalisation as a key driving force. Through collecting, sharing, and exploiting data, companies, as well as public sector and third sector bodies, can cooperate efficiently in novel ecosystems with each other and the end users of the new products and services they provide – nationally and more and more also globally. Digital data opens up enormous possibilities for new business, but organisations lack the necessary collaboration competencies for turning the possibilities into value-adding business model innovations. Universities are in a central role in the national and global innovation systems. How can they answer to the request for new competencies to develop and manage emerging business ecosystems?

In this paper, we show how universities can educate game changers that have the capabilities needed to develop business ecosystems. We claim that the competencies are taught through a networked education service process between students, companies of the emerging ecosystem, and university teachers. We present a case study of two university courses in Industrial Management that collaborated with an emerging company ecosystem. Following the service-dominant logic [1], we analyze how this education service created value to all its actors: the students, the business ecosystem, and the university teachers.

## 2 Theoretical background

### 2.1 Education as a networked service

Following the service-dominant logic [1], education can be conceptualised as a service process, where the students as “consumers” and the teachers as “producers” co-create in interaction the core value of the service, i.e., learning [1, 2]. If external actors, such as company representatives, participate in the process, we can speak of a *networked education service* (Fig. 1)



**Fig. 1.** A course as a networked, interactive service process.

In networked education service, the teachers are the process owners, but the students are responsible for their own learning. The teachers integrate into the students’ studying processes the external actors’ operant resources, to enhance the students’ learning. In the interaction between the students, the company representatives, and the teachers, an innovative knowledge community emerges where all actors co-create knowledge [3, 4]. The students as participants gain *new knowledge and expertise*; the company re-presentatives gain *shared understanding* about their collaborative operations and business, which can even lead to *innovations* in real-life. Moreover, the teachers gain ideas for improving the *networked education service process*, as well as for *empirical research*.

Our case study explores the interaction of teachers, students and company representatives in two university courses. How was company interaction integrated into the studying process of the students in these courses? What value did the students co-create for their learning? Did they develop expertise? Moreover, what value did the companies and the teachers receive from the networked education service process?

## 2.2 Process and business model innovations in ecosystems

Innovation can be defined as an idea or invention that is implemented and creates added value [5]. A central principle of successful implementation is the participation of the users in innovation. It has two roots: one is the law of requisite variety, the other is the principle of empowerment. According to the law of requisite variety [6], to achieve its goal against a set of disturbances, the system's degree of internal specialisation must be at least as high as the environment's variety. Applying this law to innovation, the team should possess enough variety of knowledge to cover the complexity of the problem [7]. Thus, for process innovation, the employees who have the operational process knowledge should participate in innovation to ensure the quality of the innovation.

The principle of empowerment is key to implementation and thus for the final success of the innovation [8, 9]. The employees are the key actors in realising the developed process ideas into practice, i.e., in implementation. Employees that participate in innovation develop a shared understanding, commitment and “ownership” of the change. Therefore, they further the implementation instead of resisting it.

In emerging ecosystems in the era of digitalisation, business model innovations are based on the business potential of data sharing and inter-organisational value co-creation. Thus, based on the law of requisite variety and the principle of empowerment, these innovations cannot be developed by one company. The new processes and business models have to be innovated in collaboration with all potential ecosystem actors that share the joint objective for value creation. The participants in innovation have to represent both the operational process knowledge and strategic business knowledge, as well as knowledge about the companies' ICT systems and new digital technologies.

Empirical evidence of real-life experiments for business model innovation in companies is scarce [10]. In company networks, learning quickly from business model failures and successes are hardly possible. Therefore, experiments for innovation should be arranged in a “laboratory setting,” as a series of participative knowledge co-creation workshops with all relevant ecosystem actors [11, 12]. In workshops, neutral facilitators should apply experimental co-creation methods such as process simulation, gaming, and value network co-creation methods [12]. The successive workshops can provide a temporary governance structure for the implementation of joint business model innovations in real-life ecosystems [11, 12].

Specific new competence for business innovation in emerging ecosystems is the *facilitation of inter-organisational co-creation of business processes and business models*. The two university courses that we analyse include assignments that have been developed to answer precisely to this request. They allow the students to develop and apply facilitation skills for inter-organisational business co-creation in a laboratory setting. The courses as a whole teach the development of emerging inter-organisational business, focusing on business processes and business models, coordination, and knowledge co-creation, as well as co-development methods and management of developmental intervention projects.

## 3 Case: Two courses in networked business innovation

Our study concerns two Master level courses at Aalto University, Industrial Engineering and Management: “Management of networked business processes” (the autumn course),

and “Co-development interventions in business networks” (the spring course). Following the idea of education as a networked service, the courses were designed to include student assignments with companies forming a business network. The selected company network consisted of a service business company and its two partners with whom it had realised its first business case. This business case was used as a pilot case in the student assignments on both courses. The assignments were integrated into the teaching and studying processes of the courses for the first time in the study year 2017-18, with 33 students in the autumn, and nine students in the spring.

The unit of analysis in this case study is the education service process in the two courses. Our research design combines a case study approach [13] with participatory action research since the authors acted as teachers in the courses [14].

Our data consists of 1) Documents of the education service process: the teachers’ notes from planning meetings with the company, e-mails with the company representatives, and two collaboration contracts; 2) Teaching material of the two courses, student assignment presentations, and reports; 3) Video recordings and photos from workshops; 4) Ex-post interviews with four representatives of the pilot network companies (April 2018); 5) Open student feedback from the two courses. The data in 1, 2 and 3 was used to describe the collaborative teaching process. The feedback data in 4 and 5 was used to evaluate the co-created value of the education.

## **4 Findings**

### **4.1 Description of the networked education process**

In spring 2017, based on former research contacts, the pioneers from the company contacted the teachers, seeking for collaboration potential. This led to negotiations about collaboration in student assignments of the two courses. The objectives and schedule of the assignments were planned together. Agreements on the study projects, separately for the two courses, were signed between the University, the company, and the students. For the company, the confidentiality of business-critical information was crucial.

In the assignments, the tasks of the student teams were to plan, facilitate and analyze the co-creation of the company and its network partners in workshops, two in the autumn and three in the spring. In the autumn, the focus of co-creation was on the pilot service process and its challenges, whereas in the spring the students could continue from the autumn results. First, they facilitated the co-creation of solutions to the process challenges, thereafter they continued with the networked service concept, and finally with the emerging service ecosystem (Table 1).

The teachers supported the students via lecturing about theories and methods, guiding the preparation of the workshops, rehearsing with the students the facilitation and co-creation methods, and participating in the workshops as their background support.

The teachers also communicated with the company representatives during the course, to keep up their motivation to participate in the workshops. The representatives of the company and its partners participated actively in all workshops, according to the demanding course schedule. They also prepared some background material for the autumn and a

presentation for the last workshop in spring. The company and its partners experienced co-creation in a “course laboratory setting”.

The students received additional operant resources into their studying process via the integrated interaction with the companies in the co-creative workshops: applying the theories and methods taught at the lectures, and guided by the teachers, the teams prepared the workshops, facilitated the workshop discussions, analyzed the results, wrote the reports, and presented and discussed the results again in workshops with the companies. They were “learning by doing” and developing expertise in *facilitating inter-organisational co-creation of business processes and business models*.

**Table 1.** Description of the co-creation workshops

Workshop	Goal	Participants	Methods	Activities	End-result
<b>I</b> 20.10. 2017 3 hours	Model the service process	26 students; 11 from the pilot network; 3 teachers	Process interview; Process modelling	Student teams interviewed the pilot companies on their joint service process.	A draft of an inter-organisational process model
<b>II</b> 1.12. 2017 2 hours	Develop the service process	18 students; 7 from pilot network ; 3 teachers	Facilitated process discussion with visual process models	Students facilitated the discussion on the modeled process. The pilot companies co-created further process ideas.	A refined process model. Process ideas and challenges.
<b>III</b> 9.3. 2018 3 hours	Create ideas for solving identified process challenges; Create ideas for the service concept	8 students; 5 from pilot network; 3 teachers	Two games as triggers of facilitated discussions Role play by students in discussions, substituting missing pilot network people	Students prepared the workshop and the games, guided by the teachers.  Students facilitated the games and discussions of the pilot network representatives.	Service concept ideas put on the related phases of the service process model. Ideas on revenue generation. Ideas of the service ecosystem.
<b>IV</b> 16.3. 2018 3 hours	Enlarge the service concept to ecosystem level	9 students; 6 from pilot network; 1 from larger ecosystem; 3 teachers	Modelling the value network and the ecosystem	Students prepared and facilitated the workshop guided by the teachers. Students visualised the value network and the ecosystem map.	Service concept for the ecosystem level. Visualized value network of the future service.
<b>V</b> 23.3. 2018 2 hours	Developing the service concept	9 students; 4 from pilot network; 3 teachers	Facilitated discussion of the results, using visual models	Students presented the end report of the spring assignments and facilitated the discussion on key findings.	Converging of the ideas for the networked service concept

#### 4.2 The value of the networked education service to the companies

The end report of the students in March 2018 provided the company and its partners important new knowledge that had been co-created in the workshops, concerning the emerging ecosystem’s service model and future development potential. The report included the roles and relationships of the actors; a specified value proposition; clarification of customer needs, service offering and the service delivery channels; a modular service pricing model, and principles of brand management for the service.

We were also interested in the added value to the pilot case network: did the ideas co-created in the educational service process get implemented into innovations [5]?

The preliminary findings from the interviews with four representatives of the companies, conducted in April 2018, give some positive evidence of implementation.

The CEO of the company stated in the interview that the process modelling in autumn 2017 was a turning point in the development of the company and its networked service. After the workshop in December 2017, the company board decided that the company was not yet ripe for the development of a formal strategy. Instead, they developed an operational program for the following year.

According to the CEO, it was crucial that key representatives from all partners participated in the process workshops. “Only then can the core of the service be revealed.” “You do not imagine what the customers and partners think in the service process, but they tell it and bring their knowledge into the co-creative process development in a focused way.” The process modelling and discussion helped the company to understand its role as the integrator of the networked service. It realised that it has to keep the ownership of the networked service process. The co-created process understanding became a central tool for marketing and sales. It helped the company to crystallise and to communicate their service offering. This understanding was instrumental also in formulating the web communication of the company.

The spring assignments on developing the service concept and the broader service ecosystem were beneficial as well. The games helped to create applicable knowledge. One practice developed in a game was implemented into the CEO’s work in customer relationship management “yes, it started with the game!”- A significant result was the modular pricing model of the service that students created as a result of the fourth co-creative workshop. The company applied the model immediately in its sales process.

According to the CEO, the assignments as a whole gave confidence in the new networked service. The discussions in the workshops “lifted the hidden knowledge of the entrepreneurs into focused use for knowledge co-creation”. As an overall result, the company’s service concept is now way ahead of its competitors.

The two partners of the company do not report as many concrete results from their participation in the assignments. However, the business development manager of one of them stated that the neutral facilitation of the students was an essential trust-building element: the collaboration in teaching had no vested interests, except learning. Listening to the questions and answers of the other partners in the facilitated process discussions in the workshop strengthened his insights about the potential to productize his company’s competencies. In February 2018, the new brand and the new name of the company were published, and according to the interviewee, the ideas from the service process discussion were “triggers and important accelerators of this change”.

#### **4.3 The value of the networked educational service to the students**

Through the case assignments that were integrated into the courses, the students assimilated the practical skills of facilitating networked business co-creation. In the autumn course, they became proficient in collaborative business process modelling, in the spring course in facilitating the co-creation of business models and ecosystems.

The autumn course students evaluated their learning in the assignment positively:

“The case-based group assignment was one of the things where I learned the most. It was motivating that we were able to give improvement suggestions to real companies, and know that they would possibly actually benefit from it.”

“It was super to learn to make a process model which is a skill that I will need later on as well.”

“It supported my learning well. However, I would use more time to go through how process maps are drawn.”  
 “In the beginning, it seemed like it is very easy to model the process. We realised that it is not as easy as it seems and this was my biggest learning here.”

Some autumn students felt unsure at the beginning of the assignment. According to their feedback, they would have needed more support from the teachers at the very start:

“I liked the task to develop a business process. However, the interview session was quite challenging because so many non-process-related topics were discussed.”  
 “Hands-on doing always supports learning. For the interview session I think I'd not let everyone interview, preferably everyone would formulate the questions together, but only some 2-4 students would interview. Or maybe students would be in the audience, learning by watching the teachers do the interview?”  
 “It helped to use the (theoretical) topics in a real case. There could be clearer instructions.”

The spring course students continued in their assignments from the autumn results, which gave them a smooth start. Their feedback was very positive; one student was even employed by the company right after the course ended. The students appreciated the interaction and knowledge co-creation with the companies for their learning:

“The subject and contents were great and well thought. The real-life case assignment supported greatly my learning, as well as the hands-on experience of workshop facilitation.”  
 “This course was refreshing since we got to work with an actual client on an actual case. Writing lecture diaries was more effective than having an exam on theoretical aspects.”  
 “The practical group work and discussing the articles supported learning; the diaries did not.”  
 “The final project experience and class discussion were very useful.”  
 “... It was nice to get feedback from the company people concerning the work done during the course.”

#### **4.4 The value of the networked educational service to the teachers**

The university teachers experienced their new roles as “process owners” of the networked education service, and will manage their courses similarly in the next school year. Their first task is to recruit fruitful case networks for the student assignments. For this, their former research partners and alumni provide an invaluable case “resource pool”. When planning and running the courses, the teachers collaborate with the company network and integrate the assignments into the course objectives and timetables, and into the studying processes of the students. To familiarize the students with facilitation of inter-company knowledge co-creation, the teachers facilitate with the students the very first workshop, and support the facilitation in the latter workshops if needed.

The teachers are also active researchers in the field, and the case network that participated in the education process can potentially become an object for future research.

## **5 Discussion**

The case study shows that the two courses created value for all their actors. The students developed expertise as facilitators of inter-organisational process and business model innovation and ecosystem development. The company actors co-created a shared understanding of their service process, service model, and ecosystem, and implemented the



ideas into innovations in the business world. The teachers realized their new roles and tasks as the “process owners” of the education service. As researchers, they gained access to a potential research case. - The results give support to university education as networked service for competence co-creation. More experimental case and action research applying this approach is worthwhile in all disciplines where students need to co-create competences in interaction with external actors that represent practice.

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