iSchool Partnerships and Practices – information and proposal form

Please fill in the information below and upload the proposal form (in PDF format) at the secure submission website for consideration for presentation at the *iSchool Partnerships and Practices* track at the 2019 iConference in College Park, Maryland, USA. Please keep to the advised length or the proposal will not be considered for review.

Please consider also the key review criteria for selection:

- Transferability to other institutions
- Grade of innovation
- Pedagogical dimension
- Degree of knowledge transfer

Questions about the *iSchool Partnerships and Practices* track should be directed to the chairs of the track:

iSchool Best Practices Chairs

- Elke Greifeneder, Humboldt-Universität zu Berlin
- Sean McGann, University of Washington
- Timothy Summers, University of Maryland, College Park

For general questions about the iConference, please contact iConference Coordinator Clark Heideger.

Name(s) of Author(s): Stefan Cronholm
Title of submission: Data-Driven Innovation: Managing a Project Including Multiple Business Partners
Area (please check the applicable area description with an x): Curriculum Teaching Student experience

Research X
Administrative management
Other (please enter the applicable keyword):
The submission is to the track iSchool Partnerships and Practices proposals

Submission abstract (max 150 words):
The proposal describes an ongoing research project called Data-Driven Innovation which comprises 14 researchers and 13 business partners. The project is characterized by partnership, collaboration, and interaction between the involved researchers and the business partners. The purpose of the project is to identify tools that can support the business partners in their efforts to exploit data in order to enhance service delivery and to create competitive advantage. The project is applying a socio-technical perspective in order to avoid a too one-sided technical focus. The proposal ends with presenting a number of challenges due to the increased complexity concerning the management of multiple business partners and researchers. The challenges are: maintaining the balance between competing interests, managing the problem of generalization, mutual learning, and ensure partnership throughout the project.

Submission description (max 2,350 words):

Data-Driven Innovation: Managing a Project Including Multiple Business Partners

1. Case description

The purpose of this proposal is to describe an ongoing research project consisting of multiple organizations. The project title is 'Data-Driven Innovation' and involves 14 researchers and 13 business partners. The business partners represent small, medium and large organizations from Sweden. The overall problem the project is trying to solve corresponds well to the following statement: "*The low-hanging fruit of data-driven innovation may be clear, but the full scope of potential benefits is much more difficult to grasp, resulting in opportunities that may be lost*" (OECD 2015). Data-driven innovation can be defined as the strategic utilization of data and analytics to improve or foster new processes, products, services, and markets (OECD 2015). Such innovation depends on socio-technical resources that allow organizations to identify, collect, and process heterogeneous data sources effectively. We define socio-technical resources as organizational means that will enable innovative computational and/or manual processing of newfound data sources emanating from the utilization of digital technologies within and across organizations. These resources promise to radically change and spur how organizations orchestrate and deliver services by exploiting data sources and data volumes unavailable in the past (Yoo et al. 2010).

The research project is justified by a literature review concluding that previous research on data-driven innovation and its business effects is incomplete. Extant studies of organizational efforts in industries such as automotive (Svahn et al. 2016), transport (Andersson et al. 2008), and pharmacy (Dougherty and Dunne 2012) suggest data-driven innovation must go beyond the technical process of encoding data in digital format. It rather involves deploying new socio-technical resources, e.g., software algorithms and digital platforms, because the vast amounts of data created through digitalization cannot simply be dumped into innovation processes (Yoo et al. 2010). The purpose of these resources is to help the business partners to create competitive advantage by assembling resources that work together to create organizational capabilities. Capabilities, thus, refer to an organization's ability to assemble, integrate, and deploy valued resources, typically in combination or co-presence (Bharadwai 2000). However, we have not found any studies of organizational efforts to develop, implement, and integrate socio-technical resources to enable data-driven innovation. The project seeks to answer the following overarching question: *How can socio-technical resources enhance data-driven innovation in organizations?*

The primary objective is to gain a competitive advantage through a socio-technical perspective on data-driven innovation and thereby improve organizational performance and value-creation.

The research project has relied on the Action Design Research (ADR) method (Sein et al. 2011) to structure the logic of the development, implementation, and integration of socio-technical resources, as well as consequences of such resources for organizational structures and practices. Several arguments motivated this choice. ADR provides excellent support for how to: 1) orchestrate collaboration between action researchers and business partners; 2) organize processes of knowledge co-production; 3) pursue development and evaluation activities; and 4) analyze and diffuse theoretical and practical outcomes. More specifically, it stipulates a set of guidelines, formulated as principles, to assist researchers and practitioners in their efforts to balance problem-solving related to practice and scientific knowledge production. One cornerstone in the research project is that the researchers' and practitioners' knowledge should complement each other (Van de Ven, 2007). Consequently, the research project includes several collaborative activities which means that researchers and practitioners jointly create knowledge to fulfill shared objectives. The fact that the project is highly collaborative also means that the business partners take responsibility for carrying out specific activities in the project plan. The collaboration between the researchers and the business partners is based on the framework suggested by Hevner et al. (2004) (see figure 1).

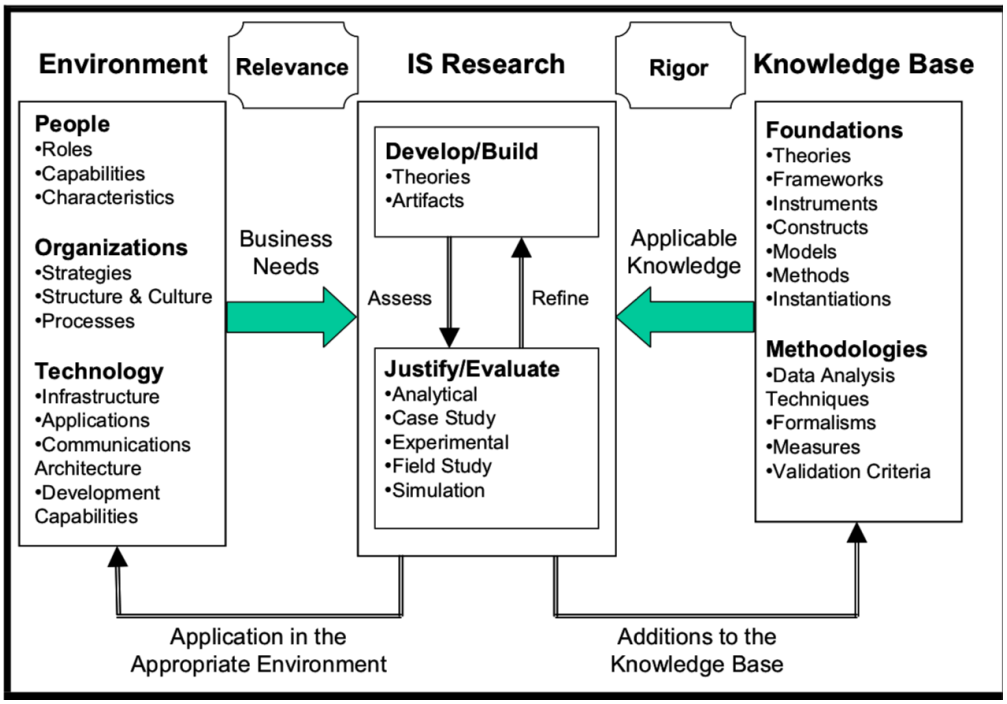

Figure 1. Research Framework (Hevner 2004)

The overall project includes three sub-projects: Software Algorithms for Data Analysis, Digital Platforms for Service Innovation, and Ecosystem Strategies to Navigate Data Barriers (see figure 1). Project outcomes such as algorithms, digital platforms, and ecosystem strategies are constituting a toolbox whose tools can be deployed separately, or used in an integrated fashion, to help our business partners tackle their key challenges in data-driven innovation. Even though the participating partners have slightly different business needs, they all share a common interest in developing, implementing, and integrating socio-technical resources that enhance data-driven innovation. As depicted in figure 2, each sub-project has a scientific objective and a business objective. The objective corresponds to what sometimes is referred to as the 'dual mission (Sein et al. 2011). The dual mission means that researchers that intervene in organizational settings are expected to fulfill the objectives of advancing theory while assisting practitioners in solving current and anticipated problems. The three sub-projects' individual objectives correlate to the overarching project objectives. One purpose of the overall project objectives is to create

synergies between the knowledge generated from the sub-projects. This means that we are integrating the knowledge created in the sub-project to a congruent whole that contributes competitive advantage to the business partners as well as advancing theory on data-driven innovation.

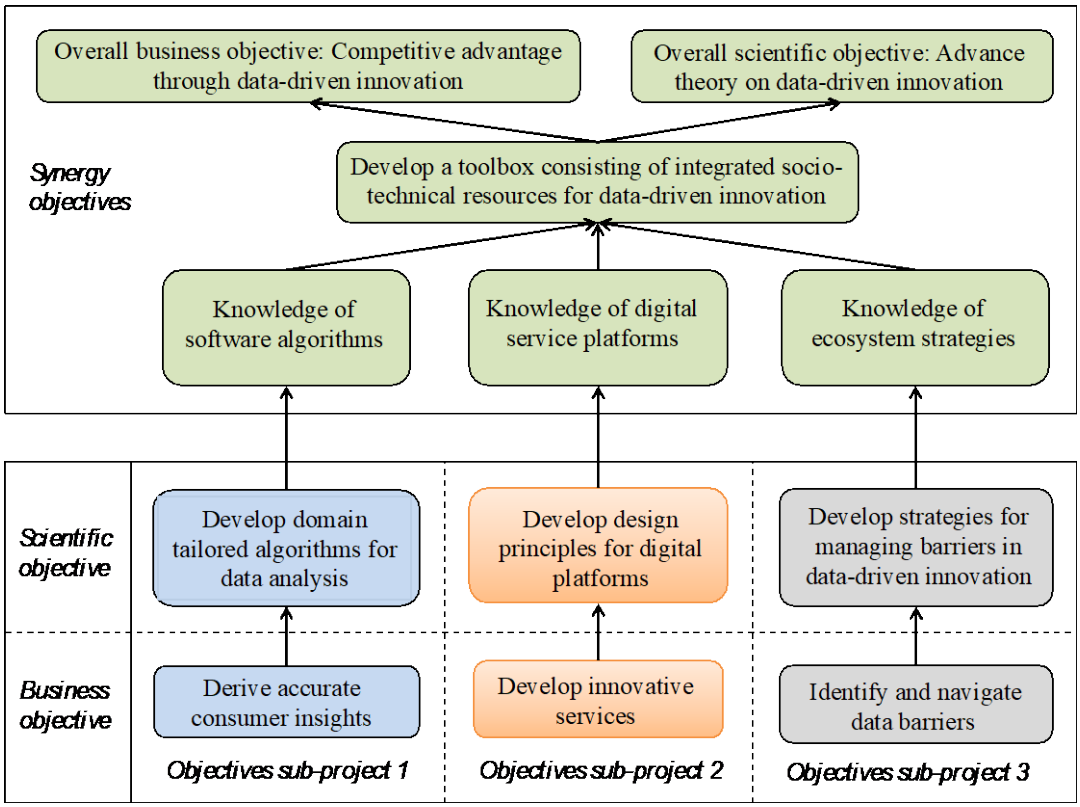

Figure 2. Synergy objectives and relations to sub-project objectives

The four-year project has been running for two years. Consequently, we can present some nascent results which constitute a number of tools: Multi-objective association rule learner (digital tool), genetic programming based on hybrid model generator (algorithm), churn prediction using conformal prediction (algorithm), sales forecasting for short life products (method), trend analysis using crowdsourcing (digital tool), collaborative service assessment (digital tool), productivity measurement (digital tool), capability model (framework), value-driven innovation (model), implementation strategy framework (framework) and barrier assessment tool (method).

One future activity in the project is to create a data-driven innovation process that is not only empirically grounded in the business partners' environments but also theoretically informed. The idea is to analyze if and how all the tools can be mapped to the process and to understand possible relationships. One input to this exercise is the data value cycle suggested by OECD (2015) which consists of the following phases: datafication and data collection, data analytics, and data-driven decision-making. Another future activity is to decide how the created knowledge in the project can be transferred into education programs.

2. Multiple business partners - challenges due to increased complexity

The remainder of this proposal discusses some challenges we needed to handle due to increased complexity caused by the fact that a large number of researchers and business partners participate. The purpose of this section is to provide knowledge that can be considered in other similar research projects.

Challenge 1: Maintaining the balance between competing interests. In collaborative projects including business partners, there might be a risk of competing or conflicting interests. The ADR method explicitly states: "The intent of the ADR team should not be to solve the problem per se as a software engineer or a consultant might" (Sein et al. 2011, p. 40). The statement legitimates and affirms the research interest without neglecting the objectives of the practitioners. To prevent possible conflicts, we established roles and responsibilities in advance and we initially drew a letter of intent as a mutual agreement between the researchers and practitioners. To secure the business partners' voice, we engaged them as active co-designers and not as passive information providers.

Challenge 2: Managing the problem of generalization. In qualitative studies, the problem of generalizing is a well-known fact. In order to generalize the problem formulation, we applied a process where we moved from the specific-and-unique to the-generic-and-abstract. First, we collected information individually from each business partner which meant that we ended up with 13 instances of problem formulations which had similarities and differences. Then, we organized a workshop that included all the business partners. The purpose of the workshop was to share knowledge and to identify a general problem formulation as well as requirements for a general solution. We followed a consensus process, which meant that it was a co-operative process that led to an agreement that both researchers and business partners supported (DeGroot 1974).

Challenge 3: Mutual learning. In order to support mutual learning beyond organizational boundaries, we organized several workshops that included all the researchers and business partners. As mentioned above, the purpose of the workshops was to establish an arena to share knowledge. The sharing of knowledge meant that business partners learned from each other and not just from dyadic researcher-practitioner interventions. Additional learning between business partners also indicated that the research project as a whole gained a generic and abstract understanding of both the problem and the solution.

Challenge 4: Ensure partnership throughout the project. A partnership in itself has no value. It constitutes a means which can help to fulfill other objectives that the partners cannot fulfill individually. Consequently, a partnership has to provide added value to the context where the partnership will take place. We illustrate the added value in the research project by describing a number of activities that are carried out: A) Identify collaboration advantages. This activity was conducted at the beginning of the project to make sure that project design included possibilities for win-win situations. An important aspect in this phase of the project was to establish trust between the researches and the business partners. B) Collaborative knowledge creation through the application of different perspectives. This activity permeates the design of the project. In the project, there is an interaction between researchers and business partners on several levels. First, there is an interaction on a daily basis between a few researchers and one business partner. Then, there are regular meetings involving all the researchers and business partners that belong to the same sub-project. Finally, there is an interaction between all the researchers and the business partners included in the overall research project. This way of interacting on different levels has promoted knowledge sharing between the project members. C) Joint publications and presentations. One strategy is to encourage joint publications and presentations between researchers and practitioners. This has meant that we have jointly published research papers. One advantage of including practitioners in the process of publishing research papers is that the grounding of empirical evidence was improved. We can also conclude that papers that are jointly published legitimizes partnerships and strengthens long-term relationships.

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