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Summary

Companies are increasingly forming networked organizations or *value constellations* to jointly satisfy complex consumer needs. Well-known examples include the networked business model of Cisco Systems, actually consisting of a series of well integrated companies. In value constellations enterprises make use of each other core competencies to offer a product or *service* that each individual enterprise could not offer on its own.

The successful collaboration of participants requires that each participant co-produces and exchanges objects of value. In value constellations that offer innovative, technology-intensive services, the value is created by means of the underlying information and communication technology. Actually, for both real-life cases presented in this thesis and taken from the domain of energy management and public administration, innovative information and communication technology is a prerequisite.

One of the first bottlenecks in commercializing innovative services is to find a value constellation (in terms of participating enterprises *and* interworking ICT) that proves to be *feasible* for service provision. The understanding of such a constellation is required within a relatively short time frame as the time-to-market of innovative services is typically just a few months.

However, the early-phase design of innovative services often allows only a limited, pre-designed setting for testing and validation. It is often not possible to address a feasible business setting for service provision, as facilitating such testing is a cost-intensive task that requires careful planning and operation.

Still, before investing serious amounts of money in developing the innovative service in question, it is essential to explore whether that innovative service would in principle prove economically and technologically feasible for provision in a commercial market. The feasibility assessment should therefore enable a coherent analysis by simulating and evaluating market-driven characteristics that would potentially occur in a real-life business setting.

This thesis introduces the *OPAL framework*, which has been developed to provide the fundamentals for such a feasibility investigation. Its development is inspired by the recognition that conceptual modeling of both the business and technology domains can help to explore and to address in a straightforward and ‘easy-to-use’ manner the feasibility concerns of complex, real-life problems in a multi-stakeholder setting. Furthermore, conceptual modeling helps interrelating different domain-specific representations, thereby facilitating the *alignment* of business and technology aspects of service provision.

The benefits of the OPAL framework are manifested in the *OPAL method*, which is also introduced in this thesis. The OPAL method provides an iterative and systematic guidance to *perform* the actual feasibility assessment and enables traceability among the executed steps. As a result, it creates a dynamic environment for practitioners to support their decision-making process regarding the commercial potential of the innovative service in question.

The principles of the OPAL framework and the OPAL method were tested in two complex, real-world case studies, which are going to be introduced in the following paragraphs. The setting and the required data of these cases were provided by industry-strength pilot studies, involving stakeholders from research institutions and from various industries, that were initiated to test innovative services. These pilot studies, however, dealt with specific characteristics and therefore did not offer any insights on how these services would perform in an upscaled, commercial setting.

Feasibility assessment in the energy sector. Innovative services support the efficient integration of distributed energy resources, i.e. wind turbines or combined heat and power stations into the existing power network. As such, these services would provide an additional control power to balance the occurring energy shortage or surplus by shifting the operational profile of these resources real time. Such an additional control support would reduce the high imbalance costs that result from other costly means of balancing measures. The OPAL method helped in assessing the commercial implications of these innovative services, pinpointing the financial consequences and the technological bottlenecks of the service provision.

Feasibility assessment for electronic customs. Innovative services support the redesign of traditional, paper-based customs procedures and facilitate electronic data sharing between the public and the private sector. Electronic customs services provide tangible advantages to stakeholders as they reduce operational costs and incorporate the auditing and control procedures of governmental authorities. The

model-based analysis of the OPAL method showed that the concrete implementation of such initiative requires the collaboration of numerous commercial services, including services related to secure data sharing and services enabling standardized data distribution. The feasibility analysis helped articulating both financial and technological implications of providing these services.

The results of the feasibility investigations were presented at numerous workshops. The feedback received from practitioners showed that the developed feasibility assessment method offers significant benefits. On one hand, it directs the focus of technology experts to relevant commercial implications of service development. On the other hand, it helps business experts to gain insights into how certain technology constraints would block the commercialization process of services.