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The drivers of services on next-generation networks

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ABSTRACT

This paper is concerned with the drivers of service development on future telecommunication networks. As these networks are being transformed into next-generation networks, new and different services are being developed and mediated. However, little is known about the drivers of this development, and frameworks for strategic management of service innovation are scarce. This paper offers two contributions. First, it develops a conceptual framework for the identification and classification of drivers. This framework is derived from prevailing theories in organizational economics, strategic management, and marketing. Second, it presents, based on an analysis of contributions from 24 domain experts, which types of drivers for network service development receive the most attention by the experts. The analysis reveals that demand factors like customer values, service quality, and user readiness by far outnumber the supply factors as well as the general environmental factors, demonstrating the importance of the users for service development in this area. The results will assist service providers to identify drivers of a specific service offering and adjust the business model to these drivers.

1. Introduction

Technological change facilitates new opportunities, but these will only be realized if they are associated with market opportunities in a favorable economic climate. One significant technological change is the convergence of the dedicated single-service networks currently deployed in the telecommunications world toward a universal multiservice network referred to as the next-generation network (NGN). NGN is a generic term that conceptualizes the emerging technology and market developments. NGN is envisioned to be an interworking environment of heterogeneous networks of wired and wireless access networks (Choi and Hong, 2007) and the purpose is to enable ubiquitous, real-time, multimedia communications that can be utilized by all types of service providers and for a broad range of services (ITU-T, 2004). The vision behind the NGN is to move from a vertical approach, where access, control and services are closely tied, to a horizontal approach, where each network layer provides reusable elements to other layers (Poel et al., 2007). The key cornerstone of the NGN is the decoupling of services and networks, allowing them to be offered separately. This implies the separation between transport, control and application layers (Yahia et al., 2006).

From a technological view NGN can be split into three major parts: the core network, the access network, and the service provision control part (Pattal and Jianqiu, 2009). NGN uses the Internet Protocol (IP) to enable the provision of different types of services, voice, data and video on any type of physical media, wireless and wire-line, and to any type of terminal, e.g. computer, mobile and TV, as well as any device with digital technology embedded (Pattal and Jianqiu, 2009). Sometimes the term "all IP" is used for NGNs. Other characteristics are packet-based transfer, end-to-end quality of service, open interfaces, and the provision of improved end-user mobility (Valcke and Stevens, 2007). Built on open modular elements, standard protocols, and open interfaces, the NGN caters to the specific needs of all users, companies and households alike. International

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Telecommunication Union (ITU-T) defines a next generation network (NGN) as: "A packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users." (Feijóo et al., 2007).

The architecture and technologies of NGN are well known, and will allow the deployment of new types of services that are feature-rich, interactive, and multimedia capable, using increased bandwidth and richer devices and incorporating location and presence awareness (Laden and Yari, 2008). Service creation is fundamental to the promises of the NGN, and the future network can be seen by network operators and service providers as a new revenue stream from its potential of increased service offerings (Licciardi and Falcarin, 2003). However, the future service-offering assortment is not clear, and a killer application still remains to appear (Yelmo et al., 2008; Iden and Methlie, 2010). Furthermore, there is still a lot of uncertainty as to what will drive the development of services on these networks (Ofcom et al., 2008), although some conditions are being discussed in the literature.

First, a major driver for the development of new services is technology, and especially the penetration of broadband and Internet access to households and firms, together with improved quality and capacity of terminal devices (Tadayoni and Sigurðsson, 2007; OECD, 2004). Another enabler is the emergence of service platforms and high-level application environments that can be used across different vendors. This will make programmers more productive as they can concentrate on functionality rather than the underlying infrastructure (Licciardi and Falcarin, 2003). Technological research conducted to fulfill the vision of NGN has been intense, and is expected to continue growing (Houssos et al., 2004). Second, since modern information and communication technology has such a great impact on societies and economies, regulators and policy makers are influencing the market by a number of policy instruments, such as access and channel regulation, market control, and property rights. The current and future role of the regulatory bodies on regulation, deregulation, and competition has been discussed by many (Tadayoni and Sigurðsson, 2007; Modarressi and Mohan, 2000; Poel et al., 2007; Valcke and Stevens, 2007; Feijóo et al., 2007; Falch, 2007; Lievens, 2007; Huigen and Cave, 2008). Third, open standards are a prerequisite as the new services will entail a greater level of interconnectivity, system flexibility, scalability, and quality of service (performance, reliability, and availability). NGN involves complex structures, in a hierarchical fashion, with a meshing of systems and subsystems even for simple services (Kryvinska, Strauss, and Auer, 2008). Standardization in the area is intense and a range of standard bodies exists (Dickerson, 2004). Fourth, although policy makers have deregulated the telecommunications market in order to foster competition and reduced prices for end-users, the multi-sided, complex nature of the NGN requires new services to be created and provided in a cooperative business environment including operators, content providers, and other service providers. Especially, third parties are expected to join the market with new and value-added service offerings. Fifth, changes are not taking place merely on the supply side. People familiar with Internet services have new demands and different behaviors. User-centric service creation allows end-users to create, manage, share, and execute their own personalized services that fit their needs (Yelmo et al., 2008). Application development in a NGN context is in many aspects very close to Internet application development (Licciardi and Falcarin, 2003). Thus, one may expect service innovations also from the user side of the market. In the service literature, there is a debate on the customers' role in innovation. New perspectives on the roles of customers and companies in creating value of services are developed (Möller et al., 2008). Several authors extend the customer-based approach from service value to value-in-use, so-called customer-dominant logic (Heinonen et al., 2010) or service-logic (Michel et al., 2008).

The work reported here is concerned with the variety of factors that may bring about services on next-generation networks – factors that we denote drivers of service development. Researchers have examined innovation from different perspectives ranging from product, market, technology, and organization. A dominant perspective in recent service innovation research has been the resource-based view of the firm (Barney, 1991) combined with the dynamic capabilities' view (Teece et al., 1997). Frameworks for the strategic management of service innovation are, however, scarce (Möller et al., 2008; Frei, 2008; den Hertog et al., 2010). This paper adds to the current understanding of service development for next-generation networks in two respects. A first objective is to develop a conceptual framework, based on a multi-perspective view on strategic management, for identifying and classifying drivers of service development. The second objective of this paper is, on a broad scale, to use this framework to identify which types of drivers receive the most attention by a group of 24 domain experts working as service providers, consultants, advisors, researchers, regulators and journalists within telecommunication. Identifying drivers of service development on these networks is an obvious precondition to achieve for the service providers in order to design effective business models. Policy makers will also benefit from such knowledge, for example by assessing more precisely the potential impact of regulations.

The rest of this report is organized as follows. The next chapter presents the conceptual framework and its theoretical basis. Then, the methodology for data gathering and analysis is accounted for, followed by the results of this analysis. Finally, a discussion and summary chapter concludes the paper.

2. Conceptual framework

2.1. Theoretical basis

New service development is closely associated with innovation. It is recognized among economists and policy makers that the innovative capacity and the ability to imitate new technologies are key factors in determining the rate of growth