Digital Innovation on Mobile Platforms: A Business Model Analysis

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ABSTRACT
This paper discusses how the very rapid innovation in mobile platforms within a digital infrastructure challenges the traditional analysis of the revenue business model used by mobile telecom operators. The authors discuss how these mobile platforms have a more dynamic approach to digital innovation, hence they are able to shift business model strategies at a faster pace than telecom operators, reflecting on a diversified value chain for the delivery of digital services. Hence, in this paper the authors propose an understanding of how control is balanced in such an environment, as an analytical tool for understanding the innovation challenges. The results hold interesting implications for the future of the telecom industry as well as being critical to current digital innovation models.

Categories and Subject Descriptors
J1.1 [**Computer Applications**]: Business

General Terms
Business Models, Innovation, Mobile platforms, value networks, Control.

Keywords
Business models, innovation, digital products, mobile platforms, telecom operators.

1. INTRODUCTION

The 21st Century is the century of digital infrastructures. The Internet and global mobile telecommunications infrastructures are increasingly converging at different layers. This paper is concerned with reaching an understanding of the innovation of such converged mobile digital infrastructures. Digital infrastructures are established and operated by a heterogeneous collection of stakeholders drawn from both private and public organisations [9]. The Internet was originally established on the basis of the alignment of interests between the government agencies, universities and research laboratories promoting it, but opening the infrastructure to a range of interested parties since the Mid-1990s has resulted in a much more complex arrangement.

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Furthermore, the convergence and overlay of the Internet with global mobile telecommunication systems with radically different control mechanisms, such as centralised ownership structures and payment termination embedded in SIM cards, has paradoxically led to further complexity and divergent interests in the increasingly unified mobile Internet [2,6]. Understanding the complexity of, and challenges confronted by telecommunications operators requires multiple layers of analysis, especially when considering the provision of digital services. One of the main characteristics of the expected changes is the presence of variable socio-technical triggers in the operator's value networks, leading to tussles and network design changes [7]. A major characteristic of a digital infrastructure is the active role of a diversity of stakeholders with direct and indirect interests in the network operation through tussles. This paper considers the dynamic interactions and strategies among stakeholders, making use of the analytical domains proposed by [8]: the innovation space, the marketplace, and the regulatory regime.

2. MOBILE PLATFORMS, CONTROL AND INNOVATION

The many actors in the ecosystem of a digital infrastructure are left to wonder and ponder the best choices in order to survive in such changing and interactive conditions. An analysis of value networks using a control points method provides interesting results on how firms manage to shift and balance control and innovation. The concept of control points, as part of a methodological tool for analysis of the development of network design, has been successfully transposed from its technical origins to become a socio-technical variable [3]. For mobile telecom operators this analysis provides a valuable source of insight in understanding the cycles of innovation and its relationship to their value networks.

Business models and value chains can be defined in terms of "the way a network of companies intends to create and capture value from the employment of technological opportunities" [4]. Fine [5] was one of the first researchers to work on comparative studies using the approach of value chain dynamics, cross industry comparisons, and the exploration of life-cycles in complex value chains. Fine [5] proposes a double helix model, which for telecommunications captures this life cycle in four phases: integration, market differentiation, verticalisation and disintegration. It visualizes a complex trigger dynamic analysis that leads to the observed integration/disintegration effects. Trossen and Fine [10] extend this to develop analysis methodologies that allow for segmentation into value chains or value networks. Fine [5] also discusses the bullwhip effect, whereby a complex value chain can

amplify changes in demand, the impact being increased volatility of demand further up the supply chain. While this more traditionally relates to inventory-based value chains, a similar behaviour can be observed in telecommunications (e.g. equipment stock) and computer industry (investment in R&D). Mitigating this effect, within the context of future network design, is desirable.

Faber et al, [4] definition of the business model highlights the networked character of digital infrastructure innovation, the value creation and captures involved in the trade-off, as well as the issues connected with technology design [1]. In doing so, there are three critical dimensions of analysis [1]; an industry structure and value network; a functional and technical architecture; and a value creation and capture dimension. Based on the empirical evidence collected by the authors, there are no strong indicators to challenge this description of the fundamentals of tussle and control creation and management between operators. When converting these dimensions to an analysis of value networks completed by [1]: for each component of the proposed model by [7], there is a value component in the model proposed by Ballon.

In this proposal for a business model ontology there are incorporated four different levels of a business model: a strategic, functional, financial, and value configuration level. At the strategic level, a business model is concerned with the value network configuration, i.e. setting up roles and relations between actors, and the physical and virtual flows between them. At the functional level, a business model describes the architecture of a product or service, which is determined by a specific configuration of modules, interfaces and intelligence. At the financial level, a business model describes the cost and revenue sources, as well as the distribution of flows for the actors involved. Together, these three levels contribute to the fourth and final level of a business model, i.e. the value configuration.

The authors of this paper propose that within complex and converging business and digital infrastructures, characterised by value co-creation within a large "industrial architecture", research should not just focus on any clearcut value proposition, but rather on the process of value construction leading to various value configurations. This deals with the way in which actual value is created in the market. While specific design choices also need to be made at this level, the value configuration can also be viewed as the logical outcome of business model design choices made at the previous levels. These components together illustrate the basic, bi-directional relations between the different levels of the model.

In reality, a range of complex, both direct and indirect, bidirectional relations exist between the different levels. Also, which particular relationship is focused on and in which 'direction' the impact is studied, depends upon particular cases and contexts.

By focusing the discussion on the element of this model a sample data on longitudinal events for relevant platforms the authors will analyze the implications of these relationships to innovation and the business models associated with convergence on digital mobile platforms.

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