

Introduction to Special Issue “Mobile Communications and Novel Business Models”

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1. Introduction

With the ongoing introduction of 5G, the fifth generation of mobile communications technologies, the mobile communications sector is facing disruption in regulative, business and technology domains [1]. Modern communications networks including 5G serve as the backbone for all digitalization in our society. Mobile communications networks are increasingly becoming virtualized and becoming multi-sided service platforms that facilitate an offering of tailored on-demand context, location- and customer-specific connectivity, and content services to meet versatile and localized end customer- and vertical-specific needs. These service platforms can be topped with various extended, complementary, and ancillary devices, systems and services that turn the business environment into an ecosystem. New opportunities brought about by technological innovation and regulatory developments call for novel, scalable, replicable, and societally, environmentally and economically sustainable [2] business models for the different stakeholders of the mobile ecosystem or industry. In this Special Issue we were looking for contributions that help in mapping the impacts and consequences of 5G and beyond networks on businesses in the mobile communications ecosystem in general and for society and the environment at large. Indeed, this 5G-related disruption is influencing all aspects of sustainability, be it economic, societal, or environmental.

The business model has emerged as the “contemporary paradigm for designing, visualizing and communicating different business and service concepts and their implementations.” [3] (p. 731). As a boundary-spanning unit of analysis [4] it not only helps to map the past, but also to deal with present and future challenges [5]. The versatility of the business model approach is specifically evident in ecosystemic contexts where the traditional networked focal firm approach [6] of business models has been extended to platforms [7] where the platform owners, users, and complementors deal with demand and supply, and the sharing economy [8] where underutilized assets are brought to better use. All these three types of business models are relevant for the mobile communications sector.

Scientific papers focusing on mobile communications business models has increased over the years. A quick search in the Scopus database for research paper titles and abstracts (accessed December 15, 2020) using the terms (“4G” OR “5G” OR “6G” OR “mobile operator” OR “mobile network operator” OR “mobile virtual network operator” OR “telecommunications operator”) AND (“business model” OR “revenue model”) finds 552 documents. The annual numbers of published papers are depicted in Figure 1. In 2020, over 60 research papers were published on business models in the mobile communications domain according to Scopus only. We consider this growth in the number of publications to reflect the interest and expected disruption in this domain.

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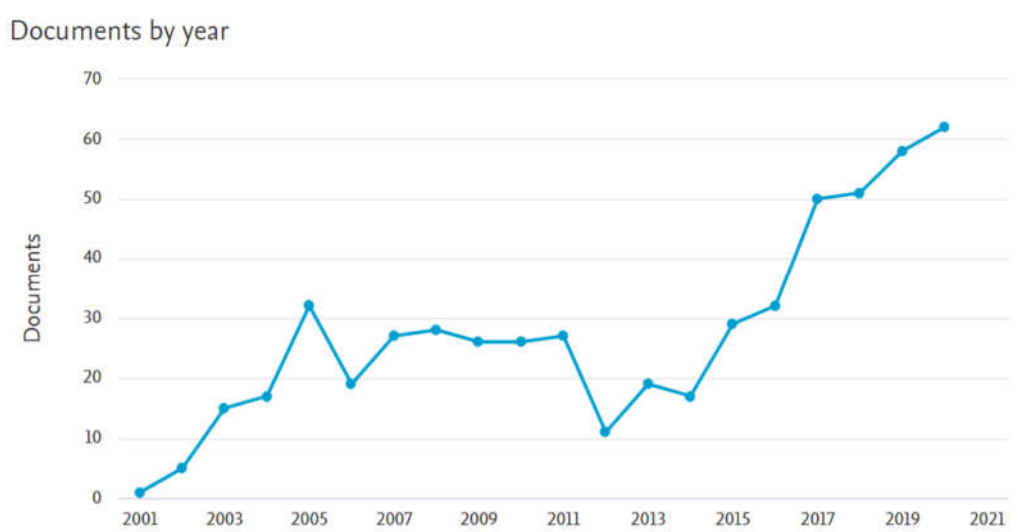


Figure 1. Growth in the number of mobile communications business model publications in the Scopus database, 2001–2020.

The research for business models in mobile communications domain is multidisciplinary. Figure 2 depicts the distribution of the publications in the Scopus database across different subject areas in 2010–2019. Approximately two thirds (67 percent) of the publications are within computer science and engineering. Second, around 11 percent of the publications are within business, management, and economics. The rest, approximately 22 percent of the publications represent various other subject areas.

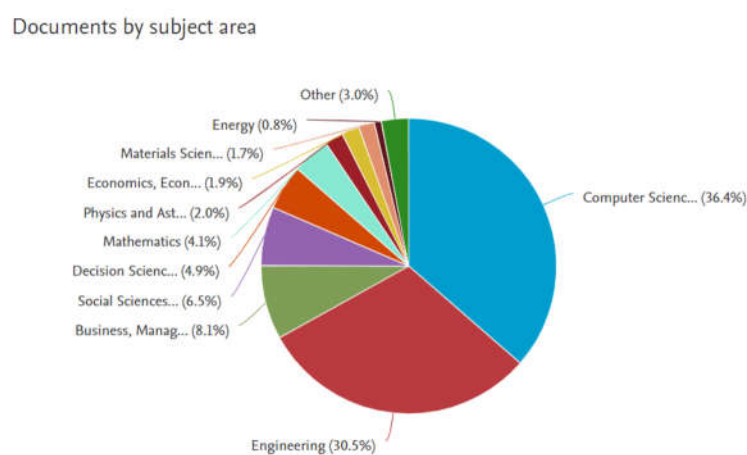


Figure 2. Subject areas of the selected publications in the Scopus database, 2010–2019.

In Figure 3, a SciVal key phrase analysis conducted on our sample of the Scopus database clearly indicated the increasing importance of business model research within the whole of the mobile communications systems—in connection with themes such as virtualization, network slicing, edge computing, and spectrum sharing as examples. The decreasing role of the traditional operators in the extant research [3] appears indicative of the emergence of novel ways of doing business in this context.

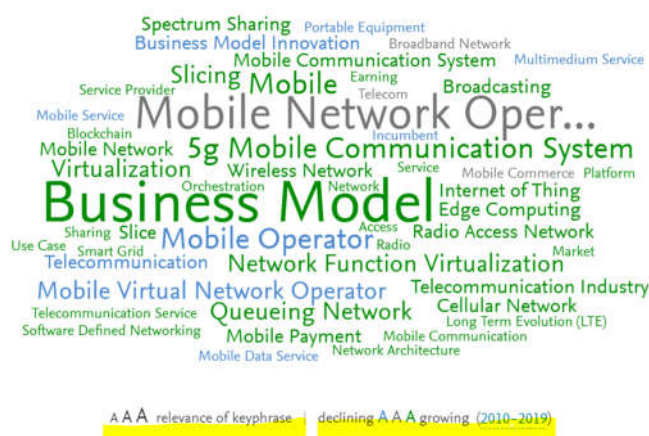


Figure 3. A SviVal key phrase analysis of the selected publications in the Scopus database, 2010–2019.

More than being multidisciplinary, this Special Issue aims at being cross-disciplinary, and as such sought to publish conceptual, theoretical, and empirical studies that consider the interrelated business, regulation and/or technology aspects of mobile future communication networks. The following questions were of special interest:

- What kind of novel business models and ecosystems could emerge within mobile communications networks for different users (consumers, verticals, etc.) in different places?
- How scalability, replicability, and sustainability may influence business models within mobile communications?
- How business model innovation may influence sustainability in mobile communications?
- How could the changes and innovations in the regulatory and/or technological domains influence the mobile communications ecosystems and/or business models?
- How could the sustainable development goals (SDGs) be taken into account in mobile communications sector?

2. Contributions of the Special Issue

The Special Issue comprises the article “Sustainability as a Challenge and Driver for Novel Ecosystemic 6G Business Scenarios” by Yrjölä, Ahokangas and Matinmikko-Blue. The findings presented in the Special Issue article can be found on three levels: a) future scenarios on 5G and beyond, b) sustainability impacts of 5G and beyond, and c) a business model approach to examine growth and sustainability for the future.

a) The Special Issue includes an outline of 16 future scenarios for the mobile communications context at user, business, sustainability, and geopolitical levels of analysis. At the user level, the new brand of prosumerism (i.e., combination of consuming and producing) is expected to emerge along with the technological developments, but also the rise of robot and machine users as well as societal users such as smart cities and communities is becoming increasingly common. At the business level, the operators' role is expected to transform, and new broker-type operators are expected to emerge. Additionally, the mobile edge and over-the-top (OTT) internet service providers are expected to bring about new opportunities. At the level of sustainability, the configurations emerging around the dynamism of economy and power structures are expected to become visible via enhanced economic race or multi-local growth opportunities. Alternatively, more dystopic inward- or control-oriented developments, or more transhumanism- and societal impact -oriented scenarios may emerge. Finally, at the level of geopolitics, the US-China-Europe comparisons may also lead to the emergence of blocks. As a reflection, the 16 scenarios presented characterize four types of possible developments relevant for 5G and beyond

mobile communications; we could be moving toward a more competitive, protective, networked, or empowered worldviews.

b) The sustainability impacts that the Special Issue identifies can be seen from economic, societal, and environmental perspectives. From the economic point of view, customer experience, new types of community customers, and localized services are expected to bring about new business opportunities. From a societal perspective, the market environment is expected to become more complex and challenging. Different kinds of hybrid threats are increasingly expected to appear, and tensions between various worldviews will emerge. Additionally, privacy, security and the use of AI will lead to new challenges for sustainable 5G business.

c) Environmental and climate change-related problems are influencing the direction of technological advancement to achieve the United Nations' social development goals (SDGs) within 5G. Sharing- and circular economy -based co-creation is expected to be boosted by mobile communications solutions using zero waste and zero emission technologies.

Finally, the Special Issue contributes to business model research by presenting a novel approach that is based on antecedent and outcome concepts related to the business model: with opportunity, value, and advantage as antecedent concepts. These three are related to choices that organizations need to make when servicing their customers. In addition, the business model is presented to have three expected outcomes: scalability, replicability, and sustainability. Scalability, the internal flexibility of the business model enables servicing a growing number of customers. Replicability, the external flexibility of the business model, enables entering multiple different markets simultaneously with minimal changes to the business model. Scalability and replicability can be considered as prerequisites for sustainability, whether economic, societal, or environmental.

3. Suggestions for Future Research

The application of business model research raises several challenges for future research. First, as 5G itself is in its first phases of deployment, there are several open, forthcoming practical questions to be answered. From the techno-economic perspective, novel business models for new kinds of end users such as communities, machines and even AIs (artificial intelligence) are under-researched [9,10]. Additionally, the opportunities and business models arising from the softwarization and platformization of networks—such as edge cloud and network slicing—should be researched more, also as indicated by the key phrase analysis presented above [11].

The techno-economic research implications in the extant research trigger several research topics related to societal or environmental outcomes or goals. For example, the intersection of SDGs and the future mobile communications business give rise to several research questions on the scale, scope, and type of viable business models [12]. For example, localized services and local mobile communications networks may face regulative, entry barriers, or scale-related viability hurdles. There are also opportunities for intriguing new research insights on regulatory challenges related to integrating sustainability as a guiding force in policy-making both in the mobile communication sector as any other sector of our society benefiting from future mobile networks. For example, the combined effects of data, spectrum, privacy, competition, and environmental regulation may bring unwanted or counter-intuitive consequences, or the effects may vary across ecosystems and verticals.

From the methodological perspective, the suitability of the business model—and its neighboring antecedent and outcome concepts opportunity, value, advantage, scalability, replicability, and sustainability—for futures-oriented research has been demonstrated in several publications. However, the outcomes of this Special Issue encourage us to advise research to delve into the patterns and meanings of business model interaction in different contexts to further our knowledge and clarify the concepts. Especially, an understanding of the boundaries and interfaces between the business model and its accompanying platforms or ecosystems is still developing.

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