Digital business platforms and sustainable industries: an exploratory framework

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Research within and around the pays to be green (PTBG) area has identified innovative business models as crucial elements not only for the creation of competitive advantage but also for the ecological sustainability of systems of production and consumption (Kavadias, Ladas & Loch, 2016; Berchicci & King, 2007). According to Nidumolu, Prahalad & Rangaswami (2009) and Orsato and Clegg (2005), among others, the deployment of more sustainable solutions by firms depends less on technological breakthroughs than on management innovation (Birkinshaw, Hamel & Mol, 2008). In the realms of the car industry and mobility, for instance, Orsato (2009) and Orsato and Wells (2007) identified product-service value propositions as they key drivers for business model innovation. Companies such as Uber (car riding) and Car2Go (car sharing) epitomize such logic. They made the business case of satisfying the demand for individual motoring more efficiently at lower costs – when compared with private car ownership.

The innovative business models of Uber and Car2Go were only possible because of the advent of mobile (phone) computing, including cloud storage and improved data processing speed and statistics (known as big data). In this respect, the release of the iPhone in 2007 was a milestone not only because it made mobile applications possible but also because digital business platforms (BP) could emerge and grow exponentially. In just ten years, half of the world’s most valuable corporations were formed by BPs (Forbes, 2017). In the last decade, BPs also made the most valued Initial Public Offers (IPOs), including Facebook, Alibaba, and Airbnb, which are textbook examples of the potential of business platforms to revolutionize traditional sectors,

BPs have two essential characteristics that distinguish them from traditional business models. First, they are a two-sided market, since they facilitate interaction between a platform owner and two distinct groups: those who buy and those who sell applications (Landsman & Stremersch, 2011; Rysman, 2009). Because BPs mediate the relationship between consumers and producers, both groups must be brought into the platform (Zhu & Iansiti, 2012). For this reason,
the decisions that the platform owner takes to meet a particular side (content providers), impact the value for the other side (clients that demand the service), and vice versa. The additional value that a new user brings to existing members of a platform is called network effect, the second characteristic of business platforms (Rochet & Tirole, 2003).

Information and communications technology (ICT) developments, such as mobile computing (mainly via smartphones) have contributed to the growing awareness of conscious consumption, the proliferation of collaborative web communities and social commerce and sharing (Hamari, Sjöklint & Ukkonen, 2015). Such movement, also called collaborative consumption (CC), explores the value of an idle asset through its shared ownership, such as renting, swapping or trading (Belk, 2014; Botsman, 2014). Some examples of sharing economy include car-sharing (Zipcar, Car2Go, ShareandGo), collaborative online encyclopedias (Wikipedia), as well as content sharing sites (Youtube).

As mobile computing technology allowed the deployment of radically innovative business models via digital business platforms, one could wonder whether such developments increase or decrease the ecological sustainability of specific industries. In the cases of Uber and Car2Go, mentioned earlier, researchers working on the sustainability area could ask whether the net environmental impact of the mobility sector increased or decreased with the success of such platforms. Broadly, the answer requires an analysis combining network and rebound effects, as well as the findings of the PTBG research (Reinhardt, 1998, King & Lenox 2001; Orsato, 2009) – that the greening of industry is conditional. In the light of these arguments, by developing an analytical framework to guide empirical research this paper represents the first step towards answering the following research question: When do digital business platforms generate more sustainable industries?

Network effects constitute a well-established field of research aiming at identifying the determinants of technological dominance (Suarez, 2004). Because consumers are willing to pay for the dominant technology, the stronger the network effect, the higher the likelihood of a technological standard being the winner (Katz & Shapiro, 1992; Brynjolfsson & Kemerer, 1996). Additionally, the stronger the network effect, the higher the switch cost of consumers and the greater the difficulty of a firm to steal consumers from its rivals (Suarez, 2004). At its extreme, an innovative business model based on a BP has the potential to generate a quasi-monopolistic scenario, as the cases of Alibaba and Amazon have shown for e-commerce. This is known as a winner-takes-all hypothesis.
Rebound effects, on the other hand, emerged from environmental studies to refer to the difference between the expected and the actual environmental savings from (efficiency) improvements, once a number of economic mechanisms have been considered. In other words, it means the savings that were taken back (Vivanco, McDowall, Freire-González, Kemp & van der Voet, 2016). For instance, the success of Uber may result in the reduction of car ownership, which would also reduce the environmental impact of the mobility sector. However, it may correspondingly increases the number of car rides and the net environmental impact. Hence, a positive net effect (less use of private cars) is ‘rebounded’ by a negative one (more car rides).

Both network and rebound effects comprise indirect aspects. Indirect network effects can include the proliferation of products and services (called ‘complementors’ by the specialized literature) indirectly bounded to a business platform (Ruutu, Casey & Kotovirta, 2017; Zhu and Iansiti (2012). Such indirect network effects can influence the success of what Porter (1990) called ‘related and supporting industries’ in the traditional view of industrial clusters. Hence, network effects can extend broadly, influencing the diffusion of a multitude of products and services. By its turn, indirect rebound effects relate to factors other than prices, such as habits, lifestyles and environmental awareness that may mitigate or amplify the rebound effect (Walnum, Aall & Lokke, 2014). Taken together, network and rebound effects may explain why business model innovation deployed via digital business platforms may result in some economic sectors becoming more (or less) sustainable.

References
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