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Unlocking how start-ups create business value with mobile applications: Development of an App-enabled Business Innovation Cycle

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ABSTRACT

Little is known about the business value that mobile applications (apps) can create, and how start-ups can leverage this value. We present a multiple-case study to both explain the process of app-enabled value creation and the type of value outcomes associated with the use of apps for business purposes. The study develops an App-enabled Business Innovation Cycle model that includes 1) twelve routines matched to four dynamic capabilities for creating business value using apps, 2) an explanation of the interactions between these capabilities, and 3) eleven types of app-enabled business value. Based on the developed model we give directions for future research and practice.

1. Introduction

Better understanding of how businesses leverage digital technology to create value is of prime interest (Wheeler, 2002; Yoo et al., 2010). Mobile applications (apps) particularly provide organizations new opportunities to create value, for example by meeting new demands, increasing efficiency, supporting knowledge sharing and improving competitiveness (Sheng et al., 2005; Unhelkar and Murugesan, 2010). Several calls have been made to investigate how the strategic opportunities of apps can be achieved (e.g. Anthes, 2011; R.C. Basole, 2007; Ladd et al., 2010; Sheng et al., 2005).

When dealing with opportunities relating to digital technologies in new and dynamic markets, as in the case of apps, start-ups are often the first who identify and explore these opportunities (Hitt et al., 2001). Start-ups are ventures in the process of discovering, developing and implementing a viable and scalable business model to exploit market opportunities. Despite the dominance of start-ups in app development, previous theory on net-enabled value creation focuses on the value creation process of large organizations (Wheeler, 2002). Therefore we focus our research on app-enabled value creation by start-ups.

Many studies investigating the value of IT have their roots in the field of production economics. These studies investigate what part of the value at the output of a production system can be accounted for by IT related inputs (Zhu and Kraemer, 2005). However, recent studies on IT business value contest the 'black box' production models, and aim at investigating the dynamics inside the production process (Kohli and Grover, 2008). We argue that looking inside a highly dynamic production system, as in the case of apps, there is need to focus on the Dynamic Business Capabilities (DBC) that shape an IT input and ultimately create value. For this purpose, the approach to the study takes a Dynamic Capabilities Perspective (DCP) that adjusts Wheeler (2002) DBC theory to the practice of app entrepreneurs.

Following the call of DCP, the goal of this study is to explain how app-enabled business value is created by start-ups, and what the business value of apps is. Consequently, we formulate two research questions. First, we want to know how start-ups create value by using apps for business purposes. Second, we aim to answer the question what type of value is created by start-ups that use apps for business purposes. We will answer both questions by combining insights of existing theory of e-business development and the experiential insights of eight app entrepreneurs. First, we develop an App-enabled Business Innovation Cycle (ABIC) model, which gives a new theoretical perspective on processes for transforming app business opportunities into real business value. This model is a variant of Wheeler's Net Enabled Business

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Innovation Cycle Model (NEBIC) such that it becomes relevant for the specific context of startups and apps. Second, we present cases that ground the propositions of the ABIC model in the practice of start-ups that create business value through apps. Last, implications are drawn for further research and for practice.

2. Theory

To explain the process of app-enabled business value creation, we first define app-enablement. We then explain the need to use a Dynamic Capabilities Perspective (DCP) and describe a DCP developed for IT and e-business named NEBIC. Next, we develop a variant of the NEBIC for app-enabled business value, termed ABIC, including nine research propositions.

2.1. App-enablement

Apps may take on a large variety of business functions, and we therefore need to formulate a working definition of apps and app-enablement before taking a closer look at their business value. Nickerson et al. (2007, p. 2) define apps as "a use of a mobile technology by an end-user for a particular purpose." Next to defining the form of an app as 'a mobile technology', the definition reflects the importance of the function and fit of the apps; namely, it includes a 'purposeful use' and a 'user'. The latter two are especially important in the context of this study. Value is not created by just a technology, but it is rather created through the interplay of the technology, the user, and the purpose of use (Lee et al., 2015).

However, the focus of the above definition is on mobile computing in general, and would include all uses of a mobile technology, such as mobile phones, tablet PC's, but also WiFi-enabled laptops. This study excludes laptops as they are more closely related to the desktop pc than to mobile phones and tablet pc's, based on for example function, input/output mechanisms, and operating software. Also, the current study focuses on apps that potentially have business value. For example, an app could be used by organizations to communicate with suppliers, facilitate collaboration between employees, or reach and attract customers.

Apps are often the heart of mobile services that provide value to consumers (also see, Chen and Cheng, 2010; Gallouj et al., 2015; Gurtner et al., 2014). More precisely, an app interfaces a mobile device user with a mobile service when using a mobile device. The activity performed on the mobile device takes place through the software interface (the app from the user perspective) that interfaces between front-end and backend to exchange information. Apps are offered as services on digital technology platforms, such as app stores (Basole and Karla, 2011; Karhu et al., 2014). These digital technology platforms offer members a risk-free infrastructure to develop and exploit apps as complementary services (Basole and Karla, 2011; Parker and Alstyne, 2008). On the basis of the former, we define an app as "an interface on a mobile phone or tablet pc used for accessing a mobile service that potentially holds business value." App-enablement involves the use of one or more apps by organizations to enable a value proposition.

2.2. A Dynamic Capabilities Perspective on IT business value

Dedrick et al. (2003) reviewed more than 50 empirical articles that successfully related IT to economic performance. Most of the empirical assessments used production economics models, whose train of thought is to investigate through regression analysis what part of the outputs can be explained by 'IT investment' input. However, an organization can invest in apps, but if they are poorly developed or implemented, no part of the intended value creation will be realized. According to Brynjolfsson and Hitt (2000, p. 45), "both case studies and econometric work point to organizational complements such as new business processes, new skills and new organizational and industry structures as a major driver of the contribution of information technology." Research has indicated that for the purpose of linking IT to the value it creates, it is necessary to look at how an IT is used (Aral et al., 2006; Devaraj and Kohli, 2003). For this purpose, IT business value research has shifted from using production economics to employing a Resource-Based View (RBV) as theoretical basis (Santhanam and Hartono, 2003; Wade and Hulland, 2004). However, the RBV does not seem to apply in dynamic markets (Eisenhardt and Martin, 2000), like the one concerning apps. Competitive advantage from resources in fast-moving markets erodes because of the speed with which new technologies disrupt the market (Wheeler, 2002). To compete in dynamic markets, organizations need to continually build new resources and reconfigure their existing resources to create novel forms of competitive advantage (Chakravarty et al., 2013).

The essence of the Dynamic Capabilities Perspective (DCP) is that competitive advantage comes from having strong capabilities in the form of routines that continually create and reconfigure resources (Teece et al., 1997). Dynamic capabilities are "organizational routines through which firms achieve new resource configurations" (Eisenhardt and Martin, 2000, p. 1107). The capabilities themselves are not a source of competitive advantage; it is the effective evolution of the capabilities that provides long-term advantage (Wheeler, 2002). In case of market dynamism, the effective evolution of the capabilities depends on the ability to assess and understand changes in the market, and respond to them in a timely manner by reconfiguring organizational resources (Teece et al., 1997). Similarly, app-enabled start-ups need to continually reconfigure resources to create long-term value because apps can quickly lose their value due to imitations and technological developments.

An IT-related DCP for net-enabled business is formulated by Wheeler (2002) and named Net Enabled Business Innovation Cycle (NEBIC). The NEBIC is an "applied dynamic capabilities theory for measuring, predicting, and understanding a firm's ability to create customer value through the business use of digital networks" (Wheeler, 2002, p. 125). The theory describes the cycle of value creation in net-enabled organizations through four dynamic capabilities: (1) choosing emerging/enabling technologies, (2) matching with economic opportunities, (3) executing business innovation for growth, and (4) assessing customer value. The relations between the capabilities are processes that describe learning from each of the four capabilities, communicating the results to the following capability, and feeding back market-based metrics. The NEBIC can be approached from both a variance and a process perspective. From a variance-based perspective, the model suggests that the four sequenced capabilities are discrete variables (i.e. can be high or low). The configuration of these variables will be related to the outcome in terms of created customer value. From a process perspective, the model suggests that strong capabilities and effective communication processes between them are necessary conditions to create value.

2.3. App-enabled Business Innovation Cycle (ABIC) propositions

The NEBIC framework describes value creation processes for "particularly large firms" (Wheeler, 2002, p. 139). For our purpose the NEBIC processes have to be adapted to fit the context of app-enabled start-ups. The proposed adaptation leads to the ABIC (Fig. 1). The numbered processes connecting the capabilities in Fig. 1 correspond to the numbers of the propositions discussed below, explaining the sequencing and the mechanisms of interaction of the capabilities.

Most NEBIC propositions describe the processes between capabilities as communication processes. As such, the NEBIC theory focuses on intra-organizational learning through communicating knowledge and assumes that each of the four capabilities resides with different departments in an organization. In the case of small start-ups, the entrepreneur alone or a small group is usually involved in the initiative from conception to market, and learning is usually a cognitive process (Baron, 2006). As such, there is no direct need to communicate the knowledge to a different group of people. Therefore, the ABIC will