DIGITAL PAYMENTS INFRASTRUCTURE EVOLUTION: REQUIREMENTS ON ORGANIZATIONAL CAPABILITIES

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Abstract

This paper inquiry into the effects of digitalization on the payment industry. In the case of payments, the ecosystem surrounding a payment historically involved two parties exchanging goods and services for money (banknotes and coins). Today, payment increasingly consists of digital representations of money in a globally intertwined system that involve many parties, such as payers, payment services providers, banks, telecom operators, mobile phone manufactures, and payees. We study how the digitalization of the payment industry has affected one major European bank. We find that the development of a digital payment infrastructure has blurred the border between the bank’s internal IT operations and the surrounding environment. The bank has successfully redirected its IT capabilities from anticipatory to reactive, which enables the bank to with comparatively few resources and short time respond to external developments. This responsive capacity gives the bank an important competitive advantage compared to other banks in the region.

Keywords: Digital infrastructure, Payments, Banking.

1 INTRODUCTION

Historically, payments involved two parties exchanging goods and services for money. Today, payments, with increasing frequency, consists of digital representations of money in a globally intertwined system that involve parties such as payers, payment services providers, banks, telecom operators, mobile phone manufactures, and payees.

The digitization of payments that occurs around the world, leads to the emergence of a new type of IT artefact called digital infrastructure. Digital infrastructures are taking increasingly prominent positions in the life of individuals, organization and the society at large. The emerging digital payment infrastructure spans organizational and national borders including a diverse set of stakeholders with only partly aligned objectives and even opposite objectives. It connects to and utilizes a multitude of already installed physical and digital infrastructures, and evolves dynamically due to technological, business, and political innovations. It also in itself reinforces the dynamicity by enabling innovations utilizing the infrastructure as platform.

In this paper we study the consequences of the emerging digital payment infrastructure for one actor in the financial industry: Nordic Bank. Although many banks, including Nordic Bank, has since many years been supported by complex mix of IT systems, the design and development of those systems has mainly been driven by internal requirements and opportunities. With the emergence of a digital payment infrastructure, the border of internal and external has been blurred as systems transcend organizational borders. We present an historical analysis of how the digital payment infrastructure has forced Nordic Bank to adapt its IT strategy and to develop new IT capabilities that match the requirements caused by forming part of a digital infrastructure.

2 THEORETICAL PERSPECTIVES: DIGITAL INFRASTRUCTURES AND RBV

The paper builds on the theoretical perspectives of Digital infrastructures (Hanseth & Lyytinen, 2010; Tilson et al., 2010; Henningsson & Zinner Henriksen, 2011) and the Resource Based View on corporate strategy (See, for example, Barney, 1991; Grant, 1991; Peteraf, 1993). The combination of the two
perspectives is an attempt to capture and bridge the interactions between external and internal IT evolution for organizations forming part of digital infrastructures.

As the digitalization and computerization of the world continue, new phenomena of importance to individuals, organizations and the society emerge – phenomena that we do not completely capture with existing skills and toolsets. The digital infrastructure is one of these phenomena. Millions of users log onto Facebook, download iPhone applications, and use mobile services to overcome time and space both in work and private settings. Understanding and dealing with these new dynamics will necessitate paying attention to digital infrastructures as a category of IT artefacts (Tilson et al., 2010).

There are still many things about digital infrastructures and how they can be developed towards specific ends that are unknown, but there is an increasing awareness of that digital infrastructure development is fundamentally different from developing IT systems. Compared to IT systems, digital infrastructures are (Hanseth and Lyytinen, 2010, Tilson et al., 2010):

- Not the responsibility of one or a few organizations, but the shared responsibility of several actors in digital eco-systems with only partially aligned objectives.
- Heterogeneous, in that the components of the infrastructure represents grand variety.
- Open without clear boundaries. Transcending organizational and national boundaries.
- Often very large in scale with millions of users and complexity in technical setup.
- Evolutionary and dynamic in that new technological innovations or new practices triggers side effects and unintended consequences.
- Path dependent, meaning that future development options are dependent on the existing installed base.
- Support tools of our everyday activities.

Until recently, phenomena such as the digital payment infrastructure has been seen and approached as large scale or global types IT systems with methodologies and approaches tailored to address problems with IT systems development. However, recent experiences have in very painful ways demonstrated the fundamental difference of digital infrastructures and the inadequacies of these approaches to address the specific problems. The huge losses in foregone investments, opportunity costs, and political and social problems are exemplified by the difficulties with developing nationwide e-Health system in the UK (Sauer & Willcocks, 2007), the struggle to introduce international standards for EDI (Damsgaard & Lyytinen, 2001), the over budget Danish “rejsekort”, the new social security system in Sweden, and the on-going struggle to develop an interoperable infrastructure with standardized functionality is slowly emerging, but to the cost of billions of Euros for increasingly frustrated traders and customs authorities.

At the same time, in a world where IT increasingly becomes integrated in corporate strategy and operation, the organizational capacity to manage and use IT resources is continuously becoming more critical to organizational success. It is generally acknowledged that only in rare occasions organizations gain sustained competitive advantage directly from IT resources (Bhatt et al., 2010; Bharadwaj, 2000; Mata et al., 1995). Instead it has been suggested that IT resources are combined with other organizational resources, and in complex patterns forms sustained competitive advantage (Wade & Hulland, 2004).

In the context of digital infrastructures, sustained competitive advantage from IT resources would come to the organization with the capability to adopt the internal part of the digital infrastructure to match development of the external infrastructure faster and/or by using fewer resources than competitors.

Previous research has presented findings that indicate the prospect of sustained competitive advantage from a flexible IT infrastructure, based on infrastructure characteristics of compatibility, connectivity, modularity (Chung et al., 2003; Duncan, 1995; Byrd & Turner, 2000). IT infrastructure flexibility can vary significantly, and that the degree of flexibility has impact on how a company can develop its business (Byrd & Turner, 2001; Davenport & Linder, 1994; Sambamurthy et al., 2003). IT infrastructure
flexibility gives the company options by enabling redeployment of its constituting components and more efficient incorporation of new components (Broadbent et al., 1999).

3 CASE: NORDIC BANK AND THE EVOLUTION OF THE DIGITAL PAYMENT INFRASTRUCTURE

Nordic Bank is one of northern Europe’s largest financial institutes with more than five million customers in its retail banking business. The bank has through the years expanded its business to thirteen European countries, and to the US.

In 1997, Nordic Bank launched a new strategy that presented northern Europe as the new home market. Following, Nordic Bank made several acquisitions in the north-European countries. Deregulation of the European financial industry made it possible to run the acquired banks as local branches. Essentially customers of the acquired banks banked with the parent bank’s legal entity, operating under foreign national legislation and with support from the parent bank’s state guarantee of deposits. This was made possible by bringing over the acquired banks to the centralized IT platform, enabling front offices to work in real time with central databases in much the same way as the parent bank’s offices did. Subsequent acquisitions followed the same pattern, keeping with the IT strategy of one centralized IT platform even as the bank continued expansion to new European markets.

In the early 2000’s, Nordic Bank was recognized for having a highly qualified and efficient IT platform that together with the organizational resources formed a competitive advantage compared to the other banks in the region. To maintain this position, a number of initiatives were launched to improve the business based on technological possibilities. In many sense, Nordic Bank was a pioneer in making the IT organization part of developing new business opportunities.

However, during the 2000 the infrastructures upon which payment transactions are executed started to become increasingly digital. For Nordic Bank, this led to an increasing blurring of the frontiers of their IT systems. Increasingly, Nordic Bank’s IT systems were interconnected with IT systems outside the control of the organization. This was not a discrete transformation, but a continuous process that still is on-going in 2012.

During the ten years covered in the study, technological, business, and political (regulatory) innovations have increasingly put pressure on Nordic Bank to adapt its IT infrastructure in response. Starting to experience the interconnectedness outside the organizational domain in 2002, Nordic Bank started to actively work with IT infrastructure flexibility, constantly improving in the attributes of compatibility, connectivity, and modularity. In the latest IT strategy program, named Digital Banking, Nordic bank moves from “IT leading business” to a “business leading IT” position.

In 2012 the IT infrastructure flexibility is put to test as European banking is facing a “regulatory squeeze” in which “the coming years will see a huge amount of regulatory change …with many initial deadlines only a matter of months away.” The response of Nordic Bank has been to reconstruct its IT infrastructure and associated organizational process from proactiveness in the sense that the bank actively plans the evolution of functionality of the IT platform as a measure to drive business, to proactiveness in the sense that adaptability and agility to respond to external demands and seek out external opportunities has been in the forefront.

By 2011, Nordic Bank used about 15 of its total budget on IT. Of the 15%, about 40% of the total budget is spent on new development. The external market analyser Datamonitor calculates that Nordic Bank has a “Change the Bank” (IT investments made to improve the business, rather than maintain the existing operations) ratio of 42,3%. The industry average is about 30%.

According to Nordic Bank, the low cost for IT operations and maintenance is a direct result of its service oriented architecture. These costs are normally caused by the need to react to changes in the bank’s external, such as new legislation, or changes in the digital infrastructures for global financial transactions. The high compatibility, connectivity, and modularity make it relatively easy for Nordic Bank to react to

1 McKinsey (2012) How Europe’s banks can navigate a regulatory squeeze
2 IBM (2012) Using regulation as the catalyst for transformational change
external changes, giving a competitive edge towards competitors as it enables spending less of the IT budget on system maintenance compared to industry peers.

4 FINDINGS AND CONTRIBUTIONS

The digital payment infrastructure and its surrounding eco-system demonstrate several of the features that are causing problems around the world. The infrastructure is the shared responsibility of many different types of actors; influenced by many international and national authorities, commercial businesses, software and hardware developers, and individual consumers. Technically, very heterogeneous parts of the infrastructures are located to different organizational and juridical domains. The national part of the infrastructure does not exist in an isolated vacuum, but is open to the European and international context in order to meet user requirements and be successful. Technological innovation in mobile technologies and increasing internationalization continuously push the infrastructure that most likely never will assume a stable and mature shape, in the same way that the digital infrastructure supporting international trade has dynamic evolution as its normality.

We find that for an organization that forms part of a digital infrastructure, the organizational capability to adapt its internal IT infrastructure to the on-going evolution of the digital infrastructure becomes a key competitive advantage that is difficult for competitors to imitate.

Drawing on the literature on evolution of organizational resources we distinguish between capabilities for IT infrastructure deepening and IT infrastructure extension. The first represents the reuse of existing IT resources, and the latter represents the addition of new IT resources to the infrastructure. On a high level, both capabilities combines attributes of corporate IT infrastructure flexibility as asset quality with the organizational capability to perform deepening and extension actions. Both capabilities are essential to adapt to the constant evolution of digital infrastructures.

References

Chung SH, Rainer Jr RK and Lewis BR (2003) The impact of information technology infrastructure flexibility on strategic alignment and application implementations. The Communications of the Association for Information Systems 11(44),


