
Innovation in financial services: a tale from e-banking development in Indonesia

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Abstract: Even though financial innovation plays an important role in the modern economy, surprisingly, few empirical studies have investigated the phenomenon. This research addresses how financial innovation is developed in Indonesia, how it is diffused from time to time, what factors drive and influence the e-banking implementation, how banks manage their e-banking offerings, and what lessons can be learnt from this case. An extensive case study research was conducted within five leading Indonesian banks. This study concludes by summarising the case of electronic banking development in Indonesia. Unarguably, customers and competitors play an important role in influencing e-banking services adoption. There is also an indication that bigger and older banks are not as innovative as their smaller and newer peers. Interestingly, the unavailability of legal protection does not discourage them to partner and cooperate with each other and it is likely that only few people drive innovation among Indonesian banks.

Keywords: financial innovation; diffusion of innovation; electronic banking; Indonesia.

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1 Introduction

Innovation in financial services has been illustrated as the “life blood of efficient and responsive capital markets” [van Horne, (1985), p.621], yet, there have been few empirical studies (Frame and White, 2002). Financial innovation has not only been a dynamic attribute, but also critical to the changing economic landscape over the last centuries (Mention and Torkkeli, 2012). Although they have kept up introducing a variety of new products and services (Miller, 1986), innovation in financial services is merely the adoption of new technologies. In fact, many of the innovation initiatives are half-hearted and seem isolated from the typical business processes of the organisation. Secondly, most innovations in financial services unquestionably were developed in developed countries that have very distinct characteristics to those of developing countries (Agarwal et al., 2009; Akinci et al., 2004; Gerrard and Cunningham, 2003; Gikandi and Bloor, 2010; Lee et al., 2012; Rotchanakitumnuai and Spence, 2003). Thus, it is not unusual that adoption of innovation in developing countries has not always been promising (Frame and White, 2002).

The focus of this study is to investigate financial innovation, particularly in electronic banking (e-banking) among Indonesian banks, how it has diffused over time, what factors drive and influence e-banking implementation, how banks manage their e-banking, and what lessons can be learnt from it. We use the definition of e-banking as the deployment of banking products and services carried over electronic and communication networks directly to customers (Singh and Malhotra, 2004). Indonesia has been selected in this research because it exhibits an exceptional case as a developing country, especially after experiencing crisis, financial recession, and economic reform (Dowling and Yap, 2008). However, following restructuring implemented in the wake of these crisis, Indonesian banks remain in a far stronger position and have become highly involved in products and services innovation (Enoch et al., 2001).

It is obvious that the process of invention, innovation, and diffusion of e-banking in Indonesia with feedback occurring during the learning process has merged into the process coined ‘innofusion’ (Fleck, 1993). The research also shows that a radically changing landscape for the electronic delivery of retail banking services in Indonesia is still driven by market forces (Dew, 2007). However, there is an indication that bigger and older banks are not as dynamic as their smaller and newer peers (Christensen, 1997). It also seems that it is only ‘those’ people who drive innovation among Indonesian banks, moving from one bank to another, dragging their colleagues to switch, and developing new innovation. It is common to find the same innovation in a number of Indonesian banks, but bundled and marketed differently, and does not take a long time until it becomes communal in nature. However, the empirical cases show that each of the e-banking innovations has emerged gradually through different speeds of innovation stages and processes (Rogers, 1995).

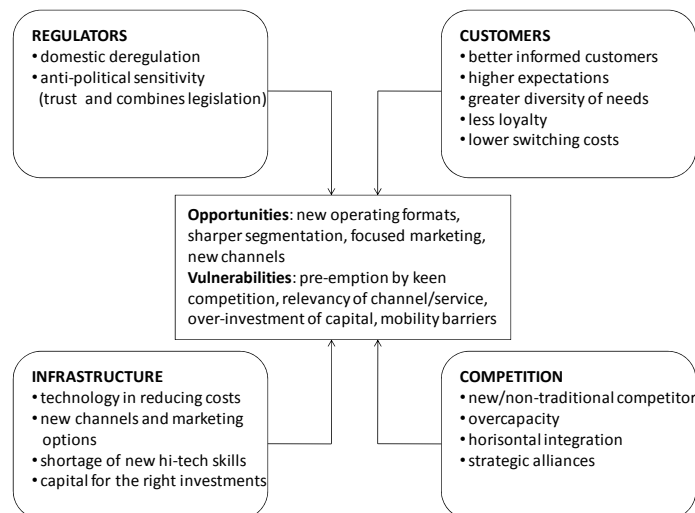
The rest of this article is organised as follows. After identifying research aims, objectives, and scope of this research, the next section reviews the main literature and develops conceptual and operational definitions applicable to this research. Section 3 introduces the research method and presents the interviews and the findings of this work. Discussion and analysis are then presented in Section 4. Implications and recommendations from this research, a summary of contributions, and appraisal of potential future work are presented in the last part.

2 Innovation in financial services

Rogers (1983, p.5) defined diffusion as “the process by which an innovation is communicated through certain channels over time among the members of social systems”. The factors identified in his seminal contribution were relative advantage over current products and methods, compatibility with existing modes and customer values, trialability, observability and complexity, and the perceived risk associated with the innovation (Rogers, 1995). However, the association between the diffusion of innovations and organisation’s size has produced mixed conclusions. Some argue that large organisations have more advantages over smaller ones (Brown, 1981) while others believe that small organisations tend to be more innovative (Nootboom, 1994; Segers, 1993).

Fleck (1993) introduced the concept of ‘innofusion’, which reflects innovation and diffusion combined. Both are processes of social learning; creating innovations within the context of use rather than in a laboratory environment. Fleck (1993) argued that the actors of innovation are seen as being involved in a continuous process of attributing meaning to the artefacts and embedding them to their needs. Thus, there is a chance that every innovation will be taken up into a wider environment, become crystallised, and made permanent (Bijker, 1992). Innofusion is a dynamic concept, whereby new products will have consequences for the environments into which they are introduced (Baskerville and Pries-Heje, 1998; Oudshoorn and Pinch, 2003). In becoming normal and permanent, some ‘radical’ innovations disrupt and challenge previously established skills, experiences, institutional arrangements, expectations, and common conventions (Abernathy and Clark, 1985; Robertson et al., 1996). This research utilises the sociotechnical constituency approach, as those constituents are inseparable and dynamic, influencing each other in creating, producing, adopting, and diffusing particular technologies, which is always needed in building technological capabilities (Molina, 1990, 1993).

Figure 1 Current state of the financial services sector



Source: Adopted from Dobni (2006, p168)

Table 1 Key innovations in financial services

<i>Category</i>	<i>Innovation</i>	<i>Adoption (est.)</i>
Service delivery or access to financial markets	Bond	1960s
	Credit cards	1969
	Money market mutual funds	1970s
	Derivatives	1970s
	Cash management account	1978
	Certificate of deposit	1979
	Mortgage-backed securities	1980s
	Debit cards	1987
	All in one account	1990s
	Structured products	1990s
	Credit derivatives	1993
	Exchange-traded fund (ETF)	1993
	Organisational functions	Risk management systems
Automated voice response		1980s
Discount brokerage service		1980s
Telephone banking		1983
Customer information file		1990s
Electronic trading of shares		1990s
Profitability analysis by customer		1990s
Organisational functions and service delivery	Automatic teller machine (ATMs)	1967
	Home banking	1983
	Electronic fund transfer (EFT)	1985
	Branch automation	End 1990s
	Internet banking	1997
	Mobile banking	1999
Miscellaneous	Lockbox system	1980s
	Treasury workstation	1990s
	Video banking	1990s
	Loyalty schemes	1990s
	One-stop banking	1990s
	Personal banker	1990s
	Open architecture	2000s

Source: Adapted from Fasnacht (2009, pp.47–48)

In the field of financial services, the significance of innovation is widely recognised (for instance: Ben-Horim and Silber, 1977; Frame and White, 2002; Merton, 1992, 1995; Miller, 1986; Tufano, 1989). Financial innovations are critical not only for firms in the financial industries, but also for other industries as well. Financial firms have the ability to raise larger amounts of capital at a lower cost than they could otherwise (Lerner,

2006). The main function of this industry is “to facilitate the allocation and deployment of economic resources, both spatially and across time, in an uncertain environment” [Merton, (1992), p.12]. This role will incorporate a payment system with “a medium of exchange, the transfer of resources from savers to investor-users of the resources, the gathering of savings for the purposes of pure time transformation, and the reduction of risk through insurance and diversification” [Frame and White, (2002), p.3].

2.1 *E-banking innovation*

It is obvious that the financial services industry has undergone major IT transformations over the last few decades (i.e., Consoli, 2005; Harris, 2001; Lockett and Littler, 1997; Nielsen, 2002). They need to innovate to keep up with the globalisation movement, both at the procedural level and at the informational level, including moving from traditional distribution channels to electronic distribution channels. Information and communication technology (ICT) and ICT-related technology are vital for innovative activities in financial services. As mentioned by Gallouj and Weinstein (1997), service is a process of operations in which its provision is intangible. At the forefront of innovation, the financial services use IT extensively and technological change has radically transformed the industry (Barras, 1990; Consoli, 2005; Dahlberg et al., 2008; Mention and Torkkeli, 2012; Miles, 1994). Although IT plays a crucial role and has become a strategic decision (Sethi and King, 1994), this does not always mean that IT will increase productivity (Harris, 2001). Despite the fact that large firms have more resources with which to exploit technologies, they are often disadvantaged when it comes to harnessing technological innovation (Christensen, 1997; Leonard-Barton, 1995).

Table 2 Common features and classification of electronic banking

<i>Name</i>	<i>Definition</i>
ATM	Devices activated by an encoded bank card, allowing customers to do routine transactions as they would at a bank teller window. ATMs function around the clock and can be located either on the bank or at some remote location off the premises (Fitch, 2000; Woelfel, 1994).
Credit card	Any card or other single credit device that may be used to obtain money, property, or services on credit with particular credit terms established by the issuing institution (FDIC, 1974; Woelfel, 1994).
Debit card	A bank card that give customers access to their funds electronically to pay or withdraw money at ATM machines. Unlike credit card, debit card withdraw funds immediately and do not offer the convenience of paying over time. (Fitch, 2000).
Direct debit	A method of collecting loan or payments by deducting the amounts owed from the borrower’s checking account on the date payment is due (Fitch, 2000).
Direct deposit	A method of payment in which money is transferred to the payee’s account without the use of checks or cash (Merriam-Webster, 2009).
EFT	Any transfer of funds which are initiated through an electronic terminal to order, instruct, or authorise a bank to debit or credit an account; may include point-of-sale (POS) transfers, ATM transactions, direct deposits or withdrawals, and transfers initiated by phone (FDIC, 1978).

Table 2 Common features and classification of electronic banking (continued)

<i>Name</i>	<i>Definition</i>
Internet banking	Conducting banking activity – such as manage account balances, pay bills, transfer funds, purchase financial instruments, etc. – through internet as the delivery channel. Customer accesses their accounts from a computer browser that runs banking applications reside on the bank's server (Insley et al., 2003)
Mobile banking	Provision and availing of banking services with the help of mobile devices, including facilities to conduct bank transactions, to manage accounts, and to access other customised information (Tiwari and Buse, 2007).
Prepaid card	A stored value card that can be used for a numerous payment purposes and sometimes might be used either on a domestic or international scale (ECB, 2000).
Smart card	A bank card containing a chip, which gives the authorised cardholder access to account balances, to approve retail purchases, and so forth. Its internal memory may store information on a cardholder's relationship with other institutions and databases that are updated every time the card is used (Fitch, 2000).

Basel Committee on Banking Supervision (1998, p.6) defines e-banking as “the provision of retail and small value banking products and services through electronic channels”. E-banking also is described as the deployment of banking products and services carried over electronic and communication networks directly to customers (Singh and Malhotra, 2004). Meanwhile, FinCEN/US Treasury Department Financial Crimes Enforcement Network (2000, p.25) defined e-banking as “an umbrella term for the process by which a customer may perform banking transactions electronically without visiting a brick-and-mortar institution”. At first, EFT was programmed to enable funds to be transferred electronically among financial firms in early 1970s (Johnston, 1998). In the early 1980s, the ATM was developed as an extension to EFT to allow regular financial transactions to be carried out over a telecommunication network (Barnes and Hunt, 2001). Later on, the internet was commercialised and internet banking was subsequently introduced. PC-based online banking was initially not very popular (Fight, 2002). Nonetheless, along with the development of technology, e-banking has become extremely popular today prior to the first adoption (McLoughlin, 1999), replacing the conventional transactions, which in turn benefits the customers in the form of lower transaction fees.

2.2 Organisational management and innovation

In the last decades, financial services have faced a number of fundamental changes, different forms of government intervention and deregulation, tighter business competition, more demanding customers, increasing cost of developing new financial products and services, the rapidity of technological advancement, and recent mergers and acquisitions (M&A) of financial firms (Akamavi, 2005). As in other industries, there is a tension within financial industries between the need to create innovation and the need to exploit innovation (Dew, 2007). Banks want to attract customers by providing them with minimum cost and maximum quality, while on the other hand they have to protect their innovation from free riding imitators. Another problem is that all new financial products and services must be completely explained to imitators, vetted by government regulators,

and probably promoted to potential imitators in order to enter into common use. Indeed, this brings the imitation cost to almost zero.

The main reason why banks implement e-banking services is “to provide a faster, easier, and more reliable service to clients, to improve the bank’s competitive position and image, and to meet clients’ demands” [Molina and Ben-Jadeed, (2004), p.90]. In the same spirit, Brown and Molla (2005) argue that cost reduction, convenience, availability, accessibility, and administration are main drivers behind the offering of e-banking services. In Indonesia, e-banking implementation is aligned with government policy in order to reduce paper money circulation, to increase efficiency in every transaction, and to move towards a cashless society. However, there are questions regarding financial firms’ efficiency in utilising e-banking features for improving their competitive advantages, for example, how far banks can realise their return on investment and increase the success rate of the innovation. E-banking implementation might also have radical impacts on a bank’s managerial structures, operational processes, products and services, and relationship with other parties (Molina and Ben-Jadeed, 2004).

Literature on strategy argues that collaboration helps organisations to acquire skills and resources that cannot be produced internally (Hamel, 1991; Hamel et al., 1989; Teece, 1986). The main objective is to obtain resources through direct transfer of assets, shared key equipment, IPR, or personnel, and through the transfer of organisational knowledge (Hamel et al., 1989) in order to survive in the turbulent competition and develop their own distinctive capabilities (Powell et al., 1996; Prahalad and Hamel, 1990). Network theory synthesises organisations as embedded within networks of linkages that facilitate and constrain their actions and interests (Nohria and Gulati, 1994). Network effect might be used to explain why financial innovations often require collaboration among different organisations. An innovator’s success frequently depends on innovation developed by competitors that are important to “share the risk, increase market depth, liquidity, and price transparency” [Kumar and Turnbull, (2008), p.2013].

Not surprisingly, patenting in banking is perceived as a minor instrument for appropriate service innovations (Miles et al., 2000). Financial services are also characterised by network externalities and standardisation (Wagner, 2008). Network externalities come from standard setting, which then make interoperability become possible. Those standardisations and compatibilities between various products will give competitive advantage for the standard owner, stimulate network effects, and accumulate big portfolios of patent. This situation, in turn, will raise a barrier to entry and hamper innovative entrants. Financial patents are also often characterised by high unpredictability about enforceability (Lerner, 2006). Most business method innovations have a practical nature – it is simply a common process that widely spread and/or no need for written documentation (Wagner, 2008). Because of uncertainty over patent validity, investing in innovation becomes unattractive. Trademarks are much more popular in financial services than are patents (Rogers and Greenhalgh, 2006).

2.3 External innovation agents

It is generally acknowledged that the demand to acquire knowledge resources correspondingly increases with the service intensity of firms. The main activities of these types of firms include “acquisition, creation, packaging, and application of knowledge” [Davenport et al., (1996), p.54]. These firms are characterised by employing professional and technical personnel with a high levels of skills and expertise. Leonard-Barton (1995)

suggested that combining different personnel with a particular set of activities would encourage knowledge building and enable innovation. In the same spirit, Moss-Kanter (1994) emphasised that collaboration enhances organisational learning. Consequently, more valuable knowledge will be generated if organisations and their partners create synergies instead of working alone (Brown, 2008). Knowledge becomes the main input and main output of the knowledge creation process and variety in this process becomes an important factor in influencing creativity, which in turn calls for access to external vertical and horizontal knowledge sources (Metcalfe, 2001). Knowledge transfer can also be seen as a mere extension of physical movement and an economic circulation that involves transfer of ownership (Gallouj, 2000). The quality of knowledge transmission will increase if knowledge is codified and will decrease if knowledge is perceived by the source as strategic (Gallouj, 2000).

Table 3 Intermediary roles of consultants

<i>User needs</i>	<i>Bridging activity</i>	<i>Supply side</i>
Technology	Articulation of specific needs Selection of appropriate options	Sources of technology
Skills and human resources	Identification of needs Selection Training and development	Labour market Training resources
Financial support	Investment appraisal Making a business case	Sources of finance
Business and innovation strategy	Identification and development Communication and implementation	Environmental signals
New technology knowledge	Education information and communication Locating key sources of new knowledge Building linkages with the external knowledge system	Examples of best practices Emerging knowledge base
Implementation	Project management Managing external resources Training and skill development Organisational development	Specialist resources

Source: Bessant and Rush (1995, p.101)

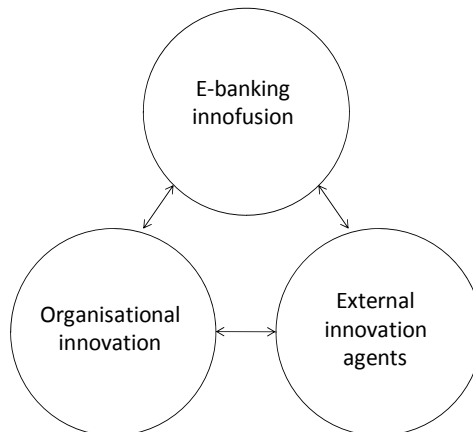
Knowledge exchange is unequivocally a complicated process. The knowledge creation process also needs a balance of both internal and external tacit and codified knowledge (Antonelli, 1999). Knowledge does not flow freely, but needs an input of effort for its adoption. This internalisation process incurs absorption costs (Cohen and Levinthal, 1990). As well, the knowledge production process itself is a cumulative and interactive process; thus, communication among the participating agents is fundamental (Edquist, 1997). Knowledge-intensive business services (KIBS), like financial services, play an essential role in the knowledge transfer process (Storper and Scott, 1995). KIBS are users, producers, and carriers of innovation that interpolate between generic external knowledge and the recipient organisations (Miles et al., 1995, 2000). The medium of knowledge transfer may vary from the use of consultants (Bessant and Rush, 1995),

dedicated training personnel (Grosse, 1996), to personnel secondment or exchange (Hicks, 1993). This exchange and absorption process requires the sharing of communication and trust among involved actors. Thus, it may explain why banks, financial firms, suppliers, consultant, and other related parties are geographically concentrated in the capital or major financial hubs.

External consultants play an important role in an interactive and client-oriented technology transfer model (Bessant and Rush, 1995). They identified activities that consultants may carry out: direct transfer from experts and specialised knowledge producer, experience sharing, marriage broker, and diagnostician to solve clients' needs and problems. Hislop (2002) found that client firms might play an important role in shaping consultancy relations, while Dodgson (1996) states that this intermediary institution also contributes to the process of establishing trust relationships. Inarguably, these types of 'innovation agents' are vital in building capability and bridging the 'managerial gap' (Bessant and Rush, 1995; Dodgson and Bessant, 1996).

To sum up, an understanding of mutually reinforcing line between e-banking innofusion, organisational innovation, and external innovation agents can be presented in Figure 2. But, how and why e-banking innofusion in Indonesia happened, facilitated, and managed that way? What are the implications of the innofusion to the business, policy makers, as well as academic researchers? This is the focus of this paper.

Figure 2 Conceptual framework of this research



3 Case of e-banking in Indonesia

This section will map the innofusion of Indonesian financial services by combining qualitative and quantitative method in order to achieve a wider understanding as well as to give added value and synergy (Perry et al., 1999) of the relationship between e-banking innofusion, organisational innovation, and external innovation agents. Secondary sources from company report and databases were analysed and integrated with data drawn from the interviews to ensure construct validity and to avoid post hoc rationalisation (Yin, 2003). This research employed semi-structured questions for the interviews in order to explore innofusion in the banking industry (Eisenhardt, 1989; Yin,

2003). The hypothesis is created based on the data and information obtained from the field observation (Miles and Huberman, 1994).

An extensive case study research was conducted within major leading Indonesian banks. The desk research and the in-depth interviews with senior managers served as a foundation for theory development (see Table 7). The interview questionnaire was adopted from The community innovation survey (CIS) but transformed into open-ended questions to anticipate more in-depth exploration of the issues. Interviews have been conducted with senior banking officials in Indonesia in the middle of 2009. The individuals participating in this study shared a common fact that they were at least in the middle management level, located in division/unit related to e-banking, and had an adequate amount of work experience in the company as well as some sort of knowledge of e-banking. The top ten Indonesian banks were selected using criterion sampling (Miles and Huberman, 1994). All of these were approached either by preliminary e-mail or telephone, but only five agreed to cooperate.

The interviews generally lasted on average about 45 minutes. Data and information gathered were manipulated before being analysed using the following techniques (Miles and Huberman, 1994): data categorisation to highlight characteristics and comparisons, and data contextualisation to reveal unforeseen contextual relationships between particular events and circumstances. A preliminary analysis was then performed to consider each case separately and to systematically fold the variables. Finally, a cross-case analysis was performed to compare each case in order to obtain a general explanation of the observed phenomenon. This set of strategies will help in ensuring the reliability of the research (Yin, 2003).

Table 4 Indonesian bank rating based on assets

<i>No.</i>	<i>Bank name</i>	<i>Total asset*</i>	<i>Portion to total assets at commercial banks</i>
1	Bank Mandiri (Persero) Tbk	328.01	13.95%
2	Bank Rakyat Indonesia (Persero) Tbk	250.54	10.65%
3	Bank Central Asia Tbk	247.61	10.53%
4	Bank Negara Indonesia (Persero) Tbk	198.92	8.46%
5	Bank Danamon Indonesia Tbk	102.98	4.38%
6	Bank CIMB Niaga Tbk	74.48	3.17%
7	Pan Indonesia Bank Tbk	68.14	2.90%
8	Citibank NA	55.49	2.36%
9	Bank Permata Tbk	54.37	2.31%
10	Bank Internasional Indonesia Tbk	53.09	2.26%
	Total	1,433.63	60.95%

Note: *In Indonesian Rupiah (IDR) trillion.

Source: Bank Indonesia (2008)

The Republic of Indonesia – located between the Pacific Ocean and the Indian Ocean – is the world's largest archipelagic state (with more than 17,508 islands), the world's third-largest democracy, the world's fourth most populous country, and the largest national economy in Southeast Asia. The gross domestic product (GDP) in Indonesia was worth 846.83 billion US dollars in 2011, roughly equivalent to 1.37% of the world

economy. Indonesia is the largest national economy in Southeast Asia. With more than 240 million population (July 2009), Indonesia still encounters with unemployment, lack of infrastructure, a complex bureaucracy, and disparate distribution among different regions. However the government has made enormous economic advances, thanks to the solid GDP growth, sound fiscal stewardship, significant reforms in the financial sector and investment law.

After more than a quarter-century since the deregulation in 1983, Indonesian banking has undergone many ups and downs, which have influenced the Indonesian economy. Indonesia adopted rapid liberalisation in the banking sector in 1988. The crisis of 1997 led the financial sector into chaos and required a bailout from the government to ensure the stability of the Indonesian banking system (Santoso, 2000). The worst situation of the banking itself probably occurred during the multidimensional crisis in 1997 known as monetary crisis brought a new structure to the Indonesian banking system. Bank closures and recapitalisation programmes have affected a number of banks as well. Since that time, a number of new regulations have been issued in order to guarantee that the bank management is more prudent in managing the customers' funds. Indeed, innovation in a bank's products and services has increased significantly, thus making it difficult to differentiate from the products and services of other institutions (Bank Indonesia, 2008). Interestingly, in order to attract more people to open an account or deposit more money into their account, Indonesian banks tend to offer a kind of prize lottery and gift, either to old customers or new ones (Table 5).

Table 5 Campaign impact on customer savings growth

Bank	Campaign programme	Customer savings*		Growth
		Dec 2007	Dec 2006	
Bank BCA	Gebyar Tahapan BCA	89.5	71.57	25.05%
Bank Mandiri	Mandiri Fiesta	81.5	57.81	40.97%
Bank BRI	Untung Beliung Britama	72.27	58.3	23.96%
Bank BNI	Rejeki Durian Runtuh	47.3	38.52	22.79%
Bank Danamon	Danamon Menjemput Impian	11.46	9.71	18.02%
Bank Bukopin	Tabungan SiAga Bukopin	2.6	2	30%

Note: *In IDR trillion.

Source: *SWA Magazine* (2008)

With regard to technological adoption, it was Bank Central Asia (BCA) who introduced ATMs in 1979 – a strategy which was considered odd at that time and took about 15 years to be well accepted. In 1993-1994, Bank BCA ATMs underwent a boom and this was followed by other banks. In 2007, ATM cards issued by leading banks in Indonesia offered dual debit functionality, carrying the logos of operators such as *Prima*, *ATM Bersama*, *MasterCard*, and *Visa Electron*. Debit card transactions in Indonesia were conducted either via personal identification number (PIN) for local debit operators or signature for international logos *Visa* or *MasterCard*. ATM/debit cards can now be used not only to withdraw cash, but also to pay telephone bills, top-up credit for mobile phones, pay utility bills, pay credit card charges, make inter-bank transfers, and so on.

Until the second quarter of 2007, 54 banks have issued ATM cards, 21 banking institutions, non-banking institutions, and Syariah units of a bank issued credit card, and

37 banks issued ATM/debit cards. Bank BCA – with more than 5,000 ATM machines – continued to dominate the market with an estimated Rp 558 trillion or 315 million transactions in 2006, followed by Bank Mandiri with more than 2,800 ATMs – up from 2,500 in the previous year. Four local consortiums developed ATM channels and provided the ‘switching’ links to the majority of ATM machines: Rintis Sejahtera (Prima), Artajasa Pembayaran Elektronis (ATM Bersama), Daya Network Lestari (Alto), and Sigma Cipta Caraka (Cakra). These ATM channels enable account holders of a particular bank to perform routine transactions at ATMs owned by other banks within the same channels. *ATM Bersama* had more than 10,000 machines with over 65 member banks in 2007, followed by *Prima*, *Link*, *ALTO*, and *Cakra*. Recently Bank Indonesia enacted the Regulation on Electronic Money No. 11/12/PBI/2009, which attempted to encourage the nation to move a step further towards a cashless society. Bank Indonesia particularly emphasised the usage of chip-based prepaid cards for the purposes of high-volume-but-small-value transactions such as toll payments, fuel payments, grocery shopping, and bill payments.

As for the internet banking, Bank Papan Sejahtera (BPS) claimed to be the first bank to offer transactions through its website in 1997, invested US \$500 million in this facility to provide its customers with facilities related to commonly known general banking transactions. It is obvious that the introduction of this technology has been backed up with the support of IBM Corp, Lotus, Hughes and other foreign consultancy institutes. In 2000, Panin Bank, a merger of three private national banks, launched the first full access to banking services through mobile devices. IBM and eMobile Pte Ltd (Singapore) provided Panin Bank and Telkomsel with transaction security technology to assure safety for their users. In the following year, of the top 10 largest banks in Indonesia, only four offered internet banking services. In 2003, only Bank Danamon and Citibank had begun offering mobile banking services. Probably internet banking and mobile banking at that time were too early for Indonesians.

Implementing internet and mobile banking can be very costly and may face challenge from within the bank due to different management priorities. It was estimated that every transaction costs US \$1.07 at the branch office, US \$0.27 via ATMs, and a mere US \$1 using mobile banking. Internet banking in Indonesia typically requires an investment of US \$15 million to \$50 million, while investment in an ATM machine requires US \$15,000 to US \$20,000 and investment of an electronic data capture (EDC) machine requires US \$4,000. The volume of total e-banking transactions in the second quarter of 2007 has reached 298.65 million or increased 8.04%, reached Rp 419.86 trillion, increasing 19.6% compared to the previous quarter. The increase in transactions was still dominated by fund transfer transactions using ATMs and ATM+Debit.

Since Schumpeter’s (1942) seminal contribution, there are arguments that large firms tend to be more innovative than smaller firms (Brown, 1981). By comparing firm age, firm size, and the time that internet banking and mobile banking were introduced, this study shows some interesting findings. For example, the number of branches and employees are positively correlated (Table 6). The factor of when internet banking and mobile banking were introduced showed positive correlation as well. However, both of these were negatively correlated with the number of branches or the number of employees. It seems that the banks that first introduced internet banking tended also to be the first to introduce mobile banking. There is a possibility that the IT platform used in this system is relatively similar, therefore both are developed simultaneously (Harris, 2001).

Table 6 Correlations analysis

		<i>Firm age</i>	<i>No. of branches</i>	<i>No. of ATMs</i>	<i>No. of employees</i>	<i>Internet banking</i>
No. of branches	Pearson corr.	0.453				
	P-value	0.189				
No. of ATMs	Pearson corr.	-0.159	0.020			
	P-value	0.660	0.956			
No. of employees	Pearson corr.	0.482	0.671	0.265		
	P-value	0.159	0.034	0.459		
Internet banking	Pearson corr.	-0.469	-0.470	0.200	-0.633	
	P-value	0.171	0.170	0.579	0.049	
Mobile banking	Pearson corr.	-0.356	-0.752	0.299	-0.760	0.707
	P-value	0.313	0.012	0.402	0.011	0.022

Note: Correlation is significant at 0.1 level.

Source: Author, based on statistical analysis; data collected from interview and annual report 2008 from each banks

On the other hand, correlation between firm ages, number of branches, or number of employees, with the number of ATMs appears to be mixed and relatively low. Furthermore, although not very significant, the factor of firm age was also negatively correlated with the time internet banking and mobile banking were introduced. This situation may imply that bigger and older banks already took their steps in investment in ATMs as their main delivery e-channel, while smaller and newer banks prefer to invest in internet banking and mobile banking services. Smaller and newer banks typically do not have as solid a capital structure as their older competitors, thus, they preferred to join ATM channels instead of building their own ATM networks and spent the rest of the money to invest in better and more reliable internet and mobile banking service. Indeed, considering the relatively small sample size, conclusions aforementioned above can be only used as an indication that should be investigated further and must be treated very carefully.

4 Discussion and analysis

A complementary concept 'innofusion' can characterise how banks adopt and incorporate users' innovation feedback loop improvements (Robertson et al., 1996). Innofusion views technology as emerging as stable solutions that can be applied directly in the subsequent phase of diffusion (Fleck, 1993). On the other hand, users and customers also play an important role in the innovation processes, as they have strong influences in the social side of innovations, thus improving and modifying the products to shape technological innovation in all its phases (Baskerville and Pries-Heje, 1998; Oudshoorn and Pinch, 2003).

Table 7 Summary of interviews

	<i>Bank 1</i>	<i>Bank 2</i>	<i>Bank 3</i>	<i>Bank 4</i>	<i>Bank 5</i>
Nature of organisation	Foreign-exchange commercial bank	Foreign-exchange commercial bank	State-owned bank, largest bank in terms of asset	Foreign-exchange commercial bank	State-owned bank
Interviewee	IT Planning & Architecture Group (one person, manager)	Channel Management Group Division (two persons, senior manager)	Mass & Electronic Banking Group (one person, group head)	Information Technology Group Head (one person, group head)	Change Management Office Division (one person, department head)
Start using this sort of financial innovation	Late 1980s (ATM), early 2000s (internet and mobile banking)	1990s (ATM), 1998 (internet banking), 2002 (mobile banking)	2002 (internet banking), 2003 (mobile banking)	Around 1990s (ATM), 2001 (Internet banking), 2005 (mobile banking)	2007 (internet banking), 2002 (mobile banking)
Factors that influence innovation	Competitor	Market (competitor)	Internal management	Customer	Customer, technological advancement
Source of inspiration	Competitor	Market (competitor and customer)	Customer	Customer and competitor	Customer
Cooperation and partnership	Yes	Yes	Yes	Yes	Yes
Organise and manage this sort of innovation	Small cross-departmental group	Project manager in the business unit level	Dedicated business group	Dedicated department	Develop internally in business unit level
Legal act to protect innovation	No, probably confidential agreement	No	Patent and confidential agreement	Patent, to some extent	No
Factors that constrain innovation	Cost	Cost	None	None	Organisational bureaucracy

Source: Author; data collected from interviews

Table 7 Summary of interviews (continued)

Banks	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5
Difficulties in using this innovation	n/a	n/a	Aligning changing technology and customer needs	Lack of readiness of third party	n/a
Innovative-ness	Top 5	Ranks 5th	Ranks 1st–2nd	n/a	Quite innovative
Main benefit of e-banking innovation	Fee-based income	Fee-based income, individual and organisational learning	Customers' loyalty, fee-based income, cost efficiency	Fee-based income	Fee-based income, company's image
Future of e-banking innovation	Cashless transaction, increasing popularity of internet banking	More feature development, better integration	More integrated, full of feature	Better feature, complicated, but integrated	Feature enrichment, consolidation
Perception on other sorts of innovation?	Every innovation treated equally	Aligned together, support each other	Every innovation proceeds with the needs priority	Must be in line with organisational structure, corporate strategy, and resources	More emphasis on system innovation and internal organisation
Particularly good practice of financial innovation	n/a	Bill payment	Online transaction between branches and headquarter	Electronic data capture integration between Bank Mega and Bank Mega Syariah	Innovation ATM, credit scoring and processing

Source: Author; data collected from interviews

Innofusion challenges the 'old' linear model of innovation (Rogers, 1995). However, the perception of 'generic' technology might be problematic. The design and development of a 'generic' technology happens where all possible user requirements and circumstances are anticipated in the design of the system prior to the first adoption (McLoughlin, 1999). In contrast, configurational technologies, such as e-banking, are largely shaped in each application by user requirements and particular situations. There is a move to uncover inter- and intra-organisational processes, interpretations, and actions that inform innofusion in partner with configurational technology and its suppliers (McLoughlin, 1999). That is where e-banking is adopted in Indonesian banks and which possibly has some degree of interpretative flexibility in use. This is where the role of the consultant may help in filling the gap between technology design and use in context.

The interviewees (Table 7) agree that external forces (such as customers' needs and tight competition) remain the main factor that encourages innofusion in Indonesian banks, contrary from the findings of Brown and Molla (2005), where internal forces were the key drivers behind offering e-banking services. In undertaking their innovation, the bank uses the profit per customer concept as the main indicator. The innovation plan will be implemented as long as it can improve the ratio of profit per customer. However, it should be noted that organisational culture and inertia could hinder innovation. As a result, they cannot be fully dedicated to innovation activities. Janice and Dennis (2002) previously warned that development choices and potential channel conflicts need special attention.

According to the interview, many innovative ideas emerge, but sometimes are not facilitated, as there is no medium to develop them and no clear reward mechanism that make these ideas have never been realised (Christensen, 1997). Secondly, in financial services, the lifeblood of a bank is determined by how well they can gather funds from the customers at the lowest cost – they buy money, do something with the money, and then sell it to their profit (Dew, 2007). Financial innovations enable firms from all sectors to raise money in larger amounts and at a cheaper cost than they could elsewhere (Lerner, 2006). According to the interviews, the majority of the fund composition is high-cost funds such as deposit accounts or time deposits. Only a small amount of funds are low-cost, such as saving accounts. Therefore, banks must innovate well and every innovation must be communicated effectively and attractively to their targeted market, not only follow what other banks do and offer the same benefit.

Interestingly, it is suspected that most banks use the same external consultant, which then plays an important role in shaping innovation (Bessant and Rush, 1995). There is an indication that the innovation actor is just the same – an elite group that are highly innovative, graduates of reputable schools, and alumni of a well-known bank that is the leader of innovation. These few people induced change and innovation and held strategic positions regarding innovation matters. They move from one bank to another, developing new innovations, and frequently drag their colleagues to switch. This is probably why the turnover rate in the e-banking division tends to be very high. It is supposed that the phenomenon of 'jumping ship' did not only occur in the top-level management, but also in the middle one.

As shown from the interviews (Table 7), banks have begun to build awareness when they actively search for customers' needs and also what their competitors do to satisfy these. Most respondents interviewed in this research acknowledged that the primary driver of innovation is the customer. Basically, a bank is willing to do anything to guarantee the relationship and customers' satisfaction. Banks receive feedback from

customers from various channels, such as private customer relationships, customer gatherings, customer complaints, readers' mail, etc. which becomes the input for the bank to innovate (Rogers, 1995). The factor of customer perception is also an important aspect in supporting innovation (Lockett and Littler, 1997).

Another factor that becomes the driver of innovation is technological improvement. Sometimes, customers do not really need a particular improvement, but the technology has nonetheless evolved. Sethi and King (1994) state that the potential of IT to enhance a firm's performance is a significant motivation for them to adopt IT. Upgrading technology then opens up another business opportunity that could be utilised by the bank. It is obvious that the incremental innovation in the technological aspect was because of the perception that it could shorten the processing time, improve security, guarantee uptime, etc. Indeed, massive investments in IT may not always be translated into increased productivity (Harris, 2001).

Considering the aggressiveness of banks in introducing their e-banking over the last few years, it becomes obvious that there is a tendency for a bank to minimise costs and expenditures. However, as shown from the interviews, the other major benefit from e-banking innovation is fee-based income (Dew, 2007). If a bank joins in an ATM network, it can generate income from other bank's customers that use its ATM machines or from third parties that cooperate with it. The more transactions with a third party, the more fee-based income acquired, enforcing the bank to enrich the features of e-banking transactions, such as mobile telephone top-ups, ticketing, paying telephone or electricity bills, house taxes, etc. Joining a certain ATM network will also create customer awareness of that bank and influence the market share. Another benefit is organisational learning. By executing certain innovations, the staff of a bank becomes more expert in that area (Cohen and Levinthal, 1990). After developing some innovations, and succeeding, a bank will find new opportunities that could be exploited further and that, in the end, will provide more profits for the bank.

With regard to legal protection and cooperation, there is a tendency for banks to attract customers by providing them with minimum cost and maximum quality and at the same time to protect their innovation from free riding imitators (Dew, 2007). This is problematic, as every new financial product and service should be explained completely to governments, competitors, and probably imitators, to promote common use. As a result, although patenting usually occurs in KIBS, patenting in banking is perceived as a minor instrument for appropriate service innovations (Miles et al., 2000). Financial patents are also often characterised by high uncertainty, which makes investing in financial innovation unattractive. The inventors of subsequent inventions may also be discouraged, due to the previous inventions that are covered by patents with questionable validity.

Rogers and Greenhalgh (2006) state that the financial services sector is more likely to use trademarks to protect innovations instead of patents. The majority of intellectual property (IP) assets acquired were trademarks, with only a small number of venture capital companies acquiring patents. Every bank can copy and imitate others' innovations freely and openly. They just utilise a trademark to protect name, brand, product, or slogan – but what is inside is almost identical. Interestingly, the lack of legal protection in financial services does not discourage collaboration with competitors. Based on the interviews, it is clear that the partnership and collaboration between banks is commonly implemented (Hamel et al., 1989). Respondents said that feature of e-banking are the integration and consolidation. Integration means that features in ATM, mobile banking,

and internet banking have been harmonised and integrated in order that they could be utilised together for real-time transactions. Consolidation means that e-banking will not only becoming specific for saving accounts but also will be consolidated with other accounts such as insurance, mutual funds, deposit accounts, etc.

It is suspected that similarity in financial innovation is because the actor is the same, the consultant agency is the same, and the recipe is also the same, therefore the innovation product tends to also be the same (Dodgson and Bessant, 1996). There is also a tendency for banks to always spy on their competitors. Others will follow every new innovation just like it. As a result, this innovation seems to be communal in nature; if any period exists between them, it is usually very short (Rogers, 1995). Because the innovation is the same, the competition between banks tends to focus on accessories, bundling, or marketing. What is obvious is that in the end, the innovation product must be able to increase profit per customer. Therefore, it is common to find an innovation in bank A that is also adopted by bank B, with different bundling. What should be underlined is that some innovations perhaps succeed in bank A but fail in bank B, and vice versa (Christensen, 1997).

This situation might be called 'collaborative competition' (Brown, 2008). It helps banks to identify problems and enables collaborative revision and iteration together. This is a new way of working innovatively in an interdependent world. In order for all these to be realised, harmonised collaboration and cooperation between departments in internal banks as well as with external parties is needed. Thus, a bank that can benefit from this situation is one that not only has strong core competence, but also has robust absorptive capacity to value, assimilate, and apply new knowledge from their partners and competitors (Cohen and Levinthal, 1990).

However, in developing such IT-intensive innovation, it should be warned that von Neumann bottleneck might happen (Backus, 1978). Thimbleby (1988) explained that this classical problem occurred because of the architecture (hardware) with limited capacity, a conceptual design of a system that collided with strategy or cost, or because of a managerial factor where the system designer could not manage the complexity and solve the problem adequately. Every system designer must have realised that there were entities that owned the system and entities that used the system – and both had different levels of understanding. Thus, screening, maintaining, monitoring, and evaluating the path of development of financial innovation is mandatory as innovation in e-banking can be implemented quickly and unilaterally, while changes in legal and financial infrastructure might be more rigid and take longer to implement (Merton, 1995).

5 Conclusions, implications, limitations and avenues for further developments

This study sheds light on how financial innovations in Indonesia diffuse, manage, facilitate, who uses them and why, and what the underlying factors are. The objective is to add an empirical contribution to the emerging area of financial innovation, especially in a developing economy. This could give an indication to answering the question of how sustainable the current innovation is, and in which direction financial institutions could develop further.

It is obvious that the process of invention, innovation, and diffusion of e-banking in Indonesia with feedback occurring during the learning process has merged into the

process coined 'innofusion' implying an interplay between banks, other financial service firms, consultants, and suppliers of technologies, as well as in the wider networks and wider technological development (Fleck, 1993). The systems of e-banking can be referred to as 'configurational'. Banks can choose and assemble their own e-banking from a wide range of choices and components from different vendors and work with various consultants in order to meet the optimum needs of their business and organisational requirements (Davenport et al., 1996; Miles et al., 1995). To ensure the interconnection and interoperation, it requires standards which in turn will lead to natural trajectories of development (Fleck, 1993).

Contrary to Brown and Molla (2005), although technological improvement and regulation will continue to affect the industry, a radically changing landscape for the electronic delivery of retail banking services in Indonesia is still driven by market forces. Innovations are to be used to gather more funds from customers at the lowest possible cost (Dew, 2007). According to the interview, in terms of e-banking innovation, two main keywords have become the jargon in Indonesian banks: 'fee-based income' and 'third-party funds'. It also appears that bank that introduces internet banking earlier tends to introduce mobile banking earlier, and vice versa. Possibly the IT platform used in this system is relatively similar, therefore both are developed simultaneously in order to gain competitive advantage (Sethi and King, 1994; Harris, 2001). However, the factor of firm age is negatively correlated with the time that internet banking and mobile banking were introduced, indicating that bigger and older banks are not as dynamic as their smaller and newer peers (Christensen, 1997; Nooteboom, 1994; Segers, 1993).

Strategic decisions in developing innovation are merely a function of the organisational context within which they are embedded, evolving as a result of previous decisions, which in turn affect the ability to innovate effectively (Leonard-Barton, 1995). Thus, alignment between consumer-facing technologies with other organisational contexts becomes an important determinant of effectiveness in innovation in the present and future (Janice and Dennis, 2002). To our surprise, while trademarks and confidentiality agreements are popular (Miles et al., 2000; Rogers and Greenhalgh, 2006), this study exemplifies that unavailability of legal protection does not discourage them to cooperate (Hamel et al., 1989; Moss-Kanter, 1994), indicating that collaborative competition among banks can be beneficial (Brown, 2008). Thus, in order to reap benefits from innovation, banks not only have to offer fabulous products and services, but also have to acquire knowledge and ensure communication among their peers (Cohen and Levinthal, 1990; Edquist, 1997). This situation, however, raises the question whether government should or should not encourage the use of legal protection in order to protect inventors from imitation and free-riders.

The empirical cases also show that it probably true that it is only 'those' people who drive innovation among Indonesian banks, moving from one bank to another, developing new innovation, dragging their colleagues to switch. Thus, if the turnover rate is too high, the question arises as to whether this then is detrimental to the industry. The consultants also play an important role in shaping the dynamics of innovation processes (Bessant and Rush, 1995; Dodgson, 1996). Indonesian banks seem to use relatively the same external consultant agency. It is common to find the same innovation in a number of Indonesian banks, but bundled and marketed differently. Thus, it does not take a long time until financial innovation becomes communal in nature. However, the empirical cases show that each of the e-banking innovations has emerged gradually through different speeds of

innovation stages and processes (Rogers, 1995). For example, while ATMs appear to be at the maturity level, internet and mobile banking are still in the initial stages of adoption.

At this moment, Bank Indonesia regulates the utilisation of foreign experts and consultants. But what if, in the near future, government decides to limit the use of foreign experts and consultants, and demands that more priority be given to local experts and local consultants? This can be problematic indeed. In tough times and economic downturns like we are experiencing currently, employing local experts and consultants may reduce cost and increase productivity. However, it is also obvious that foreign experts and consultants tend to be more innovative than are local ones. The use of foreigners probably can be a good starting place for assimilating knowledge and expertise, but what is clear is that Indonesia should not rely on foreign experts and consultant to sustain long-term growth and innovation in its banking sector.

From the regulatory point of view, it becomes clear that government action is needed in screening, maintaining, monitoring, and evaluating the path of development of financial innovation. E-banking innovation can be implemented quickly and unilaterally, but changes in legal and financial infrastructure might be more rigid and might take longer to implement (Merton, 1995). In today's competition, there is a paradox wherein private ownership but too much IP in fact would cause gridlock and discourage innovation. The financial services is characterised by network externalities that come from interoperability and standard setting between various products that will give rise to stronger market position for the owner of the standard. Developing some sort of standard may solve this problem; however, not every area of financial innovation can get a standard negotiated. The future of innovation in Indonesian financial services is bright. Nevertheless, without proper protection, this kind of innovation cannot only be exciting, but also frightening.

There are several limitations and recommendations for further work. Firstly, this study mainly focuses on the time aspect of e-banking adoption. It would be interesting to examine the level and depth of adoption. Future research might also include customers' attributes, such as how intelligent customers influence the innovation process or how feedback loop mechanisms work at this stage of innovation. Secondly, research on smaller banks, which was missing from this study, might be interesting to capture the effects of scale and examine a particular gap in managing capability and applying this service delivery. It would also be compelling to analyse how foreign experts and consultants drive innovation compared to the local ones, especially in this global financial integration. Indeed, replication on a similar sector in a country presenting similar patterns – in terms of economic growth and development, penetration of e- and m-banking solutions – is necessary and further research would open the door for more knowledge to be contributed (Mention and Torkkeli, 2012).

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