

Disruptive or Sustaining Innovation? Context-Dependent Technological Change in Developed and Developing Economies: A Comparative Analysis with Implications for Healthcare Systems

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ABSTRACT

The literature on Information Technology (IT) enabled innovation, like innovation literature more generally, has focused predominantly on work conducted in ‘developed’ countries. Historically this has been due to a lack of empirical evidence collected in ‘developing’ countries and access to comparable examples of innovation. This situation results in the application of developed world ideas to innovation in the developing world. Whether and how the adoption of IT-enabled innovation in developing countries differs from developed countries therefore remains an unexplored question (World Bank 2008). These findings bring into question the direct application in developing countries of innovation models and frameworks created through the study of innovations in developed countries, specifically of disruptive innovation. To explore this hypothesis the adoption of internet and mobile banking (IMB) in India and Australia are discussed. It was found that in India IMB satisfied an unmet customer need that had not previously existed in the form of banking (Christensen & Raynor 2003) and in the process disrupted traditional and informal finance methods. On the other hand, the adoption of IMB in Australia improved and sustained existing banking methods, providing greater efficiency. IT-enabled innovation appears to follow an opposite path in developed nations to that in developing nations driven by differences in consumer needs.

INTRODUCTION

This research aims to offer new insights into the adoption of IT by exploring and comparing the characteristics of internet and mobile banking in Australia and India, which led to improved IT enablement of banks in these two countries. The adoption of IT has enabled innovation, and the internet especially has provided considerable economic growth in developed countries. Among other factors, this has contributed to increasing the economic gap between developed and developing countries. More recent developments in developing countries, however, indicate that this will not necessarily continue to be the case. The adoption of IT-enabled innovations appear to promise faster economic growth in developing countries, yet this has only recently emerged as an area of interest amongst researchers (Pick & Azzari 2008, Miles 2008; Dörner et al. 2011).

The ability of nations to adopt and benefit from technology has been a major concern for the global community which has been magnified by the advent of the internet. This research investigates if and how the adoption of IT-enabled innovations has different impacts in developed and developing nations as a result of factors such as a country’s ability to invest in and diffuse infrastructure, user acceptance of new technology, and whether socio-economic conditions impact on the ability of nations to adopt new technology for economic benefits. Much of the research on IT adoption has focused on developed countries, with little research on the process in developing countries (Abukhzam & Lee 2010), and this lack provides heightened motivation for this study. The data collected was at three levels: global, national and organisational. Global data based on UN categories of developed and developing countries (United Nations 1999a) provided information such as internet penetration and the Gross National Income of sample countries. Country-specific data, such as the impacts of country regulation and infrastructure, was also collected. At the individual institution level, data was collected from selected banks in the sample countries of Australia and India.

RESEARCH MODEL

The two countries selected, Australia and India, represent one developed and one developing country respectively. The World Bank’s classification (1996), as used in a study by Talukdar et al. (2002) which categorised new product adoption across developing and developed nations, was used in this study. The United Nations Social Order (1999b) takes a similar approach to the World Bank in describing developed and developing countries. Countries are categorised as low, middle and high income countries (Bazar & Boalch 1997) with Australia as a developed country and India as a developing country according to this categorisation. Next, the most appropriate organisations in these two countries had to be identified.

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In total, eleven Australian bank executives were approached and nine responded favourably, while ten Indian bank executives were approached and ultimately eight agreed to the interviews. The unfavorable responses were due to internal policy or to the person approached having left the bank. The banks were selected on the basis of their headquarters being in their own countries and not being branches of foreign banks. No particular preference was given to whether banks were private, public or nationalised. No particular distinction of size of bank in terms of assets or other financial criteria was considered, but it was required that each bank had an IMB product of some magnitude. Executives were selected at each bank based on their involvement in IMB and had all been central to the IMB deployment within their own banks.

THEORETICAL BACKGROUND

This literature review begins with an overview of the body of knowledge on IT innovation. The review also discusses the interrelation of the different strands of innovation, namely, service innovation and internet banking, and the blurring between product and service innovation. Both these factors have characterised the service innovation literature over the last 20 years. Blurring has increased further as IT has allowed the service industry to adopt technological innovations which may have originally emerged from different fields, such as is the case with the internet (Brynjolfsson & Saunders 2010; Gambardella & McGahan 2010). To add to this blurring, IT and its applications in developing nations appear to have had a great impact in countries such as India and China which industrialised at a rapid pace during the latter part of the 20th century. However, despite this growing industrialisation of some developing countries, the existing literature has focused on the developed nations of Western Europe and North America, with minimal studies evaluating the impact of IT on the adoption of innovations by emerging countries (Sonmez 2005).

Banks had, in many instances, leveraged the internet to offer low-cost, high-value-added financial services (Jeevan 2000; Stamoulis 2000; Malhotra & Singh 2010), despite the security and trust concerns which persisted (Zhao et al. 2008; Zhou 2011). Other banks introduced internet banking due to competitive pressures. While no literature offers an explanation for industry adoption, the lack of understanding increases when considering global adoption. In addition, considered to be a by-product of internet banking, mobile phone banking had an unsuccessful history in developed nations, while developing nations experienced quite strong adoption of mobile phone banking services (Porteous 2006; Columbus 2012). The increased prevalence of mobile phones amongst consumers has indeed provided greater propensity for mobile banking service since its inception (Goyal, et al. (2012), such that greater banking services are now being offered to the unbanked poor than ever before (Ghosh, 2012), providing greater economic benefits to poor communities.

To provide further insights into this growing body of knowledge, the literature on the global adoption of internet and mobile banking (IMB) provides an overview of the important interrelationship of IT-enabled innovations, particularly in the services industry. The services sector has emerged as a separate body of knowledge from the mainstream innovations literature (Castro et al. 2010) and appears to demonstrate differences in innovation practices between developed and developing countries (Hobday 2005; Hang et al. 2010). The assumption behind the existing literature on innovations is that it is universally applicable across the world. This assumption appears to be a major weakness, and it is this weakness which has motivated this study of the adoption of IT innovation between different nations. Internet and mobile banking has been chosen as the empirical base to study Australia as a developed country, and India as a developing country (UN 1999). The objective of researching the IMB literature is to explore whether contemporary innovation theory can be applied universally to all nations, or whether there are differences in the innovations theories. The chapter concludes with the research question emerging from the review of the literature.

Disruptive Innovation

Christensen and Raynor (2003) suggest that an organisation may embark on two extremes of innovation, one extreme being sustaining and the other disruptive, as illustrated below in Figure 1.

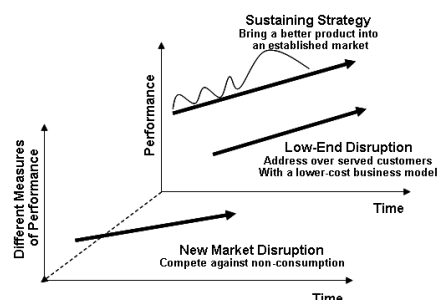


Figure 1: The Disruptive Innovation Theory (DIT) (Christensen & Raynor 2003)

Figure 1 above illustrates sustaining and disruptive innovations. Sustaining innovation may be simply an addition or extension to an existing product or service as depicted by the top-most line in Figure 1, while disruptive innovation may be providing a new product previously not offered as depicted by the lower two lines in Figure 1. Disruptive innovation may occur in two different contexts: a low-end market or a new market (Lu et al. 2012). Low-end disruption may provide customers with simply a low-cost option in an over-served market. An example of an over-served market is the entry into the North American market of Korean automakers, which allowed the least attractive end of the product base to incumbent manufacturers (Christensen & Raynor 2003; Sridhar 2011) as depicted by the bottom line in An example of a new market disruption could be the personal computer where the initial customers were new consumers of the innovation (Christensen & Raynor 2003 p. 45). Sustaining innovations may have a faster impact in the performance of existing product offerings than disruptive innovations have, due to the adoption by consumers as shown by the ‘performance’ axis in relation to the sustaining innovation in Figure 1. Practical examples of sustaining and disruptive innovation are discussed below and provide a view on DIT’s suitability for this study.

However, disruption can be a threat as organisations may not often see the potential for growth for the innovation but rather may see the innovation as a threat which would displace existing offerings to customers (Katsamakos & Georgantzas 2010; Darian 2011). Examples of these threats can be given from the computer and steel industries (Thomond et al. 2004). Cannon’s introduction of simple desk-top photocopiers designed for small and medium sized enterprises led to the disruption of Xerox’s domination of high-speed photocopying and Seagate’s 5.25 inch disk drive in the personal computer disrupted the more complex and more expensive 8 inch drive are two such examples.

Disruption occurs either at the low end or in the new product market. ‘Low-end disruption’ occurs when a product’s performance overshoots the needs of certain customer segments. At this stage, a new product may enter the market with a lower performance and may establish a competitive position in the market (Schmidt & Druehl 2008). The organisation with a disruptive innovation initially targets the least profitable customer within the segment who would be content with a product that meets basic needs (Kohlbacher & Hang 2011). This type of customer is not willing to pay for enhancements of the product beyond basic functions, and hence is unnoticed by incumbent firms. Walmart and K-mart are examples of companies which are at the low end of the consumer market as they offered less sophisticated products than the higher end stores, yet were adopted by the clientele for product simplicity (Christensen & Raynor 2003).

An example of disruption in a previously un-served market is the installation of internet kiosks in a remote village in India where villagers had not previously experienced the internet and hence a new experience was provided (Rangaswamy 2003). However, not all disruptive strategies operate successfully, as found by South West Airlines in the United States (Raynor 2011), which used new procedures rather than technology to serve airlines customers more efficiently. The above review is summarised in Table 2.2 below on sustaining and disruptive innovation.

Table 1 Definition of DIT (Christensen & Raynor 2003)

Definition	Comments
<p>Sustaining - Innovations target demanding, high-end customers with better performance than what was previously available. Some sustaining innovations are incremental year-by-year.</p>	<p>Sustaining innovations appear to present a new solution to an existing service. For example, the transition from buying an airline ticket from a travel agent to the option of buying the same ticket on the internet.</p>
<p>Disruptive - In contrast, disruptive innovations do not attempt to bring</p>	<p>Disruptive innovations attempt to address customers who currently do not</p>

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products to established customers in existing markets. Disruptive innovations can emerge as either a low-end disruption, or a new market consumption, where customers are un-served by incumbent firms.	have a particular product but that product may satisfy basic wants such as listening to music while mobile, e.g., the transistor radio.
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Despite Christensen and Raynor's (2003) work focusing on the IT hardware industry, they have extended, albeit minimally, their DIT theory to discuss whether internet banking as a service innovation was a sustaining or disruptive innovation (Enders et al. 2006). In the section titled 'The Potential for Internet Banking', they state that:

“there is not a large population of people who have been unable to open a bank account because they lacked the skills or the money, existing bank penetration of this market is high, hence this rules out new-market disruption for internet banking” (p. 54).

In the next paragraph Christensen and Raynor (2003) refer to:

“current bank customers at the low end who would be happy to accept a bank account with fewer privileges and features in order to get the service at a lower price” (p. 55).

The above extracts from Christensen and Raynor (2003) suggest that the idea of IB may not satisfy the conditions for either a new market or a low-end disruption and hence IB is likely to be implemented as sustaining innovation by established banks. An interesting study to test and counter the sustaining-disruptive suggestion is provided by ING Direct (Gary 2004). ING Direct, which is an internet-only banking provider, operates without any branches. Customers set up savings accounts only on the internet, with deductions and additions being processed via the Automated Clearing House Network and without the need for the customer to have any further interaction with the bank. Gary (2004) discusses disruptive innovation in banking by examining the ING Bank's introduction of their online-only high interest rate accounts, and suggests that the IB may not be described within the bounds of disruption as clients already had banking accounts and relationships with banks. Yet the ING example has the potential to be classified as disruptive as the customers may have had banking services but were presented with another potential disruptive method of banking other than the branch network.

An alternative view in support of Christensen and Raynor (2003) suggests that IB can only be deployed as a sustaining technology relative to creating a business model for retail banks (Enders et al. 2006). In their research Enders et al. (2006) argue that categorising IB may be difficult, as innovations evolve through sustaining innovation and potentially grow through disruptive efforts, each having different characteristics based on short-term survival and long-term growth (Thomond et al. 2004; Sridhar 2011). Conversely, Rangaswamy (2003) suggests that disruptive technologies are usually more appropriate for new as opposed to existing customers, making it hard for incumbent firms to develop them. However, the interrelated issues of disruptive innovations have not been investigated in depth (Lettice 2002). The differing views continue to raise the question of whether IB is sustaining or disruptive, and what the impacts are globally remains largely an unanswered question.

Analysis

Disruptive Innovation Theory

The Australian and Indian experiences with MB reflect the findings of research on the importance of providing products to customers based on what they want (Ulwick 2002, 2008). Ulwick highlights the unmet needs to be satisfied by an innovation and the value it creates to the user. Christensen and Clayton (2003) refer to Ulwick's notion that product uptake would be successful if companies targeted their products to the circumstances in which customers find themselves, i.e., the problems that customers may face rather than the customers themselves. Ulwick (2002) refers to wasting time and resources if customers' outcome needs are not met. Targeting the actual functions which customers need to perform will yield profitable results for the innovation (Ulwick 2008).

Christensen and Raynor (2004) define disruptive innovation as 'non-consumption' (a product or service which previously did not exist) or 'compete against non-consumption'. With this view, IB and MB in India may be

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considered to have been disruptive, as consumers who did not have a bank account were for the first time offered bank services through technology and possibly in the 'non-consumption' segment of DIT. Internet and mobile phone banking were successful where, according to Lettice (2002 p. 4), it met 'the unfulfilled needs of an emerging or niche market. It is a set of performance attributes, highly rated by niche market customers and is not initially appreciated by mainstream markets'. So with this finding, what was disrupted in India by bringing IB and MB to the rural masses? In the light of this understanding of customers' unmet needs, it is plausible to assume that MB in India attended to a 'job-to-be-done', that of providing access to commerce and information which was not available in another way. In Australia the same information was available via the internet, which was more cost effective than mobile phone charge rates.

Another factor which may have enabled the adoption of MB in India was the large number of **unbanked customers**, for whom banking via the mobile phone was the only convenient way they could perform banking other than through the traditional and informal *Hawla* system (Buencamino & Gorbunov 2002; Schramm & Taube 2003). By using MB, the previously unbanked could engage in the economy and had the prospect of greater prosperity (Pousttchi & Schurig 2004). In addition, the mobile phone had become a mainstream product within Indian society and was providing a level of relevance to the Indian consumer which meant that the adoption of new mobile applications was not a great challenge (Kim 2008) and the new Indian affluent class was emerging in mass numbers which aided the affordable cost.

In the process, many existing and informal financial practices such as village money lending were disrupted.

So What Was Disrupted?

Disruptive innovation presupposes that existing methods will be disrupted in order for a new approach to be accepted and this will occur only if the new approach satisfies a user need. However, what was disrupted and what kind of disruption IM and MB caused in the market is unclear, as the term 'disruptive' can be misunderstood (Schmidt & Druehl 2008). It is likely though that existing informal practices of financial transactions were disrupted with the introduction of IMB in India.

This study suggests that while the job of meeting consumers' needs was being developed by both IB and MB in India, the kind of disruption as defined in Christensen and Raynor's (2003) work remains unclear, partly as their work focused on the steel and computer disc drive manufacturing industry in the US and not on the service industry. Further, while no mention is made of Christensen and Raynor's (2003) view on DIT in developing countries, it is assumed the thinking is more pertinent to developed countries. However, it appears that IMB had demonstrated characteristics of disruption in India as suggested by Christensen and Raynor (2003); hence the DIT provides a useful lens for this analysis. Further, IB as observed in India demonstrates a different view from that of Christensen and Raynor (2003), who suggest that internet banking was not disrupted, yet characteristics of disruption in India's adoption have been observed, as discussed below.

For customers in rural India, the lack of a formal financial services structure allowed for informal community banking among the villagers, a practice which they had been using for centuries due to the lack of any available alternative. An informal system of financial transactions between villagers called the *Hundi* or the *Hawla* system provided finance to communities in exchange for personal belongings (Buencamino & Gorbunov 2002; Schramm & Taube 2003). This system appears to have been disrupted by the coming of IMB. These informal systems had existed for centuries in rural areas of developing countries and came under pressure as banks started offering IMB to customers who had never had any formal banking relationships. In the light of DIT, the Indian data suggests disruptive behaviour. For example, the 'inability to build expensive branch networks' (Ind1) was overcome by the use of technology to extend banking capability to customers for whom banking had previously not been possible. This resulted in customers opening bank accounts for the first time. The 'unbanked' (Caskey 2002) were, for the first time, being banked, enabling them to have access to many other products through this new banking relationship.

The population of Indians with a bank account in 1995 was 26%; by 2005 it had increased to 36% of the population (*The Times* 2008). The number of unbanked customers had reduced as a result of banks being successful in using the internet and mobile phones for capturing customers who historically had never held a bank account (Lafferty 2006). This increase occurred in all the Indian banks, where the internet and later mobile phones allowed banks to create a range of new services (Lettice 2002). It appears that the unbanked and the Financial Inclusion Policy were related (Chakrabarty 2006; Gwinner et al. 2006), in that regulations had been developed to ensure that all citizens could be included in the financial framework of the nation. As one interviewee commented:

Sustaining or Disruptive Innovation?

This analysis questions whether IMB was disruptive or sustaining according to Christensen and Raynor's (2003) disruptive innovation theory. Unable to use institutional theory to answer the two key differences of the adoption of mobile phone banking and new customers between Australia and India, Christensen and Raynor's (2003) DIT was used. Christensen and Raynor have suggested that IB can be deployed only as a sustaining technology relative to creating a business model for retail banks. Sustaining innovation improves the performance of existing products along the dimension of mainstream customer value and does not disrupt existing business. While disruptive innovation demonstrates characteristics that existing customers may not want initially, such innovations will be cheaper and simpler, even with inferior quality, if compared to existing products. The claims made by Christensen and Raynor, which have not only been contentious but have also engendered much discussion among scholars with reference to IB, are:

- There is not 'a large population of people who have been unable to open a bank account because they lacked the skills or the money, existing bank penetration of this market is high, hence this rules out new-market disruption for internet banking' (p. 54).
- Are there current bank customers at the low end who would be happy to accept a bank account with fewer privileges and features in order to get the service at a lower price? (p. 55)

In Scandinavia Enders et al. (2006) conducted a study with Nordea Bank to test if DIT provides insights into whether IB is sustaining or disruptive. Enders et al. (2006) concluded that IB at Nordea was a sustaining innovation and not a disruptive innovation. They conducted a qualitative study to evaluate the motives of Nordea for introducing IB. They found two categories of motives:

- **Overlapping value networks – initially serving low-end customers with an offering of value over time for more established customers**
- **Disruptive circumstances – either over-served or 'non-served customers or customers who lack ability, wealth, or access to conveniently accomplish an important job for themselves' (Enders et al. 2006 p. 70).**

The Nordea case demonstrated that customers were existing and were not over- or under-served but were simply provided with an alternative banking method. The second aspect of a sustaining innovation was the desire of banks to use the internet as a strategy to retain customers who could be lost to competitors. Banks which were later adopters saw IMB as a retention tool rather than for generating new business. Banks such as Ind8 and Aus8 who were later adopters wanted to guard against losing existing customers after realising that existing relationships with customers were altered by the internet (Li 2001). In Australia, no new customers were acquired as a result of the innovations but in India new customers, particularly previously unbanked customers, were acquired, particularly by the new banks.

One of the major drivers for IMB in Australia and to a lesser extent India was to maintain service and introduce a better product into an established market using an alternative channel to serve customers. An alternative implies that a service already exists. The improved service resulted in self-service banking for customers and reduced the cost for the banks (Lafferty 2006). Internet banking allowed banks to pass much of the transactional capability to customers (Fisher 2006) and there was a cost benefit to banks in reducing branch infrastructure. By providing self-service, banks were able to save costs and retain customers as well as serve customers who did not have to wait in bank queues.

In India, the new product or service being introduced to the masses was IMB and the option of improving services was not possible as there was no existing service to improve in many cases. In Australia, banking had been almost universal and the option for improving the service was delivery via an alternative channel with the added aim of cost saving. In the words of Christensen and Raynor (2003), the market was 'under-served' in India while in Australia the notion of 'unbanked' did not exist. According to Christensen and Raynor (2003), when sustaining an offering, no new customers are created; rather existing ones are better served by the use of technology or pricing. This theme was prevalent throughout the Australian banks where no bank indicated capturing new clients as a result of IB or MB except for clients from other banks. There were no instances of Australian banks being under-served (no banking) or over-served. In all instances, they provided IMB to facilitate self-service via an alternative channel, to reduce costs for the bank and to differentiate from competitors.

In the process of disruption, 'leapfrogging' appears to have occurred in India, both technological and social. Serageldin (2006) observed 'leapfrogging' in developing nations and has received attention from other scholars who have all defined it as 'deployment of advanced technologies in developing countries ahead of or at least at the same time as their deployment in industrialised countries' (Socolow 2001 p. 1). Supporting the leapfrogging

finding, Fleming (2003) explains that countries that are advantaged with new technology can leapfrog to take up a new position on the technology adoption curve. Internet banking leapfrogged Indian banking consumers to technology-based banking without Indian consumers first engaging with the traditional branch network.

DISCUSSION

The key research objective of this thesis was to understand the dynamics of IT-enabled innovation adoption in developed and developing countries and to explore if and how they differ. It has been observed that Australia did not have any emerging class of citizens; there was no reference to such a class in the data. It was evident in the data that in India the emerging class arising from improved socio-economic conditions has a significant role in the adoption of innovation. For example, the emerging class was a motivator for Indian banks offering a new range of services.

Populations experiencing financial affluence are a major enabler of technology adoption (Ind4), and this affluence can have a major impact, particularly on the lives of younger and educated citizens in developing countries, to a greater extent than in developed nations (Bijapurkar 2007). This increasing affluence has altered the dynamics of the adoption of technology in these countries as these customers have been targeted by new organisations which understand customers' needs quite differently from traditional and established organisations. These factors contributed to the differences in adoption of IMB between Australian and Indian banks, and may hence result in the different theoretical viewpoints which have emerged among nations in North America and Europe. In the light of this apparent difference in the adoption of technology, the objectives of this study were explored through the research questions:

The adoption of IMB in Australia appears to be indicative of a sustaining innovation, while the same innovation in India suggests a disruptive innovation.

Internet and mobile banking in India have satisfied an unmet customer need that had not previously existed in the form of banking and in the process disrupted traditional and informal finance methods (Christensen & Raynor 2003), while in Australia existing banking methods were improved and sustained, providing greater efficiency.

Banking the 'Unbanked'

Disruption to gain market entry appears to be an approach to dislodge existing organisations (Christensen & Raynor 2003) to gain new customers (Djankov & Sharma 2008), where customers have limited or no services (Comminos et al. 2009). According to an interpretation by Rangaswamy (2003), disruptive technology is understood as a new product or service that 'disrupts' an industry and eventually wins market share. Christensen and Raynor's theory states that innovations will often demonstrate characteristics that existing customers may not want initially. Although they may be cheaper and simpler, they may also be of inferior quality compared to existing products. While this would appear to be the case in the context of developed countries, this research suggests the same claims cannot be made for developing countries. Customers in India were offered IB via a personal computer at the local post office and later on the consumer's mobile phone. This approach relates to Christensen's premise about non-consumption and providing a solution which is offered in the absence of any previously available facility.

Growing Affluence Encourages Disruption

The emerging consumer class in developing countries is a relatively new occurrence (Bijapurkar 2007), created by the affluence of fast developing nations, and there appears to be little theoretical literature to turn to for guidance. There has been a dramatic rise in the number of citizens engaging in the economy as a result of increased prosperity in some developing countries. This has led to an increased need for services such as air travel, hospitality and banking.

Neither institutional nor disruptive theories offer any insight on emergent affluent influences in the adoption of innovations. Some understanding has been offered by Bijapurkar (2007), who attributes the new Indian consumers and their growing affluence to economic prosperity, as does Khanna (2007), who offers insights into the growing entrepreneurship in India leading to greater affluence. Hiscock's (2008) contribution to this stream is that the growing wealth in developing countries is driven largely as result of opening up historical economic constraints.

So Was Internet Banking Disruptive?

Whether IB and MB were disruptive requires the application of Christensen and Raynor's (2003 p.49) 'litmus test' that provides comprehensive test which defines three separate criteria's to establish if a technology is disruptive. These are listed below in Table 2.

Table 2 explores the factors to be considered from the litmus test provided by Christensen and Raynor (2003 p.49), the data appears to demonstrate that internet and mobile banking had indeed been disruptive in India and sustaining in Australia, and that Christensen and Raynor's (2003) DIT theory may be extended to include countries with different socio-economic condition as the study appears to demonstrate that conditions for disruption were met in India in that there was no other product or service before the introduction to IMB, and that in Australia the conditions to offer the innovation was to enhance or improve the existing service.

CONCLUSION

From this study it would appear that developing countries may bring new opportunities to corporations which have the desire to address the 'bottom of the pyramid' (Prahalad 2005). The needs of these economically emerging communities appear to be driven by an emergence of new wealth, and there appears to be no historical comparison to developed countries. This new emergent class of consumers has allowed organisations to offer services that had not previously existed in their own countries or even, in the case of MB, in developed countries. It may be that developing countries have leapfrogged developed countries in the development of IT-enabled services in the banking sector, and maybe in other sectors as well.

The economically emerging consumer appears to have disrupted the normal practices of service offering, and this disruption has led to product innovation such as MB that is unprecedented even in developed countries. The resultant impact of these may present a reverse of the innovation process in developing countries, as appears to have been the case for IB and MB in Australia and India. The implications of these processes may present organisations with the opportunity to develop products and services previously unheard of. For researchers, the implications of innovations in developing countries may present a completely new stream of research as developing countries emerge out of poverty and into prosperity.

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Metal Ions in Life Sciences

Table 2 Christensen and Raynor's litmus test for disruption (2003)

Christensen and Raynor's (2003) Litmus Test for Disruption	Internet and Mobile Banking Observations in India	Internet and Mobile Banking Observations in Australia
Is there a large population of people who historically have not had the money, equipment or skill for this function?	In India, consumers did not have the relevant components to conduct their banking. ✓ criteria met for disruption	98% of the Australian population had a banking relationship; hence no disruption ✓ criteria met for sustaining
To use the product or service, do customers need to go to an in-convenient, centralised location?	Indian consumers did not in many cases have the option to conduct their banking in the villages, or the need. ✓ criteria met for disruption	78% of Australian households had internet access in 2001 and could access IB from their own homes; hence no disruption ✓ criteria met for sustaining
Are there customers at the low end of the market who would be happy to purchase a product with less performance if they could get it at a lower price?	In India there were two tiers of customers: the city and the village. The village customers required basic banking services, and would be prepared to accept a lower performance banking product. ✓ criteria met for disruption	The needs of the city and the rural community were similar, no mention by the interviewees of this being different; hence no disruption.
Can a profit be earned at the low end at discount prices?	Banks could generate income by being able to provide banking to poor communities through banking deposits via the internet, and on-sell other banking products through the access. ✓ criteria met for disruption	Internet banking was developed more for cost savings through branch reductions and never envisaged as a profit-making initiative; hence no disruption ✓ criteria met for sustaining
Is the innovation disruptive to all of the significant incumbent firms in the industry?	All banks described new consumers for both internet and mobile banking, and all banks had to provide new services or streamline existing process, and hence disruption had occurred at different levels, particularly to incumbent firms as a result of the newly formed banks. ✓ criteria met for disruption	All banks used the internet channel to sustain their existing businesses; hence no disruption ✓ criteria met for sustaining