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FINANCIAL SERVICES INNOVATION:
OPPORTUNITIES FOR TRANSFORMATION THROUGH
FACIAL RECOGNITION AND DIGITAL WALLET PATENTS

DEBORA S. BARTOO

A DISSERTATION

Submitted to the Ph.D. in Leadership and Change Program
of Antioch University
in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

May, 2013

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This is to certify that the Dissertation entitled:

FINANCIAL SERVICES INNOVATION:

OPPORTUNITIES FOR TRANSFORMATION THROUGH

FACIAL RECOGNITION AND DIGITAL Wallet PATENTS

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Abstract

Bringing innovation to the marketplace for new products and services involves creativity, a culture in which change flourishes, and leadership that thrives on transformation and complexity. This study explored the potential for market disruption or change based on innovations involving patents granted to nonfinancial services organizations that could affect financial services, specifically consumer or retail bank products. It involved analyzing documents related to recently granted patents and completing a mixed methods survey integrating the Delphi research technique. This method required multiple iterations of a survey presented to expert panelists or industry thought leaders to attempt to gain consensus (“Consensus”, 2011) or general agreement by the group (Tersine & Riggs, 1976). With this research method, the goal is to gain an understanding of initial individual perspectives. Through an iterative process, then determine if, as a group, they can move toward a common vision of what is likely to happen after viewing other’s perspectives. This research was specific to two innovations for which patents have been granted: facial recognition and digital wallets. Patents can provide insights into potential new developments planned by organizations. In some cases, patents can provide insights into innovation, potential threats, opportunities, or disruptions that could change the way a market operates. The goal of this research was to select two recent patents from many that have been granted, develop theoretical insights, and, through a mixed methods survey integrating the Delphi methodology, identify when or if these patents could have an impact on financial services. This research brought together thought leaders in an anonymous, collaborative approach to assess considerations and provide their perspective on these changes. This study served to help leaders drive innovation in financial services

organizations and to understand how others perceive these innovations. The electronic version of this Dissertation is at OhioLink ETD Center, www.etsd.ohiolink.edu.

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Chapter I: Introduction

Innovation is important for companies to compete or create new revenue opportunities. For some companies, innovation is a mindset integrated in the culture. For others, innovation may be a separate part of the organization providing a sense of uniqueness and accountability. Successful companies tend to integrate innovation throughout their culture (Snyder & Duarte, 2003) to ensure that everyone is responsible for embracing change throughout the organization. These companies have a strong desire to encourage success through creativity and risk taking. Innovation can exist in products, business models, analytics, marketing, operations, and many other facets of the company. An innovation strategy must be communicated throughout the organization. The strategy could involve financial resources, human resources, technology, marketing, and business partners throughout the value chain (Dodgson et al., 2008).

Leading innovation involves many leadership theories, including transformational, adaptive, and authentic, to name a few. Innovation leadership may require the use of any of these theories at any time, or the leader may need to incorporate knowledge from various theories. The Center for Creative Leadership noted that leaders need to create an “organizational climate where others apply innovative thinking to solve problems or through developing new products or services. It is about “growing a culture of innovation, not just hiring a few creative outliers” (Horth & Buchner, 2009, p. 7). Leading innovation involves understanding marketplace changes and being able to successfully influence when it is the best time to be courageous and take risks. From a transformational leadership perspective, innovation may lack a clear, defined vision or require change or flexibility, bringing a sense of uneasiness. Leading innovation means being a champion for what you believe will be a success (Northouse, 2010) or

the ability to sell concepts when others may not clearly see the benefit. Innovative leaders create innovative visions that engage others in new possibilities.

For financial institutions, innovation is critical to success. The 2008 financial crisis brought challenges with consumer confidence in banks. The crisis became a focus for saving many large financial institutions from failure. New legislation was drafted with more controls to minimize risk to avoid future industry collapses. The intent was to protect consumers and the markets. New legislation can be costly for financial institutions when they have to develop technology or operational processes for compliance. Often additional staff members must be hired to meet regulatory reporting requirements. This cost often usurps the funding for innovation.

Financial institutions continue to innovate based on technology and capabilities brought to the market. However, new capabilities are costly to build and maintain. Therefore, although organizations might want to be innovative, there is always a risk when committing significant funds to build new technology capabilities. Additionally, marketing new products and launching new services to consumers in the hope that they will adopt the service can be very costly. Consumer research might be included as a part of a corporation's product or innovation roadmap to help manage this risk. It can be difficult to gauge if consumers will actually embrace a new product until it is launched. If consumers had been asked if they wanted or needed an iPod, the answer probably would have been no. Consumers likely could not identify with such a device until they had it in their hands. Nor could they understand its capabilities until they saw friends and families use and recommend it.

A result of the financial crisis involved new legislation imposed by Washington on financial institutions. In particular, the Dodd-Frank Act including the Durbin Amendment,

named after Senator Richard Durbin, focused on a sweeping piece of legislation. This legislation was signed on July 15, 2010. Implementation was required no later than April 2011.

The Durbin legislation resulted in the government getting involved with determining fees paid to financial institutions by merchants for debit card transactions occurring at a merchant's store. The industry calls these fees "interchange" fees. This sweeping reform and change in dynamics caused financial institutions to rethink strategies, and quickly focus on recouping lost revenue with new products or modifying services. The financial institutions had to look for opportunities to innovate as a way to replace that loss. Innovation strategies become more risky especially when trying to fill short-term revenue losses with significant returns. Executives tend to have a decreased appetite for risk or failure when technology funds are constrained. Technology funding becomes constrained when government legislation is mandated.

This legislation required banks to think creatively about future opportunities for new revenue streams. Several areas where innovation could take place include prepaid cards, merchant-funded rewards, and alternative payment methods, to name a few (Bezard, 2010). Prepaid cards and credit cards were not subject to the regulations. Financial institutions sought innovative opportunities to quickly aid in increasing revenue. The economics associated with free checking accounts were evaluated and continue to be a focus to determine if they can remain a viable product. Interchange revenues would no longer subsidize the cost for these accounts.

Financial institutions use technology innovations to be efficient and to support customer-driven needs. Examples are innovations developed through smartphones or tablet devices. These devices can now be used as sales tools or as a way for consumers to access their accounts. Pressures exist for organizations to produce new products faster providing a steady flow of innovations organizations hope will result in new revenue streams (Artz, Norman, Hatfield, &

Cardinal, 2010). In some cases, financial institutions partner with innovative organizations to understand their product roadmaps and launch plans. This shared knowledge can help determine the appropriate time to launch, minimizing risk, and costs. In other cases, firms prefer to keep their plans secret until launch. Apple does this quite effectively with new product launches. This strategy can be a way to disrupt the market and help gain market share, build customer loyalty, or delay product clones especially when a product is highly innovative.

Innovation in some cases can be critical to organizations to sustain their viability. Emerging companies that can react to market changes or innovate quickly can become a threat to those who cannot operate in this way. Some companies seek out those who can bring creativity or proven innovation methodologies to their product organizations. One approach to innovation called design thinking is about discovering many ideas, evaluating them, and determining their viability. The concept is to terminate ideas least likely to succeed as early in the process as possible (Brown, 2009). Failing early can reduce the costs associated with continued work on the innovation. In some cases, ideas may need more refinement before further time is spent testing or commercializing them as a product.

When companies conceive ideas, the organizations must consider obtaining patents for the innovations. Through patent approvals, we get a glimpse at what the future could hold for new products. Patent reviews provide an opportunity to evaluate impacts on financial institutions that could be either positive or negative. Impacts could include services or ways in which the business operates. Financial institutions can patent products, processes, and methods. Through monitoring which patents are approved, organizations can understand what innovations are being developed.

Overview of This Study

Financial institutions have been involved in many changes since the 2008 economic crisis. Business models changed when legislation was introduced that compromised revenue, requiring innovation to find replacement revenue sources. Threats from nonfinancial organizations such as Google, Apple, and PayPal are forcing financial institutions to find new business opportunities. This could lead to disruption of existing models through the launch of new products and services. Google, Apple, PayPal, and others have the technology and nimbleness to introduce change quickly. Financial institutions, while seeing revenues compressed, need to continue to innovate to remain competitive and retain customers. Technology innovation continues with new features integrated in smartphones and many customers choosing to upgrade annually so they have the latest model.

Several diverse forces pose challenges. Financial institutions need to allocate significant resources to comply with new legislation. Financial institutions' risk assessments may involve more scrutiny to ensure there are no threats to the financial system and that it remains safe and sound. Emerging and technology-driven companies threaten the landscape through innovation and technology. For some, building their patent war chests to protect their innovations is important intellectual property that provides increased value on their balance sheets.

Financial institutions can become aware of the threats or opportunities posed by others through reviewing patents. Reviewing existing patents can provide insights into other companies' strategies and innovations. This study examines select innovative patents granted that could cause changes in financial services. The likely adoption of new technologies can help leaders drive innovation in their organizations. It is difficult to tell at what point financial institutions or stakeholders need to embrace change to support innovation.

Patents can provide insights from the perspective of implications for existing products, processes, market dynamics, potential shifts in consumer behavior, and more. This research will provide important insights for organizations as they build product roadmaps. Understanding how others think contributes significantly to validating approaches.

Research Question

Because of recent financial institution challenges, nonbanks have had an opportunity to increase their innovation capabilities. The research question is, “What is the impact of technology patents on future innovations in the financial services industry?” Innovations likely involve change, whether in process, product, or technology, or throughout the value chain that often exists to support services. This may involve change in thinking for consumers to successfully transition or adopt new methods or services. The specific patents or technologies examined in this research work are facial recognition and digital (mobile) wallets.

Rationale for the Study

Many innovations are launched every year and many patents issued for technology advances. Many entrepreneurs as well as established companies focus on innovation to retain customers or develop business opportunities. Many innovators hope to become, for instance, the next Facebook or Google. Some believe if they just build the right relationships and client base, success will come.

Because there are many innovative ideas and patents each year, executives can be overwhelmed by vendor calls and presentations. Many entrepreneurial organizations contact banks believing they have the next new idea that can make a difference in retaining customers or providing revenue opportunities. Executives often listen to many presentations, and may be afraid that if they do not spend time doing due diligence with the many vendors, they may miss

the one right opportunity that could make a significant difference to their customers or their bottom line. The competitive nature of financial services requires organizations to spend time evaluating new opportunities to minimize the risk of loss of an opportunity to a competitor.

The purpose of this study is to obtain insights from those who have worked in innovation and financial institutions regarding specific patents. This research can help in the strategic planning process by incorporating thoughts from other diverse organizations. This work captures insights from several different companies and different levels of executives related to these new technologies. These technologies can be transformative in financial services. This study also helps to provide insights into when these technologies should be piloted and launched by financial institutions.

With innovation, it can be difficult to justify business cases since unproven technology may be involved. Organizations understand that in many cases they need to pilot new technologies in order to gain new knowledge. This can take many years from when the patent is granted until the technology is broadly provided to consumers. With this in mind, this research provides insights into thought leaders' views, which can help in planning roadmaps as organizations decide if they want to be leading edge or embrace a strong follower strategy with innovation.

Statement of the Problem

The area of innovation and, in particular, this research focused on two very high-profile technologies, facial recognition and digital wallets. Many aspects can be studied with these technologies: technical aspects, customer experience, privacy, security, industry perception of these technologies, and others. Each specific area could lead to research. Significant

information can be learned from each area, including stakeholders such as manufacturers, vendors, consultants, customers, or the industry that could change due to their introduction.

This research provided the opportunity to gather knowledge from those in the industry who may not always present their views publicly. Financial institution competitors, vendors, and consultants provided a broader industry perspective. The research method was the Delphi method, which brought together thought leaders to understand and gain general agreement through multiple iterations of questions. Through this method, participants have the opportunity to know others' opinions and to maintain or change their stance.

The Delphi method provides a structured research approach and instills a sense of discipline and validity in the results received. This type of rigor provides thoughtful insights and a structured method to apply in future years as these innovations continue to evolve. This work can help organizations in the industry that are unsure of what strategies to adopt by providing the opportunity to evaluate and determine if it is best to move forward as an innovator or to take a "wait and see" approach. In some cases, organizations allow others to launch innovations and are fast followers as the organizations see the technologies prove themselves or as customer adoption increases. Two examples are mobile banking and mobile deposits. Ed O'Brien from the Mercator Advisory Group observed that 2012 was the tipping point for mobile deposits (Tsuruoka, 2013). Mobile deposits became a part of the important value proposition to customers using basic mobile banking services. In this case, it involved organizations taking risks that these technologies would become a part of mainstream banking activities.

The leadership aspects of these innovations can be what attracts or maintains customers. Leading innovation is costly. It requires individuals who understand the risks and yet can still determine the investment is worth the cost. The innovations described in this work require

forward thinking. Innovative organizations take leadership roles in the industry to test and learn. Their leadership moves the industry forward in understanding the risks, evolving the product through pilots, and ensuring that customer adoption is paramount.

This work also contributes to understanding these complex topics from an industry perspective. This research will aid those who wonder what they should be doing from a strategic perspective. The technologies continue to evolve, and it is often difficult for organizations to determine the right ones to launch with customers and when it is appropriate. Midsize to smaller financial institutions may not have the funding to innovate or test and learn that larger financial organizations may maintain in their budget.

Definitions of Terms Used in This Work

Table 1.1 lists the definitions of terms used in this work.

Table 1.1

Definitions of Terms Used in This Work

Term	Definition
Business model	The way in which a company makes money. A business model presents how the organization captures and delivers its products or services in a way that differentiates the organization from others and provides a financial return to the organization.
Digital wallet	Carrington (2012) described this as the ability to access credit or debit card information for payment to complete commerce-related activities. This can also facilitate additional services that may include electronic receipts, integration of offers, loyalty rewards, and product information through a smartphone.
Facial recognition	Using digitized faces and storing reproducible images through sophisticated algorithms for retrieval and authentication (Gates, 2011).
Innovation	Goffin and Mitchell (2010) provided a perspective that innovation is taking an idea and translating it into something such as a good or service for which people will pay or that may result in a significant change to a process.

Term	Definition
Interchange fees	Organizations determine what their definition of innovation is as it relates to their business model. For some, it could be ensuring it produces the latest new products or services that are leading edge. For others, it could be the number of patents filed. It could be creating a connection with customers that ultimately results in the purchase of new products (Snyder & Duarte, 2003).
Near field communication (NFC)	Fees paid directly or indirectly between a merchant and the cardholder's financial institutions for debit or credit card transactions conducted to complete a purchase (Pacheco & Sullivan, 2006). A short-range wireless technology, usually less than 10 cm, providing for the capability for multiple devices to communicate (Gemalto, n.d.). In the scenario described in this work, smartphones communicate with a store's point-of-sale device using this technology.
Patent	A specific right granted by the United States Patent and Trademark Office (2010) for an exclusive period of time for the right to preclude others from making or selling an invention in the United States in exchange for disclosing information about the patent (United States Patent & Trademark Office glossary. 06/02/2010, p. P).
Thought leader	Sestili (2012) found 21 documented definitions. In the context of this work, a thought leader is an individual who is knowledgeable in the industry on the topics to be researched.
Value chain	A term describing the various stakeholders and their contributions as a product is being developed (Magretta, 2012, p. 74).

Summary of Chapters

In Chapter I, an overview of the research study was provided, and the intent to answer the research question noted. This chapter established the foundation for the literature review by introducing several aspects of innovation challenges.

Chapter II presents a review of the literature related to the importance of innovation in financial services and the topic of change specifically related to the select patents. The chapter includes a review of leadership and change related to innovation. This critical analysis of the literature, a summary of the themes, and insights into literature gaps help identify where further work can be accomplished.

Chapter III explores the approach defined for the patent analysis, the Delphi research method used for this study, the data collection, and the analysis methods used.

Chapter IV presents the analysis and summaries of the participants' responses to identify conclusions from the data presented.

Chapter V discusses the conclusions and implications for this research and suggestions for future research.

Chapter II: Literature Review

Introduction

Innovation is an important component for businesses to continue to be successful. It is the lynchpin of maintaining the organization's viability and is important for national economic growth (Tidd & Bessant, 2009). An emphasis of this study is the understanding of the importance of innovation and the impacts it can have on business models. Innovation can create risk; it can be the means to success in good times or when an organization or industry experiences volatility. This includes changes in economic conditions, emerging entities, industry dynamics, new technologies, new legislation, or new business models. The scope and perspective for this literature review included specifics related to the patents selected: facial recognition and digital wallets. Lastly, leadership is critical to innovation and important to this review.

Innovation and Its Importance

With today's technology and the nimbleness of startups, an organization may be a viable company one day and threatened the next day by those that are innovating faster or delivering more features. Innovation provides an important way to continue to compete. Companies that do not have innovation as a strategy or fail to adopt innovation processes will find they are followers quickly losing market share or even their business. Major business schools emphasize the goal of bigger profits from innovation (Prahalad & Mashelkar, 2010). Success can also be learned from failure in innovation. While success in innovation is desired, lessons can also be captured from those that require more time to pilot or from customer feedback. In other cases, organizations may choose to be a follower of innovation and benefit from the early investment of

others. Organizations that become quick followers may rapidly build on additional capabilities that differentiate their product.

Innovation becomes critical to organizations because it is what can make a difference in the financial state of the organization. If organizations continue to do the same things, they are at risk of others coming in and taking market share. Innovation offers new growth opportunities. It may include developing new value creation, new customer experiences, new markets, or focusing on new top line revenues that could take the company to the next level. Organizational challenges include attracting and maintaining the talent that can be effective in executing complex innovation initiatives. There is also risk if a company chooses not to innovate. Talented employees with the innovation spirit and passion will seek to work for other organizations that have that focus. Google continues to attract the best and the brightest individuals (Iyer & Davenport, 2008) because of their exciting projects, innovation culture, and ability to instill a passion for their products.

Embedding innovation into the organization should consist of a “wide range of actions that assimilate, incorporate, internalize, and imbue the entire fabric or lifeblood of an organization with the mind-set and skills of innovation” (Snyder & Duarte, 2003, pg. xv). Innovation does not always involve major change. Cohen (2005) believed that in some cases, a small, short-term change can create significant consumer enthusiasm. From a leadership perspective, Davenport and Manville (2012) provided a perspective that sharing a common objective helps to build the trust needed and support from others to achieve success in innovation.

Why Innovation Business Models Are Important

Many times, there is enthusiasm for designing the innovation rather than being engaged in all of the political aspects of bringing the idea to fruition (Van De Ven, 1986). Denning and Dunham (2010) noted that socialization and ability to gain concurrence on an idea can take significant mobilization to bring together support for it. The potential for creating something new is attractive and provides motivation and excitement. Business models help provide a methodical process to evaluate options or to understand many of the attributes that lead the organization to success. The rate of innovation continues to shorten the cycle time to deliver new products or services, especially with continued, rapid technologic advancements (Goffin & Mitchell, 2010). The use of appropriate business models can ensure that questions surface early in the process, ideas go through a review process, and those with the greatest potential receive initial seed funding to test and learn more.

An example of this type of business model is what Kim and Mauborgne (2005) call the blue ocean strategy. The cornerstone of the blue ocean strategy focuses on working toward finding the uncontested markets – those that have opportunities that others are not pursuing. The intent is for deep analysis on how to enter these uncontested markets to bring value and revenue to the corporation. This strategy is to create new markets (Burke, van Stel, & Thurik, 2010). The contrasting strategy is the red ocean strategy, which looks for ways to compete in existing markets where there is intense competition (Buisson & Silberzahn, 2010). The red ocean strategy may choose tradeoffs such as cost or value. Red ocean strategies follow the competition or accept that there are barriers which must remain and are immovable or cannot be changed (Pitta & Pitta, 2012). An example of a red ocean strategy might be financial services, where rates are no longer competitive, everyone has similar product offerings, and there are many

options open to consumers. Regulatory requirements and legislation may also limit opportunities for expansion.

The blue ocean strategy recognizes that there are new markets that could provide better opportunities (Van Assen, Van Den Berg, & Pietersma, 2009). This model provides for the opportunity to be innovative through the introduction of new capabilities within a new space. New markets challenge what we know today and may have more risks, but could also provide more reward and less initial competition. They come with a need to continue to question and assess whether the opportunity is worth funding. Examples of blue oceans include Cirque Du Soleil, which provided a type of entertainment that had not been provided before and Swatch (Buisson & Silberzahn, 2010), which became trendy in the watch market with almost cult-like followers.

Organizations may approve innovation funding in stages so they can gather data to make well-informed decisions throughout the process and potentially reduce risk and cost. Cooper (1993) subscribed to ensuring that a review process be in place with leadership to decide whether to further advance funding or end the initiatives.

The amount of process in innovation needs balance. Those who provide the creativity need to focus on that aspect of the work. Others are needed to focus on implementation including providing measureable results so decisions incorporate appropriate data or findings.

Financial Institution Innovation

Innovation in financial services is important and fuels economic growth. Through innovation, we can overcome obstacles to managing risk or building efficiency into our systems. P&G has purposely sought to evolve their innovation processes. In 2000, they found that “only 15% of innovation efforts met profit and revenue targets. Today the figure is 50%” (Brown &

Anthony, 2011, p. 10b). P&G is not a company that is likely to set small revenue targets for innovations. Innovation provides new revenue opportunities. Innovation fuels creativity in products and services providing the opportunity to compete in challenging environments or keep customers interested in the enterprise's products or services.

Financial institutions have found ways to maintain customer loyalty in very challenging times. For some consumers, it may be simple and easy access to online banking or bill payment. Others may find that continued mobile banking or tablet banking innovations are key to their loyalty. For others, it may be that they have a relationship with their financial institution consisting of several loans and it may be difficult to change based on their years of loyalty. Some consumers may feel their bank knows them and their needs. Financial institutions gain knowledge about their customers through innovations in big data, which provides the opportunity to delve deeply into data and emerge with insights and understandings of customers and their needs. The data financial institutions maintain are massive and the analytics can provide significant insights to use to their advantage. Financial institutions, similar to companies like Google and Facebook, understand the importance of this information and the value it can provide. Innovation is not just in the form of products and services, but also in the use of data.

Financial institutions use such data to understand their consumers and to target offers and products to them. Companies such as Google and Facebook use data to target ads and increase revenues supporting their business model. Data have applicability and are important to each business. The more data collected, the more one tends to know and understand the targeted consumer behaviors.

Financial institutions must continue to innovate to meet customer needs, stay competitive, and manage costs. Banking centers provide the highest cost "channel" to serve a

customer. Limitations for consumers include location convenience and banking center hours. Innovation for financial institutions can occur through products or services sold or supported in any of their channels. For instance, many customers moved from visiting a banking center to online banking and now to mobile banking using smartphones and tablets. Services such as being able to transfer funds to friends or family at different banks electronically are now in place and meet many consumer needs. ATMs now provide check-scanning capabilities for deposit transactions, and the bank that issued the check can receive the information electronically resulting in processing items sooner, reducing risk, and lowering costs. Checks no longer need to be picked-up by an armored service from an ATM, batched together and flown to regional processing centers for clearing. Customers receive a receipt from the ATM with the check image providing proof of the deposited check. These types of customer products and services may require highly complex hardware components in the device. They likely include sophisticated technology and require complex technical software changes. They require constant monitoring including ongoing review of risk policies and security compromises or threats. Innovation may require ongoing funding to improve based on constantly changing technology.

Challenges to Innovation

The 2008 financial crisis created some significant events that resulted in new legislation, with financial institutions becoming more risk adverse. When corporations become risk adverse, innovation tends to stall. If innovation stalls, it provides an opportunity for new entities to emerge and become threats.

Because innovation requires creativity and risk taking (Byrd & Brown, 2002), an organization that fails to have access to creative ideas through its culture or its partnerships, or becomes risk averse, will limit itself as a viable organization. Others may come into the market

and take advantage of the opportunity. Financial services can encounter risk in failing to innovate through limiting the funding available to develop a new product or service.

Prioritization of certain initiatives over innovation can impose risk. Innovation may involve evaluating fraud complexities, consumer privacy concerns, the potential for cyber threats, attacks, or compromises, among many other risks. Change imposes risk. This often challenges organizations with the “we haven’t done that before” or “it’s always been done this way” mentality. In order to innovate, change to current thinking is required.

Recent Legislation

The intent of this review is not to discuss the implication of this legislation to each party. Nor is it to challenge the intent and the outcome, but rather to provide insights into the impact of this legislation on innovation.

Dodd Frank Act. The Dodd Frank Act was a direct result of the global scare from the 2008 financial crisis and was motivated by industry excess by many high profile players including Lehman Brothers and Bear Sterns. Its enactment was a result of the near collapse of the financial industry. The nation watched with much concern over the potential of a great depression as a highly likely outcome if government intervention did not occur and reestablish some sense of accountability. The result was the Emergency Stabilization Act of 2008 providing government--backed funds to stabilize the financial services industry. Legislation known as the Dodd-Frank Wall Street Reform and Consumer Protection Act (Ropiequet, Naveja, & Hirsh, 2010) was proposed in December 2009 and signed by President Barack Obama in 2010. Dodd-Frank became the sweeping legislative reform consisting of 2,319 pages of regulations (North, 2010). This legislation was put in place to monitor financial services and to understand and regulate risk within institutions that could compromise the economic stability of the country.

The goal was to minimize the threat to America and to act as a model for other countries to avoid such a catastrophic situation from occurring again. The government believed the need existed to instill more accountability and transparency protecting consumers from abusive practices (Pittenger, 2010). North (2010) provided insights into the breadth of this legislation noting that it created ten new federal agencies and offices to oversee financial institutions and provide consumer protection. Among them was the newly created Consumer Financial Protection Bureau which was established to protect consumer interests.

The Durbin Amendment. A last-minute amendment was included in the Dodd-Frank Act known as the Durbin Amendment. Financial institutions, merchants, consumers, and the government strongly debated this legislation based on the substantial outcomes it would have for each of the parties. Its purpose was to reduce fees paid by merchants to banks when consumers paid with debit cards at a merchant's point-of-sale device. The intent of the government was to have merchants pass on the reduced fees or savings to consumers. The government was getting involved in pricing for financial services with the networks involved in passing along transactions between parties -- the consumers, the merchants and the financial institutions. Financial institutions argued that the proposed fee reductions would reduce their ability to cover fraud costs and ongoing product costs including innovation. This legislation focused on those financial institutions that had over \$10 billion in assets (Barba, 2012; Hayes & Frisbie, 2011). New rates went into effect in October 1, 2011 and were then set at \$.21 per transaction and .05% of the transaction value. An additional \$.01 per transaction was added to help cover fraud prevention costs (Federal Reserve issues, 2011). Additional elements of this amendment required merchants to be able to send their transactions over a choice of networks (for example, MasterCard®, Visa®, Star®, NYCE, etc.) rather than one determined by the network rules or

financial institutions. Bezdard (2010) noted that some of the effects could involve merchants steering their customer's transactions where the merchant wanted with respect to routing for transaction approval. A merchant can choose to place certain prompts on their point-of-sale device to influence customer choice or they can adopt pricing to help steer the type of transaction to be processed. This provides the merchants with the opportunity to assess what is most cost effective or provides the best level of service.

This amendment was also to govern regulation of payments made to family and friends overseas and sent through international money transmitters such as Western Union. Crozman (2012) mentioned that the intent was to provide clearer fees and disclosures. This rule ensured that the amount sent and the fees associated with that amount would be clear to the consumer and recipient.

This legislation affected many other aspects of financial services operations. This required substantial funding to comply with and, in some cases, compromised funding for innovation. Funding legislative projects often compromises funds for innovation projects. Alternatively, some have viewed the legislation as providing new opportunities in innovation. Prepaid cards started to emerge as a way to offer a debit card not encumbered by this legislation. U.S. Bank adopted this as their strategy (Bjorhus, 2012). However, it remains to be seen if these programs will continue to be unregulated. The Federal Reserve reported in 2009 that over 6 billion prepaid card transactions took place with estimates that the value was over \$140 billion dollars (Wilshusen, Hunt, van Opstal, & Schneider, 2012). This is a substantial amount in the monetary system.

Now that this legislation is in place and financial institutions have implemented the requirements, impacts are visible. Revenue losses are a reality. Consumers may have lost debit

rewards programs, new checking account fees are in place, or minimum balances have increased (Evans, Litan, & Schmalensee, 2011). These are only a few of the strategies deployed to try to offset the losses. With the implementation of new banking fees, it is natural for customers to evaluate options and look at alternatives including other financial entities' services. These dynamics can have an impact on plans for innovation and the level of risk the financial institution is willing to take. When revenues are impacted, loss of funding for innovation might be the result. However, in some cases innovation may be accelerated. There may be substantial low risk, high reward, and short terms gains based on the opportunity.

Legislative Market Impacts

The challenge for financial institutions, when technology funding goes to legislative mandates instead of innovation, could risk existing business. Often, new market entrants can be nimble and operate with the latest technology. They do not have to deal with the dated infrastructures or complex systems in place in many financial institutions.

New banking regulations can compress revenues as occurred with the Durbin Amendment. Banks may seek innovation in new products or services to build new revenue opportunities to help absorb the losses. Innovation becomes critical to provide new revenues or reduce operating costs through designing new products. Innovation can also build efficiencies into processes, or provide opportunities for new ways to do business. If innovation ceases or becomes stagnant, it provides the opportunities for others to become more aggressive in their initiatives or innovations. When innovation is not a top priority for an organization, it can take years to recover. Vaitheeswaran (2012) noted how companies can be blindsided if they fail to monitor the landscape or understand what unanticipated threats could do to their business. It can be devastating.

The Payments Industry Landscape

The many areas and complexity involved in the payments industry landscape includes online banking, mobile banking, mobile payments, money transfer, prepaid cards, and more. This area continues to evolve with many consumer services involving innovation at the forefront. The digital aspect to these services continues to add new dimensions with constantly changing technologies. Many new market entrants try to find better consumer value propositions through the use of their services or promote new product functionality. While some fail, other companies might be interested in pursuing these firms for equity investment or purchase because they may be technically agile. In other cases, some own patents or they may have talent within the firm that is creative and innovative. Companies continue to see the payments landscape as ripe for patent and product opportunities.

The Finovate Group holds conferences, where companies focused on financial services innovation present their products in a seven-minute pitch to venture capitalists and those seeking innovative product ideas. The Finovate 2012 show provided the opportunity for 1500 attendees to hear about financial services innovations from 63 companies (The Finovate Group, 2012). Each company has the opportunity to present at the spring and fall show, or in the United States, Europe, or Asia. Finovate maintains a video archive for those not able to attend their shows. This is a very useful way for innovators to launch new products with a highly targeted audience interested in hearing about their innovations. It is also a way for those that cannot attend to be aware of what innovations are taking place and the opportunities for partnerships. It affords the opportunity to see what companies may have patented and can reduce the risk of infringement.

Innovation is a main theme at Finovate, and companies come and go. In reviewing those that participated in 2008, six of the 24 companies that participated are no longer in existence.

Those no longer in business were:

- FiLife (personal financial management)
- SmartHippo (mortgage comparison)
- Vidoop (authentication solutions)
- Loanio (peer to peer lending)
- Wesabe (personal financial management)
- MoneyAisle (online auction for rate comparison)

Acquisition is common because start-ups often do not have the capital necessary to grow their idea. Five of the companies represented at Finovate in 2008 were acquired. They were:

- LoudwaterLabs (personal financial management)
- Sybase365 (mobile software solutions)
- Checkfree (online bill payment)
- mFoundry (mobile banking and mobile payment solutions)
- Mint (personal financial management)

Companies often look to Finovate to provide the venue to present their business and gain exposure to venture capitalists or organizations desiring to pursue innovation. Venture capital is a major source of funding for innovation presented at shows like Finovate. Venture capital groups assess risk carefully and may choose to reduce their investment risks during times like the financial crisis. Girard (2009) argued a perspective that the result of this is that innovation decreases and emerging companies are forced to fund their companies with limited funding or no funding at all.

NonBanks Emerging in the Payments Landscape

Nonbanks have been involved in the financial institution landscape for many years. Nonbanks provide payment services functions for various payment types “such as credit cards, debit cards, electronic checks, credit and debit transfers, e-money, and stored-value transactions” (Sullivan & Wang, 2007, p. 84). They are not subject to federal regulatory supervision nor managing risks or security as required by regulatory agencies for financial institutions. An example of a nonbank is PayPal. PayPal does not accept deposits but is involved in the payments landscape for other financial transactions. Non-banks may process checks through the Automated Clearinghouse; they may be involved with ATM ownership and transaction processing. Many new services are evolving in the payments landscape where nonbanks are involved including:

- The ability to pay another person directly and instantaneously with accounts maintained at different financial institutions
- Payment for purchases at a merchant location through a point-of-sale device at the checkout lanes using a phone number, launched by PayPal (Goode, 2012b)
- The launch of “Square” providing small business merchants a device that can be attached to smartphones to read debit and credit card information off the consumer’s card. This is similar to a point-of-sale device in a store so that debit or credit card payments can be accepted (Goode, 2012a). A simple process for merchants is in place to apply and obtain the device to get up and running quickly.
- Walmart continues to venture into banking products through relationships with network providers such as American Express.

These are just a few examples involved in innovation and new product introductions in the payments landscape. From a financial institution and regulatory perspective, the financial services environment needs protection from systemic and system-wide risk with innovation.

What becomes important for consumer confidence and the markets is to ensure there is appropriate oversight to manage financial services and non-banks to minimize risk. Systemic risk involves the failure of one party to cause issues throughout the process to fail. This type of risk is of the highest risk to the system. System-wide risks, at the next level, are those risks that could cause the entire system to fail creating a massive domino effect (Bradford, Davies, & Weiner, 2003). These types of risks are at the forefront of concern for financial institutions as they assess innovation and perform risk assessments and analysis. Any interruption to this system results in diminished consumer confidence in the safety and soundness of the system (George, 2012).

Payments systems in the U.S. consist of cash, checking, credit and debit card systems, The Automated Clearing House, and wire transfer systems (Benson & Loftesness, 2010). Examples of payments systems institutionalized in financial organizations include:

- Payments made through point-of-sale devices. These could include physical store locations, vending machines, transit systems, and local parking meters, among many other applications. This also expands to purchases made online.
- Online, mobile, and tablet banking are included in the landscape and include bill payments. Additional applications include financial institutions presenting a consumer with the opportunity to view a bill online and the consumer requesting payment sent to the company owed. Another aspect of payments includes person-to-person payments where a consumer can pay a friend or family member by

sending the request for payment from their account to another account. This can occur even when the friend or family member banks at a different financial institution (Benson & Loftesness, 2010).

Financial institutions are an important part of the payments ecosystem providing the clearing and settlement of these transactions. Financial institutions manage risk to the financial system and to consumers and meet regulatory requirements to process payment transactions. Rapid and significant changes in competitors, technology advances, customer behaviors, and legislative and market dynamics have contributed to this complex and ever-changing landscape (Hayes & Frisbie, 2011). Decoupled debit cards, contactless cards, mobile payments, contactless mobile stickers, and cloud-based payments are a few innovations being brought to market (Bradford, 2009).

Payments Market Dynamics

The intention of the payment landscape review was to provide a high-level view of the complexity of the environment and systems. The regulatory environment adds complexity in innovation because legislative bodies may not be prepared to introduce legislation when a new financial services product launches. Regulations may come many months or years later, requiring adjustments and investment to be in compliance. Emerging companies with new technology may not understand the risk with innovation in a highly regulated environment. They may unknowingly add risk while attempting to innovate. The industry has been very dynamic with many new companies attempting to innovate. They may be immature in their industry knowledge causing risk to their viability. In other cases, new start-ups may gain momentum quickly through venture capital funding to establish their innovation. They may find themselves quickly acquired based on the value they could add to other ownership or because of the

reduction of threat through acquisition. Organizations sometimes seek others for either equity or acquisition based on their valued patent portfolios. The tension created helps the market to maintain a dynamic, competitive state and provides for heated debates among the parties.

Market Innovators

Some financial institutions may choose to monitor their own industry while others understand there is value in understanding others. It is important to monitor threats. Google excels in several areas including their technology, ability to experiment, use of analytics for data-driven decisions, ideation processes, and more (Iyer & Davenport, 2008). They continue to focus on innovation. They have the ability to test and learn quickly to gauge consumer sentiment and to eliminate products if consumers do not readily embrace the innovation.

Google. Google has noted that its mission is “organize the world’s information and make it universally accessible and useful” ("About Google," 2012). Thus, Google could have a profound impact in many ways on financial services. The safety and security of financial institution and customer data are at the forefront of consumer trust. Financial institutions maintain significant amounts of customer data. A company such as Google places a high value on data, since understanding consumer behaviors is important to their business model and primary business, Internet advertising. Google’s desire to collect data inspires the company to develop opportunities for new services that could add to Google’s massive data warehouse.

Google had announced plans to issue a prepaid card for a digital or mobile wallet that consumers could use to make purchases at stores, rather than using a bank-issued credit or debit card (Digital Transactions, 2012). This service although short-lived was intended to provide Google the opportunity to obtain information on customer purchases and then pass the transaction off, aggregated in total, to the financial institution. The financial institution would be

able to report to the customer only that it was a Google transaction, and the specific merchant location information would be lost from bank statement details. Google benefited since it would have more information about the customer. The customer would lose valuable reconciliation information and the ability to have detailed information to track purchases with this payment approach. This innovation did not last long. Google announced on October 17, 2012, it had discontinued the prepaid feature ("Google Prepaid Cards," 2012). A news story discussed the safety and security of customer data, which may have been a factor in this change in strategic direction (Quittner, 2012). We may never know. This does not mean that the product innovation is no longer viable, but rather, it may require changes in the design to make it viable based on results learned from launches.

Apple. Apple has been gathering customer credit and debit card information for years. Reports set this number at 400 million credit card customers (Helft, 2012). This information can provide Apple with significant data to develop analytics that may include consumer purchase preferences in the iTunes store, the dollar value of the purchase, purchase frequency, historical data to develop trends, and purchase behaviors. This information can assist Apple in serving suggestions to consumers as a part of their sales process on iTunes.

From a financial institution perspective, many have been waiting for Apple to launch a near field communications capable phone that would redesign the payment experience at the point-of-sale device (Wolfe, 2010) in a store. This would allow payment card credentials to reside on a secure element within the phone. The consumer would then use his or her smartphone for payment and would simply “tap” the phone on the point-of-sale device for payment, rather than swiping a card. The wait continues. We know the technology can do what it intends in the patent. The costs, consumer adoption, and an improved customer experience

based on performance over current magnetic stripe card technology still needs to be determined. Google has integrated this technology in a few select phones with early stage pilots. Patents also suggest that Apple intends to change payment processing for payments conducted through the Apple iTunes stores (Wolfe, 2010), which could be innovative and disruptive.

The Importance of Patents

A natural part of many organizations' innovation process is to determine if their method or process is patentable. Once organizations submit and have patents approved, the patents become public record. Many patents go unnoticed because of the complexity or technical aspects associated with the work, especially for companies that manufacture products.

In managing innovation, tasks should include patenting products or processes. Some companies even use patents received as a measure of their innovation performance; in other cases, they are an imperfect proxy for innovation (Vaitheeswaran, 2012). Others put enormous value on owning the patent to protect their intellectual property (Dodgson, et al., 2008). Patents can also be a good source of information for others outside the organization to understand the creative processes going on as part of a company's inner workings. The number of patents that an organization holds may not be the most important consideration, but rather what the patent does (McGregor, 2007).

Patents are important to the innovation process to help dissuade copies of products by competitors that do not have the right or license to sell them. Patents provide the legal right to exclusivity of the innovation, in exchange for applying, paying fees, and obtaining it (Gillmor, 2004; Goffin & Mitchell, 2010). The patent provides a powerful basis for excluding others from making, using, or selling the innovation (Miele, 2001). An organization can protect its intellectual capital and property for what may have been years of work and large sums of money

to invent or innovate. Patents may provide a limited monopoly often up to 20 years (Tidd & Bessant, 2009). Patenting is not the only form of intellectual property protection but is the focus in this work. Others are copyright which provides exclusive rights to literary or artistic works; and registered trademarks, which protect a distinctive name, mark, or symbol that a company chooses to maintain for its products (Trott, 2012).

The process of patenting usually requires an attorney, but it is not required. The process is developed and maintained or administered by the United States Patent and Trademark Office, an agency of the Department of Commerce. This agency details the required process on an online site at <http://www.uspto.gov/>. The application often includes diagrams especially if it relates to a patent for a product or process. This detail helps protect and defend any patent violation claims from other companies or people.

There is a downside to patent issuance. Patents were initially intended for something that was not obvious but yet innovative. Today, patents are issued for all types of innovations, even those that are obvious, calling into question the outdated processes and methods used by the patent office (Gillmor, 2004). Seminerio (2000) reported that the patent office had a 2-year backlog of work in 2009 with a staff of 9,500 people. Due to the constant, fast-paced change in technology today, the patent process may be outdated or no longer viable for today's environment.

Patents become important as a way to observe competitive information that is public and can provide an opportunity to understand where or how companies are planning to innovate. Patents can provide an opportunity to assess strategies based on evaluating them broadly or identifying synergies in product development (Goffin, Lemke, & Koners, 2010). Patents can

also provide details on technology and component designs that can illuminate the technological aspects to the work (Gittelman, 2008).

Patents are time-consuming documents to study. A formal review process can help a company assess whether there are potential threats and opportunities in a competitor's innovation. Evaluations can even assess if there is the potential to pose disruption in the industry. Formal reviews and publications of these results provide patent filers opportunities for further patent filings. These reviews often require thinking through what the company is attempting to do. Further thoughts could include the company's plans and the implications for others in the value chain, as competitors, partners, or future market strategies. Patents provide benefits to organizations that choose to assess royalty fees. Therefore, this can be an important aspect of revenue (Dodgson et al., 2008). The United States Patent and Trademark Office, in a report to the president requesting 2013 funding, noted that 506,294 patents were filed in 2011 with projections for 527,000 in 2012. The agency expects to see continued growth with 700,300 estimated in 2017 (United States Patent and Trademark Office, 2012). Much of this growth is from technology companies and their continued innovation.

Key market leaders and their patent activity are depicted in the following table.

Table 2.1

Patents Owned by Technology Companies

Company	Number of patents
Apple	>3,800 patents + 6,000 Nortel patents/apps
Google	760 U.S. patents + >1,000 IBM patents (Acquired Motorola Mobility since publication resulting in an additional: 17,500 patents + 7,500 apps)
HTC	127 U.S. patents + 82 patents from ADC & 253 S3 Graphics patents/apps

Company	Number of patents
Kodak	About 10,000 patents in total portfolio > 1,100 digital imaging patents
LG Electronics	>9,600 patents
Microsoft	>18,000 U.S. patents + >6,000 Nortel patents/apps
Nokia	>10,000 patent families
Oracle	>10,000 U.S. patents
RIM	About 10,000–15,000 patents + >6,000 Nortel patents
Samsung	>36,000 patents
Sony Ericsson	>27,000 U.S. patents + 6,000 Nortel patents/apps

Williams, F. I., & Safiullah, R. M. (2012). The smartphone patent wars: A U.S. perspective. *Licensing Journal*, 32(6), 16-28. Reprinted with permission. See Appendix G.

The patent process requires the innovation be useful, novel, something not previously introduced before, or different in some way to make it unique. The innovation must be nonobvious, that is, something that is not obvious to someone involved in the area in which the patent is being sought ("Qualifying for a Patent," 2013). One of the challenges with the patent process is the rapidly changing technology. Technology is evolving at such a fast pace that what might have been considered patentable at one point in time quickly becomes obvious to those involved in innovation or technology. The patent process will need to address this.

Patent Infringement

For companies, choosing knowingly or unknowingly to infringe on a patent without appropriate licensing can be costly. Nokia claimed Apple infringed on 10 patent filings in such areas as wireless data and security, including encryption capabilities, and sought \$33.7 million in royalties (McQuillen, 2009). Another significant lawsuit was between Apple and Samsung. The federal court found that Samsung violated Apple's patents and awarded Apple \$1.05 billion as a judgment (Barrett, Satariano, & Burrows, 2012; Zolkos, 2012). In other situations, organizations

may choose to agree to license patents from each other for the good of the technology and the industry. Microsoft and Apple have done this in the past, and it provided a way for the organizations to work together for the mutual benefit of the industry (Dalrymple, 2005).

The rules and laws for patents are complex. Organizations cannot create a patent and then not launch the work product. If brought to the patent office's attention, not launching products could involve legal actions to provide the second organization the right to the patent if the first company did nothing with it (Dalrymple, 2005).

The results of patent infringement settlements could cause re-evaluations of innovations and product launches. The risk of potential infringement could come with lawsuits and high settlement awards. An organization's product launch roadmap should include patent searches in their product development cycle to prevent this situation.

Google Chief Larry Page discussed buying Motorola Mobility in order to "increase competition by strengthening Google's patent portfolio, which will enable us to better protect Android from anti-competitive threats from Microsoft, Apple and other companies" (Boulton, 2011, p. 12). If an organization latches on to just the right patent, revenues from license fees can be substantial. A recent report noted that Microsoft had made more on licenses for HTC Android devices than on its own Windows Phone platform. Microsoft receives \$5.00 for each Android handset sold (Paczkowski, 2011). Some companies may try to harm competitors through patents. Google accused rivals Apple and Microsoft of collectively purchasing patents to thwart the growth of Android (Albanesius, 2011).

Patent Expiration

Patents provide protection for innovation, but they eventually expire. This allows others to compete with similar product offerings. The expiration of a patent ensures there is no

monopoly in the marketplace. Design patents expire after 14 years. Utility and Plant patents expire after 20 years. Patents also expire for other reasons, including the patent-holder's failure to pay the fees assessed to maintain the patent or invalidity of it (Cosimo Reports, 2006).

Facial Recognition

Biometric technology continues to evolve, providing consumers with an authentication method that is difficult to compromise. Wells Fargo tested early applications of facial recognition technology in branches in 2006 when it was very new to the market. Consumers, however, may not have been ready or fully understood the benefits of this technology (Sausner, 2006). Several years later, consumers have read or heard more about this technology. If a company such as Apple introduces facial recognition, consumers might be more likely to adopt the technology.

The most substantial literature published on facial recognition technology focuses on the complex technical aspects, particularly from a software perspective. Facial recognition technology continues to develop because of its biometric ability to validate individuals as the authentic person, without question. The majority of the business-related facial recognition literature focuses on technology, privacy, and security. Security and regulation will be a focus for some time with this technology as consumer rights and government agencies in the United States and abroad take a more active role. Consumers may not always know that this technology is being used. "The Foxwoods Resort Casino in Mashantucket, Connecticut uses this technology for facilitating patron database searches linking it to the video surveillance system" ("Casino Adds Facial Recognition," 2006).

DriverID uses facial recognition to identify a driver and make recommendations based on stored habits. Features include establishing settings ensuring driving speeds never go over a

specific setting. The software could set vehicle options when the driver enters the vehicle and could make calls to home as the driver is approaching (Sawyera, Teoa, & Moulouaa, 2012).

European regulators have shown concern with Facebook's use of facial recognition software for site users without obtaining their permission. The photos uploaded provide a significant database of collected information, but privacy advocates would like to see consumer consent before such technology is applied (Weise, 2011). Using this information without consent is invasive; for example, in August 2011, a group of private citizens sought to use this technology to identify London rioters (Mello, 2011).

The U.S. government is trying to determine how the digital underpinnings of these data can remain safe and how companies can or should use it (Gross, 2012). Regulators are becoming more educated on this technology, and regulations will be instituted to protect consumers and their data (DeMarco, 2012). Efforts to protect the country through the use of facial recognition technology are applications that the Department of Homeland Security can envision for this technology (Greenemeier, 2005).

A consumer can register his or her bank account and digital photo with a company called FaceCash. Through software installed on a store's point-of-sale system, the consumer scans a bar code that accesses the system, providing a digital image to the clerk. Once verified by the clerk, the payment transaction is completed. Subway engaged in piloting this application in Palo Alto, California (Hernandez, 2010).

Shipments of smartphones and tablets integrating this capability will reach 665 million units a year in the next 5 years (Investor's, 2012). Facial recognition technology will continue to be improved, and new ways of using it will emerge. It will improve the customer experience or provide a means for authenticating or verifying an individual more quickly and reliably. This

literature review posits that facial recognition is taking hold, but consumer privacy issues and the appropriate use of these data must be resolved. Areas for further scholarly research include consumer perceptions of the technology, customer thoughts on how negative perceptions could be changed, costs of using this technology versus other methods, and adoption in different industries.

Digital Wallets

The discussion of digital or mobile wallets has been exploding in the industry over the past few years based on the rapid adoption of smartphones. Near field communication (NFC) is a technology that can be integrated into smartphones. It can provide new ways to pay at retailers through providing a digital or mobile wallet experience to consumers. From a consumer perspective, the approach is simple: Open the wallet on the smartphone, tap the phone on the point-of-sale device, and the transaction is completed. The underlying technology and infrastructure to support this type of service is significant, especially since it would need to be at most, if not at all, retailers to gain consumer acceptance. The complexities of this service involve new partnerships, complex technology, and significant investment by merchants to upgrade their point-of-sale devices.

The literature review provided insights into the initiatives that have been prominent in the press, including plans by Isis (founded by AT&T Mobility, T-Mobile USA, and Verizon Wireless) to focus on new ways to pay with NFC capabilities ("Welcome to Isis," 2012) and Google, based on its Sprint partnership (Geron, 2011; Wolfe, 2010). The technology currently applies only to a small portion of phones, estimated at no more than 3% with an expectation that consumer adoption will slow (Sidel & Efrati, 2012). Notably absent at this time is Apple's use of NFC technology, but rumors persist (Mims, 2012). This type of innovation requires point-of-

sale devices that incorporate this capability, software changes, and testing by participants to ensure that the product works ("Google Wallet," 2011). From a consumer perspective, education, including awareness of the service, where it is available, and how it works, will be important for success. To date, consumers have not viewed this new method of paying as essential (Heun, 2012) because the magnetic stripe card works. What is difficult to determine is whether consumers understand the future concepts for this technology and payments. Starbucks uses a different technology for payment but incorporates a similar NFC experience. Although this system is available only to customers at Starbucks stores, it shows consumer adoption of new ways to pay can be a success (Helft, 2012). One of the keys to success is providing value to the consumer.

The literature also discusses security and safety from hacking as important components of successful implementation of this technology (Dvorak, 2012; Simonite, 2012). Security is paramount for successful adoption. Opposite opinions and studies provide a counterargument that this technology is safe and secure (Haselsteiner & Breitfuß, 2006). Most importantly, when a new technology is launched, it has to work. For example, although pilots are in the early stages, the London Underground put plans on hold due to the technology not yet performing optimally ("London Underground," 2012). New York's Metropolitan Transit Authority (MTA) and the New Jersey Transit plan to use this technology for their transit programs. These tests will help to further resolve issues and provide the opportunity for this technology for payment ("New York and New Jersey Transit," 2012).

The estimates for revenue from these new technologies and advancements are significant. Alistar Goodman of Placecast, which also sells unbranded mobile wallets, estimated that loyalty,

offers, and deals integrated in the mobile device will be a “\$400 billion to \$500 billion opportunity.”

Privacy and Customer Data

Customer data relates to both innovations: facial recognition and digital wallets. Literature continues to emerge in these areas because of the complexities and newness. Personal information continues to be collected through web-based devices and mined through analysis with little or no control provided to consumers to manage it, according to Peabody (2011). We do not know who knows what about us and how organizations are using our data. New technologies introduce the opportunity for security threats and new privacy considerations. Companies must continue to work through these types of issues to ensure that customer data are safe.

Protecting consumer data has been paramount to financial institutions and a source of concern for the current architecture of some solutions. American Express was concerned about this and the Google wallet ("Amex Challenges," 2012). Google sees the value in the data. Merchants are also concerned about sharing their data and adding more cost to the system by engaging more parties and building further complexity. Merchants have developed their own wallet solution through an organization they formed called the Merchant Customer Exchange (Sposito, 2012).

Current research presents discussion on legal issues surrounding the data and, in some cases, the need for regulatory guidance, or the Federal Trade Commission to provide more direction. Continued focus will be on consumer privacy rights. The White House has issued a framework, “Consumer Data Privacy in a Networked World: A Framework for Protecting Privacy and Promoting Innovation in the Global Digital Economy” (*Consumer Data Privacy*,

2012). This framework focuses on three elements: “privacy by design, simplified consumer choice, and increased transparency of data practices” (Rubinstein, 2011, p. 1411). Many will wonder if a framework is sufficient for consumer protection or if this is just the beginning. If, as new technology unfolds, legislation detracts from the use, the invention could be stifled. Other government initiatives include the Commerce Department completing a preliminary report on protecting consumer privacy (“Protecting Consumer Privacy,” 2012) and “Development of Industry Self-Regulatory Principles for Online Behavior Advertising” (Eggerton, 2011b; *FTC Staff Report*, 2009). The security aspects from a privacy perspective will also be pursued by lawmakers with a focus on the issue of the consumers right to know about their data and how they are used (Eggerton, 2011a). Questions related to what is or is not encrypted information on smartphones will continue to be discussed to understand what consumer information is at risk. Consumers are concerned about the privacy of smartphone applications (Kirby, 2011). Discussion on these topics, lawsuits, and consumer protection groups influencing approaches and law will continue for many years.

From a facial recognition perspective, companies such as Adidas and Whole Foods are currently using software to predict gender and age so relevant, targeted ads are delivered to consumers (Maleske, 2012). This type of software and its use continue to evolve. This software can identify customers coming into a location and providing their profile to customer service agents. Consumers may not be aware of how or when this software is used. Individuals freely post photos on Facebook and other social networking sites such as LinkedIn, not realizing this information can be used without their knowledge in other ways.

As digital wallets develop, consumers may choose one or many. Regardless, consumers will find that there are disclosures of how the information that is collected will be used. The

challenge is that consumers might want to use a service, but not want their information used or even aggregated. For instance, a consumer may want to use his or her smartphone to receive offers based on his or her location. The smartphone can provide specific location-based coordinates through the wireless provider which allows additional services to the consumer. From a marketing perspective, location-based services can provide relevant offers or other pertinent information to consumers (Mulvihill, 2012). A consumer might not think about the collection of this information when he or she chooses to use these services. Technology can collect data on where consumers are at a specific moment in time (latitude and longitude coordinates) and whether they chose to accept an offer.

Today, consumers have limited options with their data. Services such as mobile applications, online banking applications, and social media sites usually provide disclosures outlining policies for use of data. Consumers may be provided with a choice to opt out of the service or opt in, requiring that their information be used as set forth in the disclosure.

From a corporation's perspective, the regulatory effects of new legislation to protect consumers and data could affect profits. Data used for targeting consumers are very important and valuable. This issue is not just with information from facial recognition and mobile devices, but through use of the Internet and cable boxes (Eggerton, 2011b). Consumers' information is gathered and many companies use it without our knowledge. We often do not know what companies know about us, when information is collected, what the data retention period is, and how it is being used or reported.

Digital wallets will also lead to other services such as digital receipts, offers, and other content available through smartphones. The opportunity for computers and software to perform analysis based on the digital information could potentially produce adverse effects. The result

could be that consumers will choose not to use technology (Bélanger & Crossler, 2011). Consumer perception of the “creep factor” (Maleske, 2012) with facial recognition could quickly cross a line with trust that could compromise the advancement of these technologies. If companies become reckless with consumer data, or violate consumer privacy, consumer privacy will likely undergo more intense government scrutiny, including new legislation. Frameworks and best practices guide organizations. Because this landscape is evolving, organizations need to continue to monitor changes to privacy legislation as new laws and developments take shape (Tama, 2012). Issues surrounding consumer privacy, data ownership, and safeguarding of this information will be at the forefront of discussion for many years.

Financial Institutions and Customer Purchasing Data

Merchants and financial institutions are involved with consumer purchases through the payment process. The merchants know what the consumer purchased; the bank also knows if its consumers used their credit or debit card for the transaction. Massive databases at financial institutions maintain information related to these transactions and purchasing habits. Business intelligence and analytics capabilities can provide insights into the customer. The value of these data are in the analytics and behavior information. These data are important to nonbanks. If Google provides a digital wallet to consumers, the company likely wants to know as much as it can about consumers. This helps Google improve its search algorithms for serving ads to consumers in an effort to motivate them to click on an ad, resulting in revenues to Google from the advertiser. The question of who owns the customer data is an important aspect of the value equation. No longer do companies compete solely on products; having access or being able to use data are significant weapons in the arsenal for success (Davenport & Harris, 2007).

Innovation and Leadership

This area of research continues to be important based on organizations' intense desire to discover how they can attract and maintain talent who can take their companies to new levels.

Innovation can have an impact on a company's bottom-line income statement. Leaders involved in innovation or, through leadership, their teams, have the big ideas and can bring about change (Selman, 2004). Organizational innovation is a subset of organizational change (Tabor, 2007), while creativity refers to a subset of work involved in innovation.

Senior executives consider innovation one of the top three drivers of growth in the next 3 to 5 years (Barsh, Capozzi, & Davidson, 2008). Top executives also agree that while the important drivers of innovation are people and culture, finding the right people capable of doing innovation work is a challenge (Parmenter, 2012b). Leading innovation requires the ability to listen to clients, customers, colleagues, and team members through authentic conversations that bring about collaboration, inspiration, and passion to create new possibilities (Cashman, 2009). Leaders bring about change through innovation regardless of what position they hold (Cangemi, Burga, Lazarus, Miller, & Fitzgerald, 2008). Peter Drucker believed in Kaizen, which focused on making change so that something performed better. He also believed in eliminating unnecessary steps, questioning what and why something is done, and assuming that everything could be improved by bringing people together to develop solutions (Parmenter, 2012a). Questioning is an important part of the collaboration process. It is a means for learning new insights, but can be a challenge to navigate when one needs to implement a project (Abele, 2011). In the case of Google, people want to work for the firm because they know they will have an immensely interesting job (Manyika, 2011) and do leading innovation work.

Quantas Airways CEO Alan Joyce believed in the importance of a fantastic team supporting the leader with collaboration and tapping into innovation. He believed organizations have the ability to innovate, but that needs to be brought to the forefront so that all realize and support its importance (Dyer, 2010). The vision of innovation starts at the top with leadership. Leading innovation also means that some efforts will fail, but failing early where costs are lower is better. Learning can be gained from what failed.

Not just one person should hold the innovation reins; rather, the dynamics at the senior levels are just as important (Torres & Rimmer, 2012). It takes strong leadership to drive the vision of innovation throughout the company rather than confining it to one area (David & Dreischmeier, 2010). In leadership focused on innovation, four common mistakes include the following:

- Confusion about the leader's role where others are not allowed to innovate
- Too-narrow a focus, for example, on the technology but not on other areas such as customer service, reliability, and cost
- Mixed messages to the leaders or teams, for example, when rewards go to those who are successful but not to those who tried but failed for valid reasons. Their discoveries may not be recognized for the value they provide (McCall, 2008).

Reframing this can provide important steps that leaders can take, including clarifying roles and objectives, recognizing and rewarding good work, and supporting people (Ross, 2007). Good leadership is considered a rare skill and sometimes requires being able to navigate through organizations that have people with very large egos or highly self-confident peers. The ability to navigate and collaborate requires special skills to succeed (Abele, 2011). Enlightened leaders can do this through truth, compassion, intuition, creativity, and insight (Goudreau, 2011).

What makes innovation different? Innovators have a creative intelligence that enables them to focus on discovery. It enables both sides of the brain to create new ideas (Dyer, Gregersen, & Christensen, 2011). Creativity is not something to manage. We should manage to encourage creativity, and the specific difference is in fostering conditions in which people will flourish with their imaginations (Amabile & Khair, 2008). Enabling innovation is often about what is important to the organization. But to engage, those involved in a project must find it interesting (Wheatley, 2001b). Sometimes organizations also need to take risks when an idea goes through initial high-level ideation and needs nurturing to develop. At this point, the organization may want to provide limited funding to determine if the idea has further merit (Useem, 2012). Sometimes the organization must be willing to let an individual or team pursue an interest and seed money can develop it further so opportunity can be assessed based on more information. The small investment could be an investment in the future. Leadership should not always think about the short term, but how to invest in the future (Govindarajan, 2011).

Who wins at innovation? Organizations that ingrain innovation in their culture and make it a part of doing business (Hamel, 2002) can be successful. Failure to include innovation as a part of the culture risks doing what has always been done. Extinction is possible because someone will come along and do it better. Technology has shortened the timeline for the evolution of new entrants. Success takes finding the unconventional leader who is willing to operate in unconventional times, perhaps with unconventional methods, and can balance risk and reward (Romero, 2012).

Research shows that disruptive leaders, who are often unconventional, have five important skills: associating, questioning, observing, networking, and experimenting (Upbin,

2011). These skills are important to consider as potential skills for leaders hired into innovation jobs or work in innovation today.

Innovation, Leadership, and Consciousness

The second area that resonated with leadership and innovation was consciousness, enlightenment, inspiration, and emotional intelligence. This leads into current consciousness models related to leadership. They included Clare Graves's spiral dynamics model, May's model of the development of consciousness, Ken Wilber's integral model, and Jean Gebser's structures of human consciousness (Prinsloo, 2012).

Spiral dynamics focuses on the adaptive intelligence associated with the worldview held by individuals based on their experiences and interpretations. The theory attempts to understand how people think about things and the motivating factors. This perspective is particularly important when we try to understand how and why people do things in a particular way and how innovation can change that process or method of thinking.

Ken Wilber focused on what he called the integral theory that brings to light the potential for finding new approaches to problems. Compassion with oneself and others throughout the world is an important component bringing with it a collective consciousness while also providing a sense of wholeness. This sense of consciousness lends to being a more effective leader through understanding what we see as our purpose and where we can be more effective (Wilber, 2012). Through appreciating and understanding the interconnectedness, the conscious mind brings self-awareness (Secretan, 2001). Therefore, leaders can ignite a sense of passion in everyone in their sphere of influence. This leads to the wisdom that leaders espouse at an inspirational level that is not ego--based. Through understanding the state of consciousness, leadership consciousness can master seven levels which are survival, relationships, self-esteem, transformation, internal

cohesion, making a difference, and service (Barrett, 2010) that bring about the sense of connectedness.

Jean Gebser's work provides insight into the belief that a new form of consciousness is taking place called "integral." It results in continuous transformations in mind and body. His work is enriched with philosophy asking us if we are willing to settle or if we are willing to take the chance and change, knowing that it brings feelings of discomfort and risk. Many leaders in innovation regularly find themselves facing this situation. The risk aspect involved in innovation is high since success or failure can influence an individual's career and opportunities.

As the depths of consciousness contribute to introspection, leaders with emotional intelligence can contribute to the creativity needed to provide the innovation or innovation spirit important to organizations (Castro, Gomes, & de Sousa, 2012). Leaders who understand emotions can work toward more creativity from their teams. This emotional intelligence requires that leaders be more in tune with themselves and others through self-awareness, self-management, social awareness, and relationship management to be effective (Hazelbaker, 2006).

The inspirational aspect of consciousness leads us to three ways to be connected. They include being genuine, understanding others' emotions, and being able to express empathy (Swavely, 2012). These characteristics can provide a sense of connectedness and engagement with those we lead resulting in leading for success. This provides an opportunity with those we lead to be engaged and creative so that innovation can occur. The leaders themselves must be engaged first to engage their teams. Without that engagement, success is difficult (Mahalingam, 2010). Organizations able to inspire employees will see the results through their success (Sisodia, Wolfe, & Sheth, 2007).

Taking on a leadership role in an organization is a significant commitment. Leadership in innovation is often sought due to a desire for the opportunity to be involved with emerging companies or trends, the potential for status in the industry, or even the additional income it could represent through incentive-based performance. The leader who accepts this type of position in the corporation needs to take a step back in accepting this responsibility and ensure he or she can lead through inspiration bringing creativity, intelligence, organizational abilities, and love of the role to be successful (Chopra, 2010).

Innovation, Leadership, and Nurturing the Human Spirit

The search for business literature focused on consciousness or nurturing the human spirit from a leadership perspective included a review of dissertations in which Tabor (2007) reported that there were few of these studies. This aspect of leadership is emerging with an emphasis on the key values important to live a rich life, including love, compassion, creativity, and insight. The intent is not, as many think, about the human spirit with religious connotations. Many leaders are afraid to discuss this because they think it might be about the religious or self-righteous aspect of what they believe. In reality, the human spirit is the domain where universal values are understood (Goudreau, 2011) and becomes a very private and personal matter.

The human spirit can also provide meaning to our work and give us the opportunity to be more courageous and effective (Wheatley, 2002). There are high demands on leaders who choose to lead innovation. There are high expectations, risk, requirements to deliver change effectively and to provide new revenues, and the ability to deliver quickly. Those expectations are fierce. Competition and the continued emphasis on faster delivery cause stress contributing to chaotic environments instead of charismatic leaders (Nadler & Tushman, 1990). Charisma is important to the leadership tenet, incorporating the complexity involved in large-scale,

geographically dispersed organizations with many layers of bureaucracy (Nadler & Tushman, 1990). Leaders may want to practice learned methods, but pressures may change the leadership approach.

Another word to describe this aspect of leadership is integrity. This incorporates dimensions of consciousness, moral character, and faith (Sanders, Hopkins, & Geroy, 2003). We need leaders who can embrace these components of leadership to allow creativity to flourish in their organizations and innovation to take place. This allows leaders to assume an inspirational role in which results are beyond the short-term goals and people enjoy contributing to an achievement (Seidman, 2011). Some of this change requires nourishing the human spirit (Wheatley, 2001a). Collaboration and sharing best practices help provide the learning to extend the reach farther into the world. Steve Jobs practiced this through reframing, in which he had people change their beliefs and convictions based on his leadership style. He taught how his beliefs benefited others and attracted people to his way of thinking (Kaipa, 2012). The point was that through discussion and understanding other points of reference, people could choose to maintain or change their beliefs. He brought his soul and spirit to what he believed was right, which was why people easily bought into what he wanted them to understand. Soul provides the personal aspect of the individual experience while spirit is all embracing (Bolman & Deal, 2011). Together, they provide the hope and faith for what we want to believe, including that leading from the soul can provide us with the leadership respect, compassion, and commitment to achieve. With these opportunities to gain new depths of understanding, we also realize that leadership, such as experienced at Apple, does not occur often. That leadership behavior was not the norm, but it was an honor to be a part of such a forward-thinking entrepreneurial organization

that changed people's lives. It would have been a privilege to witness the wisdom and innovation that existed at Apple and to be a part of changing the world:

He was not a model boss or human being, tidily packaged for emulation. Driven by demons, he could drive those around him to fury and despair. But his personality and passions and products were all interrelated, just as Apple's hardware and software tended to be, as if part of an integrated system. His tale is thus both instructive and cautionary, filled with lessons about innovation, character, leadership, and values. (Isaacson, 2011)

Leading innovation in the way that Steve Jobs did could be too costly for organizations through loss of employees or demotivated spirits. This type of behavior is not something we would want to model across organizations. He brought innovation to a level no one had ever seen before, but his personality was not a behavior to hope for in leading innovation.

Conclusions

This literature review focused on the importance of innovation, the complex payments industry, the importance of patents, two specific technologies (facial recognition and digital wallets), and leadership involving innovation. As noted for each technology, more work has to be done since we will see many changes over the next several years in relation to their use. Since these areas are innovative, there are several points for consideration: (a) Innovation may have starts and stops. Sometimes this may mean stepping back, as with design thinking, to retool or rethink strategies. It does not mean that the innovation is a failure, but rather it may need more time to mature. (b) The ecosystem for these technologies is very complex. We will see many who entered the ecosystem leave over time or consolidate in other companies as a natural part of this evolution. (c) New technologies must provide an improved process, or be faster or simpler for consumers to want to use them. (d) Financial institutions cannot allow consumer data to be brokered or used by other organizations without their specific approval, or consumers will lose confidence in their financial institution. (e) Consumer privacy and trust are important

to maintain for technology and innovation to advance. Further government regulation and best practices will continue to be a focus if data are used in ways never intended. (f) News of pilot failures will spread quickly in the media, but it should be remembered that a pilot is conducted to learn rather than to be the final product. A pilot is part of an innovation process to gather insights for improvements.

There is still more work to do as these technologies and the industry continue to evolve. The technology, partnerships, consumer adoption, pilots, launches, customer data, financial aspects, and security will require literature updates and research studies for many years. Additional research could focus on any of these topics to continue to contribute and update the industry. This work could include technology changes, consumer perspectives on adoption, pilots conducted, security, and legislation related to consumer data protection and privacy.

From a leadership and innovation perspective, scholars could focus on the leadership aspect of innovation. Business publications and books tend to focus more on interviews or concise summaries of theoretical information. The area of leadership and consciousness or emotional intelligence brings a broad range of considerations and new ways of thinking about leadership. It includes an important component of consciousness which is to be authentic. Authors continue to write about methods and approaches to leadership in an attempt for organizations to find the right mix of nurturing, wisdom, and charisma to bring out the best in people. The enlightened nature of leadership tends to get lost in some organizations because the revenue goals are so strong or the threats so big. It is a balance a leader must have to serve all and it certainly is not an easy job.

Nourishing the soul can benefit organizations and leaders by providing opportunities to learn how to be more enlightened and to carry that into their personal and professional lives.

Enlightened leaders can bring hope and the human aspect of leadership to organizations since people have become so disillusioned with and demotivated by corporate America. Deepak Chopra teaches classes focusing on this aspect of leadership at Northwestern University through the Kellogg School of Management on “The Soul of Leadership” and “Rethinking Leadership.” Professional education and master’s programs may need to integrate courses or discussions about the complex work environments that exist combined with demoralized employees and the high demand for innovation for survival.

From a scholarly literature perspective, there are gaps that specifically relate to leadership in innovation. Studying leadership can be difficult because so many factors can come into play in determining success factors. Personalities, backgrounds, the inner workings of the leadership team in place at the time and their working relationships, and market conditions all contribute to the challenges of understanding greatness or failure. In some organizations, change in the organizational structure is constantly occurring, providing leaders with challenges to be successful. The constant state of flux can make it difficult to achieve results. A review of the literature shows many things can make a leader successful in innovation, but more importantly, the organization needs innovation to be a part of the culture. Standard meetings or forums can provide opportunities to discuss innovation initiatives. Leadership meeting agenda items can include innovation projects and progress so they have high visibility and everyone knows their importance to the organization (Barsh et al., 2008).

An important attribute for any leader is to constantly ask questions. Through questioning, one can discover other opportunities or new thoughts. Questioning provides an opportunity to gain new insights for innovation.

As innovation continues to be at the forefront of many leaders' plans, the literature will increase, including case studies, comparisons, and quantitative and qualitative studies to understand the phenomena that bring success.

Chapter III: Methodology

Selection and Justification for Using Delphi

The primary goal of this research was to use the Delphi research methodology to gain general agreement from industry thought leaders on two specific patents – facial recognition and digital wallets. The perspective to be gained was whether integrating these technology innovations into bank product offerings was viable, whether they should be deferred for several years, or whether they should not be pursued. This section includes the reasoning behind the patents researched and selected, the justification for the Delphi approach, a description of the participants sought for this research and the panel size, the data collection process, the method for evaluating the data, the data preparation process, and the acknowledgement for the panelist's involvement in this research.

Phase One – Patent Research

In order to determine the patents that would be relevant for this work, research efforts first focused on reviewing recent approved innovation patents from leading companies that could bring change to the financial services landscape. The following process was completed to determine those patents that could be innovative or transformational in financial services:

1. **Patent Research:** An investigation into recent approved patents was completed as described in the section titled “Patent Search.”
2. **Patent Selection:** Based on the initial review of approved patents, a determination was made on whether they could have an impact on financial services. In this case, the impact would be specifically on the consumer or retail bank. Further detail is described in the section titled “Patent Selection.”

3. **Theoretical Scenarios:** This involved conceptualized potential theoretical scenarios or questions to be used in developing the Delphi research approach where general agreement building is important. This provides the initial theoretical forethought to build a foundation for the survey questions to be posed to participants. These scenarios are outlined in the section titled “**Theoretical Considerations for Facial Recognition**” and “
4. Theoretical **considerations for** Digital Wallets.” Not all aspects of the theoretical review can be addressed in this research study, so there is an opportunity for future work to be done. Areas that have not been included are insights into whether the new technology can operate at or above current methods, security and privacy issues, and an analysis of impacts to others, such as merchants, and their perspective on these technologies.

Patent Search

The intent was to determine what patents published from December 2011 through September 2012 could affect change in financial services, particularly the payments industry. The research method applied to searching for approved patents involved several activities. The research started with searches based on recent patents published on LatestPatents.com and patents searched for through Google Patents (<http://www.google.com/?tbs=pts>). The LatestPatents.com site provides a weekly update on patents issued for select technology companies. It details the company, the patent name, and number issued. The web site provides links to the patent details at the United States Patent and Trademark Office. Google Patents makes available many patents from various firms, not just technology companies.

The impacts included change from technology, business models, consumer adoption, risk, privacy or other changes for financial institutions, merchants, and other industry stakeholders. Those patents chosen involved further detailed review of their abstracts. The criteria used to select the patents were those related to current industry topics that could take many years to bring to fruition. This is because of the complexity within the ecosystem to support consumer end products. Delphi participants could understand these innovations without having to read the entire patent documents.

Patent documents contain an abstract that summarize the innovation in a brief description of 250 words or less noting the novelty of the invention. The patent document may include detailed drawings to contribute to the understanding of the invention. The patent document contains a section related to a claim or claims and encompasses the details of the uniqueness of this invention. The number of claims is often dependent on the complexity of the innovation. This area becomes very important to the process as it provides the details on the scope of the patent (Cosimo Reports, 2006).

Patent Evaluation

The patents were collected, categorized by company, and assessed to identify those that would require a more in-depth review. The review included potential impacts to financial institutions, technology, consumers, or the industry. Important to consider was whether colleagues would have a sense of the patent and could readily identify impacts for this work.

Patent Selection

The following represents the initial review of patents conducted for the possible inclusion in the study. From the 12 patents noted in Table 3.1 (from an initial review of over 50), the “Locking and Unlocking a Mobile Device Using Facial Recognition” and “Digital Wallets” were

selected for inclusion in this research. Those marked as “reserve” were held for additional consideration pending determination of the length of the survey instrument for the initial selections. The number of patents to be included for this research was determined based on the length of time for participants to complete the initial survey. The possibility of participant fatigue in answering too many questions was a key consideration factor. There are many areas that can be explored and insights obtained. Consideration into the depth and time required to complete the research was paramount so that participants would not lose focus and abandon the study.

Table 3.1

Patent Search Results and Selection

	Publication Date	Assignee	Description	Use For Research Survey
1	9/20/2012	Apple Inc.	Locking and Unlocking A Mobile Device Using Facial Recognition	Yes
2	6/28/2012	Google Inc.	Digital wallet	Yes
3	8/21/2012	Google Inc.	Online Map Advertisement	Reserve
4	8/7/2012	Google Inc.	Identifying and/or Blocking Ads Such as Document-Specific Competitive Ads	Reserve
5	6/28/2012	Google Inc.	Targeting an Aggregate Group	Reserve
6	8/28/2012	Apple Inc.	Motion based payment confirmation	Reserve
7	12/29/2011	Google Inc.	Ad Privacy Management	Reserve
8	8/7/2012	Google Inc.	Method and system for obtaining identification information on a mobile device	Reserve
9	8/7/2012	Google Inc.	Targeting based on intent or presence	Reserve
10	8/7/2012	Google Inc.	Unlocking a screen using eye tracking information	Reserve
11	8/28/2012	International Business Machines (IBM)	Authenticating personal identification number (PIN) users	Reserve
12	9/20/2012	Microsoft Corporation	Data Collections on a Mobile Device	Reserve

Theoretical Considerations for Facial Recognition. Apple was granted a patent on September 20, 2012 for “Locking and Unlocking a Mobile Device Using Facial Recognition” (Zhao & Tsai, 2012). Financial institutions continue to evaluate biometrics and facial recognition technologies. With Apple’s intention to make this technology available to lock or unlock phones, consumers may more readily adopt it and be more receptive to embracing it for other means of authentication, for instance online banking, mobile banking, or online ID’s and passcodes. Facial recognition technology continues to evolve slowly, requiring more work for consumer confidence. Areas for further discussion and resolution have included:

- Consumer concern with a feeling of “creepiness” with this technology
- Whether authentication could become a commodity service that could be performed or outsourced to other companies
- The question of who would maintain the customer credentials for facial recognition authentication so that they would be secure.
- Determining if financial institutions risk losing control over the customer relationship if they allow another company to hold these credentials
- How data compromise issues would be handled
- Determination of whether the technology can perform on par or better than current methods.

Opportunities. The future will determine whether facial recognition could or should be used for banking. It has the potential to provide the following benefits:

- This method could be easier to authenticate rather than having to memorize login information; there would be no need to change it from time to time.

- Facial recognition software continues to evolve with the technology becoming more reliable and more mainstream. Adoption by companies such as Apple eliminates the “creepiness” factor.
- The technology continues to improve. A company such as Apple cannot afford to have technology issues or data compromises. Consumer confidence will be paramount to trust this technology or have backup plans, such as a code to access the device in the event of an emergency. Failure to be able to use the device in an emergency situation would negate the benefit of being easy to use or provide improved identification methods.

Threats/disruption. Other companies that hold facial recognition data could be considered the trusted partner for authenticating consumer credentials for online or mobile banking, eliminating the need for financial institutions to have this role. The opportunity exists for the trusted partner to design a system to and replace multiple passwords to systems with a simple, safe, and secure method that works across many websites.

Facial recognition scenarios. The following scenarios were incorporated into this study:

Table 3.2

Facial Recognition Scenarios

Item	Topic Addressed
1	Do you think consumers would be open to use facial recognition technology to access their online and/or mobile bank accounts?
2	What are the top three reasons that you believe prevent facial recognition from being introduced as an authentication mode for online or mobile banking?
3	Will authentication eventually become a commodity service that can be outsourced to other companies?
4	What are the top three issues the industry will need to work through to bring facial recognition to the market?
5	What is your biggest concern with facial recognition being used instead of an online ID and passcode?
6	How many years do you think it will be before facial recognition is being used to log into bank accounts?

Theoretical considerations for Digital Wallets. Google was granted a patent for a digital wallet on June 28, 2012. The intent of this patent is to provide consumers with the ability to use their mobile device for completing purchases at stores based on stored information, such as a financial institution's credit or debit card information (von Behren & Wall, 2012). Google introduced the digital wallet to the market on their Android smartphones (Calaf, 2011), although expectations were that Apple would be first to market. Apple still has not introduced the capability in their phones. Google's approach has been to gain access to consumer purchase data which financial institutions and merchants do not want to give up. They have also been working through security challenges with the technology. Still, Google is a mainstay with consumers. With additional services such as offers, consumers may choose to adopt this technology and use their phone for payment at merchant locations. The Google digital wallet can be disruptive or it can engage partnerships with financial institutions. Google's initial focus was to work directly with financial institutions. Since this had not been successful to date, they moved to gain adoption through shadow transactions through their prepaid card program, but this was short-lived too. Shadow transactions required consumers to have an additional Google account. Google would send the transaction to the financial institution to debit the account for payment. Since Google has a digital wallet patent and the desire to be successful in this arena, the industry closely watches as they innovate.

Opportunities. Google has an interest in providing the digital wallet service to continue to build value into their Internet advertising service by marketing offers to consumers. Consumers look for offers or deals when they shop. The ability to provide relevant offers, maintain account credentials in a digital wallet, receive e-receipts, and complete a transaction quickly at a point-of-sale device at a merchant location are features of this patent that Google plans to monetize. Collaboration with financial institutions may provide a significant base of customers where success can be attained. Consumer privacy is paramount as it relates to transaction data, especially if financial institutions are involved. The product will need to be secure from compromise. Others are quickly trying to capture the digital wallet space with patents.

Threats/disruptions. The technology associated with a digital wallet is complex:

- Some digital wallet providers have a desire to gain access to more data through the transaction or offer information.
- The amount of consumer education will likely be significant for broad adoption.
- Consumers will expect the technology to complete a transaction on par or faster than the debit or credit magnetic stripe card does today.
- Consumers need to feel confident that the solution and their data are secure.
- The solution cannot afford to have security compromises early in the launch or consumers will lose confidence in the product quickly (Jacobsson Purewal, 2012)

Merchants are developing a mobile payment platform and wallet called the Merchant Customer Exchange intended to compete with brand name digital wallets. The merchants want to simplify payments and have some concerns with the way the NFC solution is being launched by Google and Isis. Merchants want to retain customer data and not provide it to others to use.

Merchants want to ensure the consumer experience is seamless rather than requiring the customer to go to multiple apps on their mobile phone for payment (Wester & Wester, 2012). The industry will continue to evolve, and time and consumers will determine who the ultimate winner will be with digital wallets.

Digital Wallet scenarios. The following represent several digital wallet scenarios reviewed with this research study:

Table 3.3

Digital Wallet Scenarios

Item	Topic Addressed
1	With the growing number of digital wallets, what are the top three wallet types that you believe would appeal to consumers?
2	How long do you believe it will take for the ecosystem to be broadly available to support digital wallets?
3	Is NFC digital wallet technology the best technology to improve the payment experience at merchant's point-of-sale at the checkout?
4	What are the most important features of a digital wallet?
5	What would be your technology of choice to launch in the next 3-5 years if you had an unconstrained budget?
5	Should financial institutions provide the customer a choice of wallets?
6	What are the biggest hurdles to overcome with NFC enabled wallets?
7	If you were in charge of the 2013 strategic priority queue, would digital or mobile wallets make it into the top 5 priorities?
8	If you answered no to #7, would digital or mobile wallets be in your top priorities in 2014?

Phase Two – Delphi Study

Phase two of this research work encompassed using the Delphi research methodology of building general agreement by key industry stakeholders using a survey based, multiple iteration approach. The following steps were complete to engage participants in the Delphi study:

1. The Delphi research process related to this specific work was defined as described in the section titled “The Delphi Process” with a flow chart of the process used for this work.

2. The approach for the participant selection was completed and is reviewed in the section titled “Participant Criteria.”
3. The development of the survey questions, preparing the SurveyMonkey questionnaire, and conducting the survey with the required iterations with the selected study participants was completed as defined in the “Survey Timing and Process.”
4. The data were gathered and analyzed. Further detail is provided in the section titled “Data Collection Method.”

Using the Delphi Research Methodology

The intent of this research study was to apply the Delphi research methodology to gain general agreement on some of the industry effects of the patents previously described. The RAND Corporation developed the Delphi method in the 1950’s to forecast technological developments (Hsu & Sandford, 2007). The Delphi technique was chosen for this research methodology based on the complexity of the issues associated with the topics selected; the dynamic nature of the industry in which some organizations may be in the process of developing or implementing solutions they not want to discuss publicly; and the desire to inform the industry with formal research on these topics. Donohoe and Needham (2009) stated that Delphi is appropriate to use when knowledge is imperfect in the topic area. Hall (2009) contended that one of the benefits of the Delphi approach is that it provides the opportunity to gain information without disclosing or alerting competition to strategies or secrets. Stevenson (2010) noted that an important aspect to the Delphi approach is the anonymity it provides to participants. Survey participants and their responses are not identifiable to other participants (Knab, 2009) with the Delphi method. Only the researcher has the specific details. Experts who can be considered very informed or knowledgeable people can work toward gaining general agreement on

complex problems or strategies with insights that may not have been available prior to this type of study (Hall, 2009, Haughey, 2010). North and Pyke (1969) valued this approach for companies who were trying to predict as far ahead as 30 years and believed it was a serious and sophisticated method to use. Dalkey (1967) called this group the “Advice Community” and included consultants and others who were involved in predictions and analysis for making decisions as relevant to this expert classification. The Delphi method has flexibility in designing the panel of experts as those who can add meaning to the research work. A study completed by Lentz (2009) used external human resource consultants as the experts to provide the knowledge and expertise needed to gain the insights. The term *expert* may have a different connotation in each research study depending on the goals of the research and the kind of expertise required.

The published literature related to the topics researched for this study is, for the most part, discussed in trade publications, rather than in scholarly journals. This study provides the opportunity to shape future scholarly work based on empirical findings.

The Delphi approach provides an opportunity for those with varying backgrounds to provide perspectives that could be helpful to understanding and forecasting (Van De Ven & Delbecq, 1974). It provides a formalized process for gathering data. The panel for this research includes professionals from the industry who are knowledgeable on the topic areas. The intent is to improve decision-making by obtaining information based on group opinion (Landeta & Barrutia, 2011). The opportunity to forecast based on experts provides meaningful information. That information is subject to change as dynamics in the industry change, but at least for a point in time can be gathered and assessed to aid in planning direction. The Delphi method is an iterative process in which participants are taken through a series of questions several times, in this case twice. Participants had the opportunity to change their responses or stand their ground

as they saw or understood other points of view. This provides an opportunity for opinions to converge limiting or bringing to conclusion further debate or refining opinion (Dalkey, 1967). Predictions or forecasts for the future are benefits to this approach (Garavalia & Gredler, 2004).

Benefits to the Delphi Method

Research can be costly, particularly when organizations use research firms or consulting companies to conduct it. Additional costs can be incorporated in research projects depending on the research method, number of participants, data analysis, and other aspects that may be specific to the method. The Delphi methodology involves seeking participants based on their expertise on the topic. Focusing on experts can help to reduce the sample size and complexity while providing quality results.

The Delphi method provides the opportunity for anonymity. An advantage is that face-to-face forums are not used thus eliminating the influence of strong individual personalities or status (Knab, 2009). The process provides for participants to present opinions that they may not have voiced if they met in-person. It also eliminates any confrontations among the panel (Tersine & Riggs, 1976). Ludwig (1997) recognized that busy work schedules have made it difficult for research participants to travel to participate in research studies. Reduced travel budgets for many have also made it more difficult to participate in more personalized research approaches. Therefore, written responses or online surveys can provide substantial value and culminate in meaningful results.

Limitations to the Delphi Method

The Delphi approach is not a one-time event. Continued participation and interest through multiple rounds can be a challenge to maintain. The method takes time to perform and

participants can become uninterested, resulting in unforeseen dropout rates (Linstone & Turoff, 1975).

Additional limitations identified by the literature include: “1) potential to obtain manipulated consensus; 2) lack of rigor, revolving around statistical analysis and questionnaire psychometrics; 3) intensity and amount of labor required to carry out the procedure; and 4) duration of time required to complete the process” (Nekolaichuk, Fainsinger, & Lawlor, 2005, p. 467). Also noted by Gordon and Helmer (1964) is the potential for ambiguity in the questions if the participants misunderstood the question as it was intended. Despite these limitations, the Delphi method can provide insights from many perspectives; it is also a way of gathering insights important to strategic executives to gain consensus on the fundamental priorities of the organization (Floyd & Wooldridge, 1992).

The Delphi Process

The Delphi method is survey-based, by mail or e-mail. The survey responses are compiled and presented back to the participants either in an aggregated format for further review and assessment, or as the final results if the last iteration. The number of iterations can vary. Rounds or iterations can be from two (Van De Van & Delbecq, 1974) to three or four (Fink, Kosecoff, Chassin, & Brook, 1984) to many depending on the topic area and the depth of information required. This flexible approach provides the researcher the opportunity to design the rounds based on what is purposeful for the study. For this particular study, two rounds were chosen.

The process for this dissertation research using the Delphi method is depicted below:

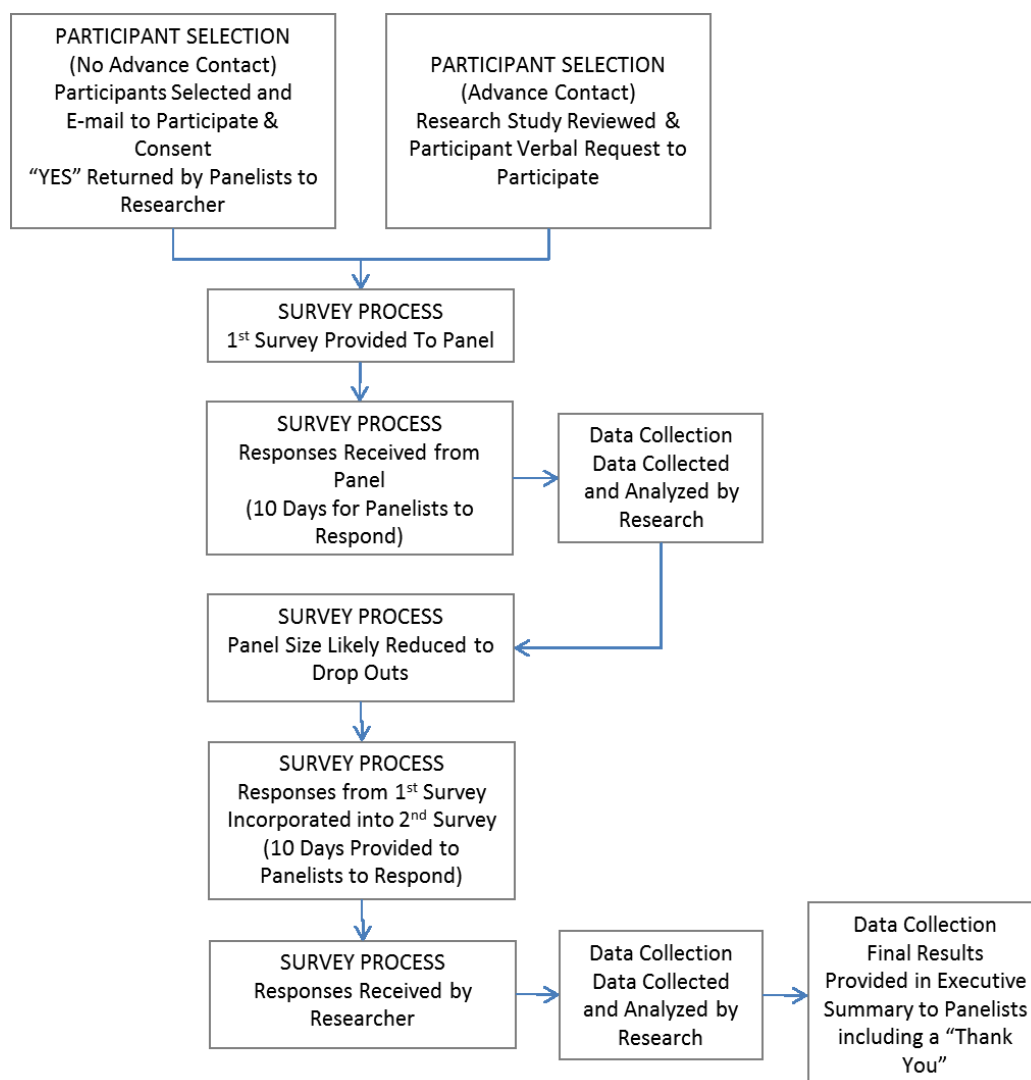


Figure 3.1. Research Process Using Delphi Methodology

The Delphi panel was selected through an initial request to knowledgeable industry contacts fitting the Delphi definition of “expert.” The request to participate in the Delphi survey panel was sent to approximately 233 thought leaders in the industry by e-mail (Group 1) requesting their participation in this research study. An additional 30 participants were made aware of this research through in-person meetings or direct email contact prior to the formal survey request for their participation. The e-mail included a researcher profile. Those contacted

understood the industry, the threats and opportunities to financial services, or the consumers related to the introduction of these new technologies. They would be able to understand the questions without needing review of the specific patents. Industry colleagues are aware of the technology discussed in these patents based on industry press, conversations, conferences, or discussions in their own organizations. The goal was for the survey to ask thought leaders for their responses or insights rather than the institution or firm they may represent. This would provide the opportunity to hear their individual perspective instead of their organization's views. This provided uniqueness to this work in that individuals often may only outwardly express views that their organization supports. This could lead to new opportunities or insights or in other cases, hidden threats that may be important to consider from a research study perspective. The survey provided the opportunity to capture those insights.

Participant age was included in the demographics and was available to be used if the sample was large enough to analyze. It was not a requirement that they have a technical background. Lastly, participants were actively engaged in the industry. They were to be forward-thinking and change agents.

The plan was to provide an opportunity to gain additional participants through the following LinkedIn payments and strategy leadership groups (Group 2) if sufficient participation was not achieved through the initial e-mail request:

- Payments Executive Group (5,083)
- Payments Leadership Network (857 members)
- Payments Strategy (14,146 members)
- Mobile Payments Strategy (12,990 members)
- Payments Experts (16,645 members)

- Innovation in Payments (7,322 members)

If a sufficient number of participants still had not agreed to participate, an invitation would have been sent to the following groups (Group 3):

- Payments & Card Networks (14,724 members)
- The Future of Money | Mobile Money (6,109 members)
- Internet & Mobile Banking Professionals (8,223 members)
- Mobile Banking & Mobile Payments (11,457 members)
- Pymnts: What's Next In Payments (3,661 members)
- BAI (2,499 members)

Although it appeared these groups had many members, many included international representation, which would have excluded their participation in this research. Many people in the industry also belong to multiple groups.

The initial instruments that provided the communications to gain participation prior to the individual beginning the survey are:

- Participation Consent (Group 1), see Appendix B, including the Researcher Profile in Appendix C.
- Invitation for LinkedIn Panel Members is noted in Appendix D.

Profile of the Expert Panel and Panel Size Sought

Based on the literature, the Delphi panel size can be flexible. There are various opinions to the best size, but there is a wide spectrum of opinion with sizes ranging from as few as two to several hundred. There is no agreement on panel size necessary to obtain results. Reid (1988) studied the number of Delphi participants in healthcare studies and found sample sizes from 10 to 1685 participants. Van de Van and Delbecq (1974) outlined the effective group size as from

two to four participants, although larger groups perhaps up to seven could be effective depending on the need for heterogeneous backgrounds. Fink et al. (1984) noted that participant groups may have less than 15, but noted also that costs for a larger panel and the complexity of the problem may help to determine the size. Delbecq et al, suggested that the panel can have from 10 to 30 participants; even as few as seven have been used (Dalkey & Helmer, 1963). The larger the panel size, the more complex it is to analyze the data (Ludwig, 1997). This could result in significant delays in providing the results back to the panel and the potential for losing enthusiasm for the research or the next iteration.

To participate on the panel, the requirements were:

- Respondents live in the United States
- They are from a financial institution, consulting company, vendor, association, or are involved in the industry such that they would have knowledge in the topic area and can provide thought leadership.
- They are likely to be strategic thinkers with innovation foresight through prior interactions, industry involvement, or their position within a company.
- Gender, race, or ethnicity were not a consideration in this survey.

Age was not a consideration in selecting participants though a majority of respondents were baby boomers (1946-1964). Demographic questions captured the participant's years of experience in the financial services industry, whether working for a financial institution, vendor, consulting, or other applicable area, to validate familiarity with the areas of innovation in this study and an understanding of the complexity of the ecosystem. It was important that panelists had familiarity with these topics (Tersine & Riggs, 1976). The initial panel size sought for the first survey was 12 participants and 10 panelists for the second survey. The difference in the

initial and final panel size planned was due to normal attrition for panelists in the second survey round.

The Delphi Process – The Survey

A good survey instrument provides insights through analysis that can be beneficial. Often it leads to other questions. The goal was to have the survey completed in a reasonable amount of time established at about 15 to 30 minutes. The time to complete the survey depended on the length of answer provided to open-ended questions.

The survey was designed to incorporate questions related to the two patents. Questions related to facial recognition were grouped together and presented at the initial part of the survey. Questions related to digital wallets immediately followed. Demographic questions followed the digital wallets section. Question options ranged from providing one answer to a question, to selecting two, in some cases three, and in some cases selecting from available options and “other” (Survey 1). The other provided the opportunity to present additional insights that may not have been presented in the choices. Where questions provided an option to add “other”, the second survey incorporated that information.

Survey respondents were provided an opportunity to choose to not answer select questions. This could be a situation where they believed they did not have the industry knowledge in a particular area. It could also occur if they felt the answer could compromise their job or would mean they would disclose company strategies.

The detailed survey instrument for the first round is in Appendix A and the second round in Appendix B.

Participant Criteria

The purpose of this research was to determine what thought leaders are thinking regarding these technologies and their opinions about when or if this change may take place. These leaders have the ability to think about how the industry and how financial institutions operate today with technology driven products, and how they could be in the future. They understand the complexity of the environments, adoption of technology by consumers, and the challenges to implement innovative products and services, including obtaining funding and building out the capabilities in organizations.

Age was important only to the extent of ensuring that the research focused on those having knowledge of technology and involvement in the industry to understand the complexities. Those thought leaders with experience can see the potential and while in some cases it may take years to develop, they still can envision the capabilities that innovation could bring to the market. They understand the complexity in bringing innovation to existing environments.

Data Collection

Survey information was collected through the online survey tool SurveyMonkey at <http://surveymonkey.com>. The survey tool provided a custom survey design that was developed for collection of the participant responses. SurveyMonkey creates a customized link for the survey within the program. It was included in the e-mail to participants when notifying them that the survey was available for them to complete.

Survey 1 remained open approximately 10 days and Survey 2, although providing for a 10-day response period, was held open for approximately 20 days as participants continued to respond. Prior to the end of the conclusion of each round, e-mail reminders were sent to participants to encourage their response to maintain an acceptable response rate for this study.

Data Preparation and Analysis

The data from the first survey were reviewed within the *analyze* component of the Survey Monkey tool. This provided easy integration of the analysis into the second survey so results could be returned to respondents quickly. The data were represented in chart form to provide a visualization of the participant's responses.

It was important that traction was not lost between Survey 1 and 2 and that participants stayed enthusiastic about continuing the process. A high response rate for the second survey was required to meet the goals of the Delphi process. The fact-based findings were reported in the second survey without researcher commentary. The panelists completed the second survey reassessing answers and then submitting their responses.

After completion of the second survey, the analysis of the data needed to be completed. The research findings were derived as a part of the process as follows:

Quantitative data were exported from SurveyMonkey and imported into Excel. Data were transferred and modified to classify each question in Survey 2 for optimizing analysis. Pivot tables were created to analyze the data for each question and the responses. The pivot tables incorporated counts and then were enhanced to add percentage of totals. The pivot tables were created in a manner to easily view Survey 1 and Survey 2 data side by side for analysis purposes. Data were analyzed for any trends and provided an opportunity to evaluate future work.

Researcher bias was not an issue as the questions were worded carefully. The external reader of the dissertation and the methodologist were able to review questions in advance to ensure researcher bias did not exist. Interpretations of the data are presented in Chapter IV-- Findings. The intent was to discover opportunities for future research based on the study results.

Survey Acknowledgement

A thank you note was included at the end of each survey. The first survey also included a reminder to participants that they would receive the results and the request to participate in the second survey within 10 days.

Chapter IV: Data Analysis and Research Findings

The purpose of this study was to understand the impact of technology patents on future innovations in the financial services industry. It involved gathering insights and gaining general agreement on the challenges and implications for the industry. Many technology organizations continue to apply and have patents granted to protect their innovations. Often it may be unknown when filing for a patent the massive change required to technology systems or whether consumers will embrace and adopt the technology. The costs to bring a new innovation to market with no guarantees of adoption can be significant. This chapter presents the findings of the data collected from the participants as they provided their initial thoughts in Survey 1, then reviewed the responses in aggregate from the entire group, and reviewed and revised their thoughts in Survey 2 to gain general agreement.

This research was based on the Delphi research method supporting two rounds of participant surveys. For both rounds, SurveyMonkey was used to gather input from participants. This research design was a solution for bringing together in some cases competitive industry thought leaders to understand their thoughts on industry implications of recent patents granted. The research incorporated questions based on two technology patents: digital wallets and facial recognition. This method was selected due to the competitive nature of the industry. Often, information such as that contained in this survey is closely guarded until launch. This research method provided participants with anonymity; this was emphasized in communications to participants in inviting them to participate. This was important since these patents often have input in strategic plans that could put some prospective participants in compromising situations, especially if they were near launch for these innovations. Participants were asked for their own opinions in completing the surveys rather than that of their organization. This approach was

used to provide participants the opportunity to communicate freely and openly, and, in some cases, perhaps express opinions or thoughts that might conflict with what their organization believes.

Profile of the Expert Panel Attained

The potential participant population for this study included 263 participants in the industry based on their positions or prior experience to ensure they had knowledge about these technologies. This was important since the Delphi method brings together thought leaders to build general agreement. Of the 263, 30 participants were contacted in advance based on discussions of this work at industry events, or existing relationships, and they indicated their desire to participate. The potential participants not contacted in advance were asked to respond to an e-mail request (Appendix C) that included a researcher profile (Appendix D) and asked the respondents to provide a “yes” reply indicating their desire to participate. After the notification for participation was sent to those not contacted in advance, a delivery failure was received for 15 prospects due to either incorrect e-mail addresses or denial by the company’s server. A similar e-mail was sent to participants who were aware of the research project. The e-mail provided additional information and an e-mail link to the survey (Appendix E). An important part of the communication process was communicating that there would be two surveys and participants needed to complete both for this study. The participant engagement funnel is depicted in Table 4.1 showing the number requested to participate through to completion.

Table 4.1

Participant Engagement Process

Survey participant analysis	Results
# of requests to participate either acknowledging “yes” or personally invited to participate	263
# of requests to participate less delivery failures	238
# of first surveys completed	38
# of second surveys completed	35
% of second surveys completed compared to first round	92.1%

For the first survey, two respondents did not fully complete the survey, and one did not complete the name and other demographic information requested. Subsequent follow-up determined the participant name of the individual who did not leave detailed demographic information. The second survey resulted in two responses in which participants partially completed the survey but did not provide their name. Where surveys were incomplete, responses were maintained for the analysis, but the incomplete surveys affected response counts for individual questions and demographic details. Therefore, variance in counts was observed throughout the analysis.

The results from the e-mail campaign and direct contact were a panel of 38 participants, (14 of whom were from contacts in advance) for the first survey and 35 participants for the second survey. The response rate was 92.1% for completion of the second Delphi research study. In another Delphi research study, a 50% or above response rate was acceptable (Friedrich, 1985).

Survey Timing and Process

The survey timing was developed based on the approval of the Institution Review Board for this work. Then it was important to plan around holidays and Antioch University Ph.D. in-person residencies to ensure the maximum number of people would retain interest and follow

through to completion. The approach was to have respondents complete the first survey within 10 days. They would then be promptly provided the results from the first survey so they would not lose interest. Since a major holiday fell during the project, when many people take vacations, the goal became to analyze and present the information to participants before the holiday. The follow-up e-mail for the second survey included noting that it would take them no more than 10–20 minutes to complete and they could complete it before the holiday and conclude their commitment. The approach involved embedding graphics providing results from the first survey in the second survey so that participants had to go through the second survey question by question to see the results while also reviewing or modifying their answers based on other thought leaders' results. Success was achieved through providing the following: (a) a timeframe of 10 days to respond to the initial survey, (b) the results in a concise format embedded in the second survey, (c) a turnaround of the first survey results to participants of 1 day, and (d) an option to complete the second survey before the holiday.

All of these factors contributed to keeping participants engaged and providing a high number of completions of the second survey. According to Delbecq, Van de Ven, and Gustafson (1975), the Delphi process for some studies can be quite lengthy and potentially take anywhere from 45 days to 6 months. However, to be successful with the Delphi process, Skulmoski, Hartman, and Krahn (2007) believed quick turnaround is important to maintain enthusiasm for participation in this type of research. Survey approaches have changed since the Delbecq publication, and methods now consist of using online tools to create and send surveys, thus obtaining data with a quicker turnaround time.

Research Process

The steps involved in the process for completing this research are outlined in Table 4.2.

Table 4.2

Steps Completed for Research Study

Research steps	Process step	Date completed
Institutional Review Board	Application submitted	February 19, 2013
	Approval received	March 5, 2013
Participants not previously spoken to	Request sent to participants who had no contact to formally respond “yes” to participation in study	March 11, 2013
Survey 1	First e-mail sent with SurveyMonkey link to participants who responded “yes” from March 11 e-mail and to those spoken to in advance	March 15, 2013
	Survey close date: March 25	
	Survey reminder e-mail	March 22, 2013
Survey 2	E-mail sent with results of first survey and new SurveyMonkey link	March 26, 2013
	Survey close date: April 5, 2013	
	Reminder e-mail	April 3, 2013

The Delphi process relies on the iterative approach to reach general agreement. This method also requires quick turnaround of responses to the panel members to keep them engaged throughout the process. This was demonstrated by the time provided to respond to each survey, the quick turnaround of participant responses incorporated in the second survey, and the continued follow-up process to ensure a high response rate and engagement.

Profile of the Expert Panel

A panel of 38 experts participated in the first round of the Delphi study. Table 4.3 presents the age group of the participants in the first and second surveys. Age combined with the position and title held, their years in financial services, and involvement with innovation provided a strong group of industry experts. They had an understanding of the complexities involved in bringing new products to market in financial services.

Table 4.3

Participant Age

Survey 1	Count	%	Survey 2	Count	%
35–44	10	26%	35–44	8	23%
45–54	15	39%	45–54	15	43%
55–64	9	24%	55–64	7	20%
65–74	2	5%	65–74	2	6%
Choose not to answer	1	3%	Choose not to answer	1	3%
Unknown	1	3%	Unknown	2	6%
Total	38	100%	Total	35	100%

Since the majority of participants centered in the 45–54 age group, age analysis for different questions was not completed.

Each participant was asked to provide his or her title, shown in Table 4.4.

Table 4.4

Participant Title

Survey 1	Count	%	Survey 2	Count	%
Chief Executive Officer	1	3%	Chief Executive Officer	1	3%
Consultant	4	11%	Consultant	4	12%
Director	7	18%	Director	5	15%
Executive Vice President	1	3%	Executive Vice President	0	0%
Manager	1	3%	Manager	1	3%
Managing Director	3	8%	Managing Director	3	9%
Other	6	16%	Other	6	18%
Partner	1	3%	Partner	1	3%

Survey 1	Count	%	Survey 2	Count	%
President	2	5%	President	2	6%
Senior Vice President	5	13%	Senior Vice President	4	11%
Vice President	6	16%	Vice President	6	17%
Unknown	1	3%	Unknown	2	6%
Total	38	100%	Total	35	100%

The titles associated with the positions held demonstrated that the participants held leadership roles within their companies.

Demographic question: “How many years have you worked in financial services?”

The number of years in financial services is provided in Table 4.5. This experience was important to show the overall depth of knowledge that each participant brought to this research.

Table 4.5

Number of Years in Financial Services

Survey 1	Count	%	Survey 2	Count	%
> 1 year ≤ 3 years	1	3%	> 1 year ≤ 3 years	1	3%
> 3 years ≤ 5 years	1	3%	> 3 years ≤ 5 years	0	0%
> 5 years ≤ 10 years	4	11%	> 5 years ≤ 10 years	4	12%
10+ years	31	82%	10+ years	28	80%
Unknown	1	3%	Unknown	2	6%
Total	38	100%	Total	35	100%

This question portrayed the panelists as experienced in financial services, which is important in understanding the dynamics and complexities involved in change in the financial services environment.

Demographic question: “How many years have you worked in financial services

innovation?” The distinguished panelists brought with them many years of experience in financial services innovation as presented in Table 4.6. Because of the participants’ years of

experience, they would understand the complexity involved in developing, integrating, and launching new products to consumers.

Table 4.6

Years in Financial Services Innovation

Survey 1	Count	%	Survey 2	Count	%
> 1 year ≤ 3 years	2	5%	> 1 year ≤ 3 years	2	6%
> 3 years ≤ 5 years	3	8%	> 3 years ≤ 5 years	2	6%
> 5 years ≤ 10 years	14	37%	> 5 years ≤ 10 years	13	37%
10+ years	18	47%	10+ years	16	46%
Unknown	1	3%	Unknown	2	6%
Total	38	100%	Total	35	100%

Many types of firms are involved in bringing innovations such as facial recognition and digital wallets to the marketplace. The broad range of participants is shown in Table 4.7.

Table 4.7

Classification of Firm Type

Survey 1	Count	%	Survey 2	Count	%
Association	2	5%	Association	2	6%
Consultant	9	24%	Consultant	9	28%
Financial Institution	8	21%	Financial Institution	8	23%
Other (Please specify below)	1	3%	Other	0	0%
Payment/Network Services	10	26%	Payment/Network Services	8	23%
Research Firm	3	8%	Research Firm	2	6%
Unknown	1	3%	Unknown	2	6%
Vendor--Software or technology solutions (primary business)	4	11%	Vendor--Software or technology solutions (primary business)	3	9%
Total	38	100%	Total	35	100%

One of the challenges with the Delphi method is keeping the participants engaged through the multiple rounds, especially at a senior leadership level. It is expected that some respondents will choose to drop out. The success rate for this survey was achieved through

carefully planning survey dates and increasing responses through follow-up e-mails and individual contact to encourage completion for this research.

Consultants made up the largest group in the second survey. Consultants are a way to augment staff and may have significant experience in the industry. In some cases, they may have worked for a financial services firm in the past and have their own consulting business today.

Findings (Round 1 and Round 2)

The purpose of the first survey was to gather insights into the thoughts of panel members related to the questions posed and to attempt to gain general agreement in the responses. General agreement is defined as the majority selecting the same answer. The responses from the first survey provided the foundation for the second survey. The following compares the answers from the first survey with those from the second.

Question 1. The first question asked, “As Google and Apple provide capabilities to unlock phones with facial recognition, when do you think mobile banking consumers might be open to use this technology to authenticate themselves for mobile banking rather than using an online ID and passcode?” The analysis shown in Table 4.8 maintained a general agreement that consumers will be ready for facial recognition for authentication within the next 1 to 5 years.

Table 4.8

Facial Recognition Technology for Online and Mobile Banking

Survey 1	Count	%	Survey 2	Count	%
> 1 year ≤ 3 years	15	39%	> 1 year ≤ 3 years	9	26%
> 3 years ≤ 5 years	13	34%	> 3 years ≤ 5 years	21	60%
Longer than 5 years	5	13%	Longer than 5 years	3	9%
Not at any time	2	5%	Not at any time	1	3%
Yes, they are ready now.	3	8%	Yes, they are ready now.	1	3%
Total	38	100%	Total	35	100%

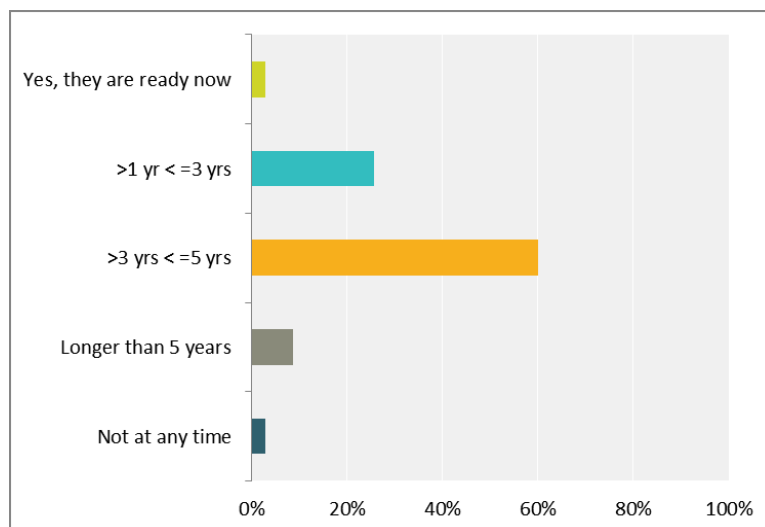


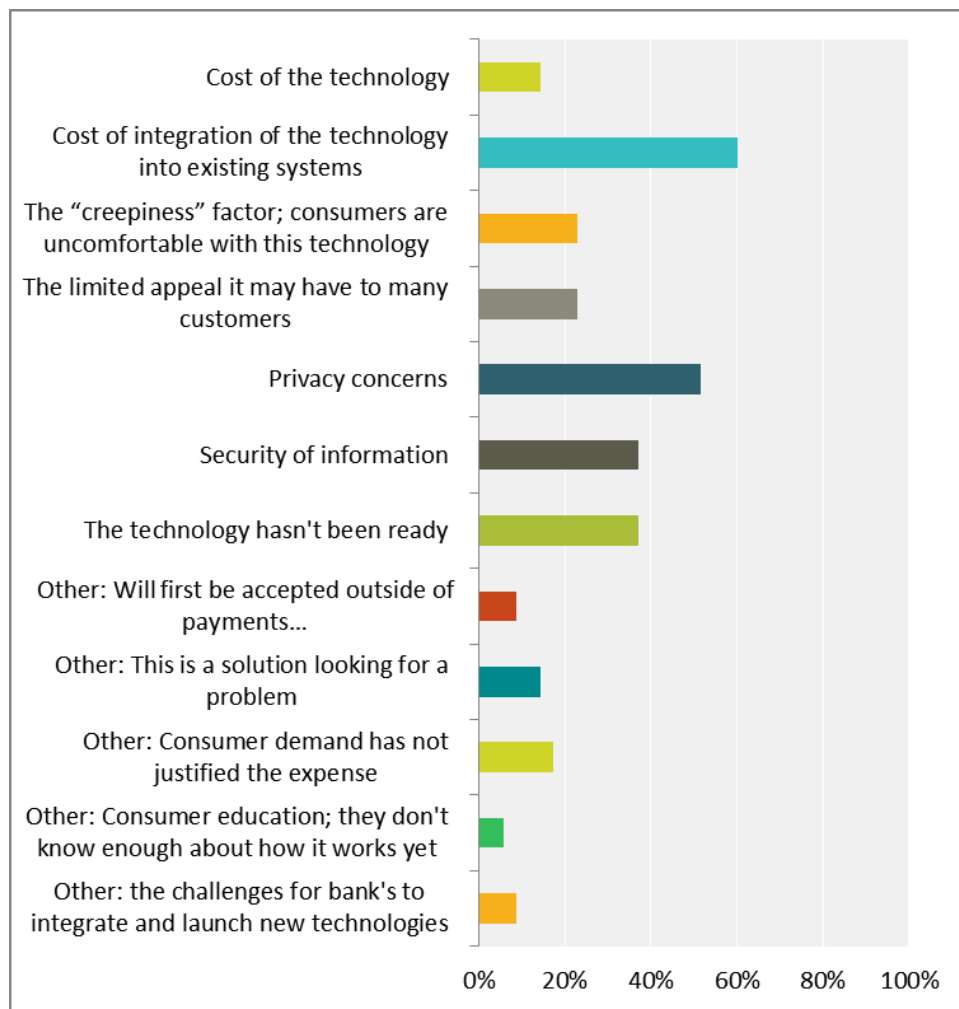
Figure 4.1. Survey 2: Facial Recognition Consumer Readiness.

Question 2. The second question asked, “What do you think has prevented facial recognition technology from being introduced as an authentication method for online or mobile banking?” The respondents were directed to select the top three. The following answers were available to participants: (a) cost of the technology, (b) cost of integration of the technology into existing systems, (c) the “creepiness” factor; consumers are uncomfortable with this technology, (d) the limited appeal it may have to many consumers, (e) privacy concerns, (f) security of information, (g) the technology hasn’t been ready, and (h) other. The first survey evoked the following top three reasons, depicted in Table 4.9, indicating reasons that facial recognition technology for authentication has not been introduced to date: (a) cost of integration, (b) privacy concerns, and (c) the technology has not been ready.

Table 4.9

Reasons Preventing Use of Facial Recognition Technology for Authentication Method

	Cost of technology	Cost of integration	Creepiness factor	Limited appeal	Privacy concerns	Security of info	Technology not ready	Other
Survey 1	10	23	11	13	18	14	15	10
Survey 2	5	21	8	8	18	13	13	3

*Figure 4.2. Survey 2: Facial Recognition Challenges as an Authentication Method.*

The "other" attributes added by participants were either added or clarified in the subsequent survey. They included the following: "Limitations and distributions of smartphones," "Proven accuracy of facial recognition and relative cost of alternate authentication

systems,” “Accuracy,” “Payments is not the space consumers want to start out with new technology. It will need to catch on elsewhere first,” “This is a solution looking for a problem right now,” “Consumer demand has not justified the expense,” “Not creepiness as much as awareness, customers simply don't know enough about how it works,” “U.S. banks have challenges when it comes to implementing new technology of any kind,” “Customer adoption/comfort with the capability/awareness,” and “It’s not widely known it is available and compatible with payments.”

The results of the second survey, also shown in Table 4.9, maintained the same top three concerns for this technology, which were: (a) cost of integration, (b) privacy concerns, and (c) the technology has not been ready.

The “other” category still evoked responses that this solution was looking for a problem. Another important aspect indicated in the “other” category was the adoption of this technology in banking will be secondary to it being the first accepted outside payments or financial services and then consumers will be ready to adopt it.

Question 3. The third question asked, “Will authentication for online and mobile financial services become a commodity service such that facial recognition used by other companies such as Apple or Google could be integrated into banking applications to eliminate multiple login IDs and passcodes?” This question provided an interesting dilemma for participants since the panel was evenly divided in the first round. The second round provided a clear majority of opinion as panel members moved to “yes.” As companies such as Apple or Google move to support the technology on mobile devices, it could be integrated in banking applications to eliminate multiple IDs and passcodes. In this case, there was no general agreement to measure against. Survey 1 and Survey 2 results are shown in Table 4.10.

Table 4.10

Authentication: Will Authentication Become a Commodity Service

Survey 1	Count	%	Survey 2	Count	%
No	19	50%	No	11	31%
Yes	19	50%	Yes	24	69%
Total	38	100%	Total	35	100%

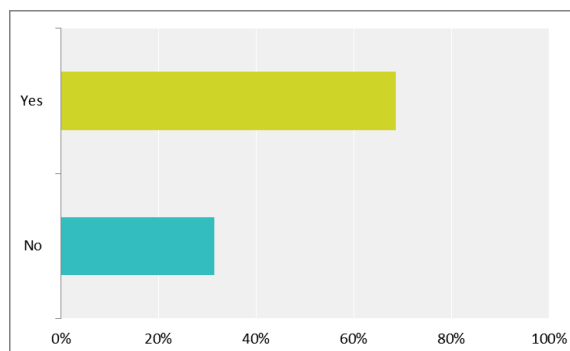


Figure 4.3. Survey 2: Authentication: Will it become a commodity service?

Question 4. The fourth question asked, “From a consumer perspective, what do you think the industry will need to work through for facial recognition for authentication for online and mobile to be successful?” Table 4.11 depicts the results from Survey 1.

Table 4.11

Survey 1: Industry Focus for Facial Recognition for Authentication

Consumers need time to become comfortable	Consumers need comfort level data are protected	Safety and security issues	Data storage required to maintain	On par with passwords	Cost: Lower than current costs	Regulations	Technology not likely to be adopted	Other
33	21	20	4	6	13	9	3	5

In Survey 2, the selections with the lowest responses were those noted in Table 4.12.

Table 4.12

Survey 2: Industry Efforts of Lesser Concern for Facial Recognition

Data storage required to maintain	On par with passwords	Regulations	Technology not likely to be adopted	Industry embraces one technology to prevent fraud	Reliability of this technology	Isn't an industry need yet
2	4	4	2	1	5	2

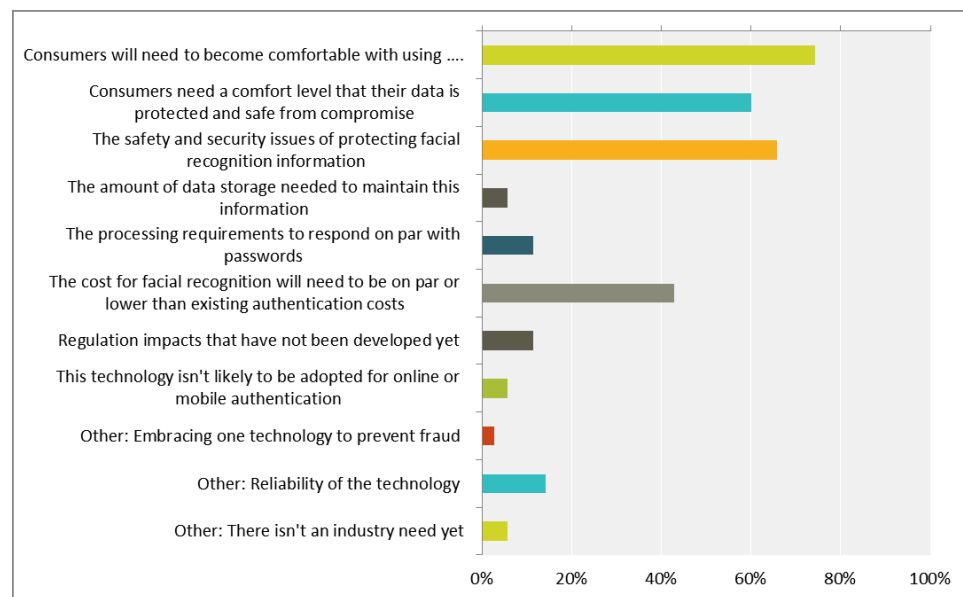
*Figure 4.4. Survey 2: Facial Recognition Adoption Concerns.*

Table 4.13 shows the selected responses that were areas to resolve to successfully launch facial recognition technology in financial services to consumers. Participants rated these high in Survey 1 and Survey 2.

Table 4.13

Survey 2: Areas to Focus on for Facial Recognition for Authentication

Consumers need time to become comfortable	Consumers need comfort level data are protected	Safety and security issues	Cost: Lower than current costs
26	21	23	15

The Survey 2 choices were expanded to include three additions from Survey 1 responses: (a) embracing one technology to prevent fraud, (b) reliability of the technology and (c) there isn't an industry need yet.

Despite these additional considerations, the top three considerations maintained general agreement among the participants with the following response maintaining first place in both surveys: *Consumers will need to become more comfortable using facial recognition for it to be considered for additional use.*

The second position and third-place responses were exchanged positions in Survey 1 and Survey 2: (a) *Consumers need a comfort level that their data are protected and safe from compromise* was in second place in the first survey and moved to third in the second survey. (b) *The safety and security issues of protecting facial recognition information* was in third place in the first survey and moved to second place in the second survey.

Question 5. The fifth question asked, "What would be your biggest concern with facial recognition technology used for gaining access to online or mobile banking instead of using a login ID and passcode?" This question was open ended for the first survey, allowing participants to add thoughts. These thoughts were compiled in Table 4.14, and were presented in the second survey.

Table 4.14

Most Significant Concerns with Facial Recognition Technology

Facial recognition technology concerns	Survey 1 ranking
Security of the solution; cloning information; making false ID	High
Accuracy, consistency, and reliability of the solution	High
Privacy related to this information	Medium
Consumer education and adoption	Medium
Cost with little to no benefit over existing solutions	Medium
Integration with existing technology	Low
A complex enrollment process	Low
Battery drain on a mobile device	Low
Concern if used as a replacement for existing fraud prevention techniques	Low
Ensuring there was a secondary method if facial recognition failed	Low
Multiuser access of shared accounts	Low

The following choices were available: (a) security of the solution, (b) accuracy, consistency, and reliability of the solution, (c) privacy related to this information, (d) consumer education and adoption, (e) cost associated with the solution with little to no benefit over existing solutions, (f) integration with existing technology, (g) a complex enrollment process, (h) battery drain on the mobile device, (i) concern if it would be used as a replacement for existing fraud prevention techniques, (j) ensuring there was a secondary method if facial recognition failed, and (k) multi-user access of shared accounts.

The second survey provided an opportunity to classify some of the additional comments into categories presented in the first survey. The results remained the same as shown in Table 4.15.

Table 4.15

Facial Recognition Technology Concerns

Facial recognition technology concerns	Survey 1 ranking	Survey 2 ranking
Security of the solution; cloning information; making false ID	High	High

Facial recognition technology concerns	Survey 1 ranking	Survey 2 ranking
Accuracy, consistency, and reliability of the solution	High	High
Privacy related to this information	Medium	Medium
Consumer education and adoption	Medium	Medium
Cost with little to no benefit over existing solutions	Medium	Medium
Integration with existing technology	Low	Low
A complex enrollment process	Low	Low
Battery drain on a mobile device	Low	Low
Concern if used as a replacement for existing fraud prevention techniques	Low	Low
Ensuring there was a secondary method if facial recognition failed	Low	Not selected
Multiuser access of shared accounts	Low	Not selected

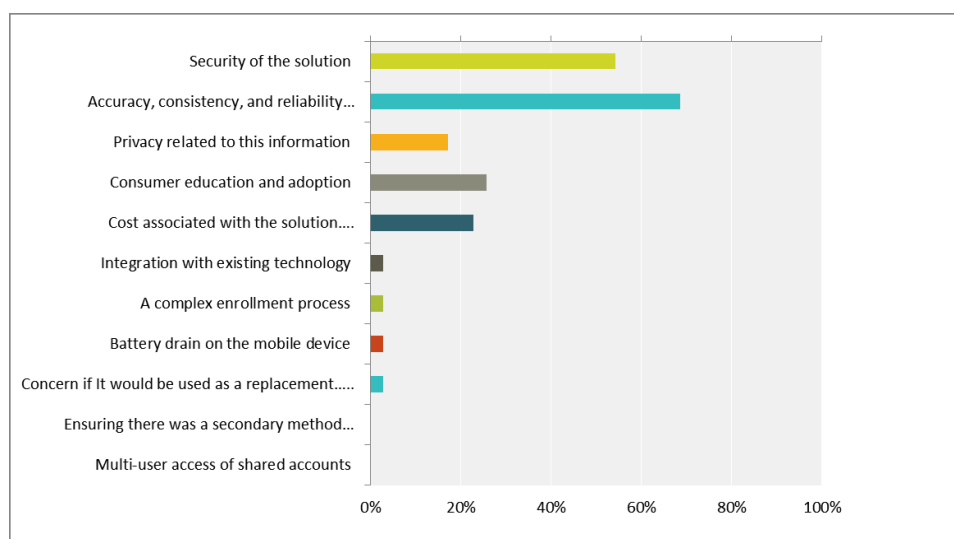


Figure 4.5. Survey 2: Facial Recognition Technology Concerns.

Accuracy, consistency, and reliability of the solution rated the highest, and the second most important was the security of the solution. General agreement was maintained in understanding the biggest impacts for this technology to be adopted.

Question 6. The sixth question asked, “How long do you believe it will be before facial recognition technology is used to log in to financial institution online banking or mobile accounts?” The interesting finding, shown in Table 4.16, was a slight movement with responses

to use this technology to log in to online banking and mobile accounts. Several who had thought the technology would affect the market in the next 1–3 years reconsidered the timeframe when they saw the responses. These participants decided that it would take longer and likely be within the next 3 to 5 years.

Table 4.16

Market Timing for Facial Recognition

Survey 1	Count	%	Survey 2	Count	%
> 3 ≤ 5 years	15	39%	> 3 ≤ 5 years	18	51%
> 5 years ≤ 7 years	6	16%	> 5 years ≤ 7 years	9	26%
> 7 years ≤ 10 years	4	11%			
10+ years	1	3%			
1–3 years	11	29%	1–3 years	7	20%
Never	1	3%	Never	1	3%
Total	38	100%	Total	35	100%

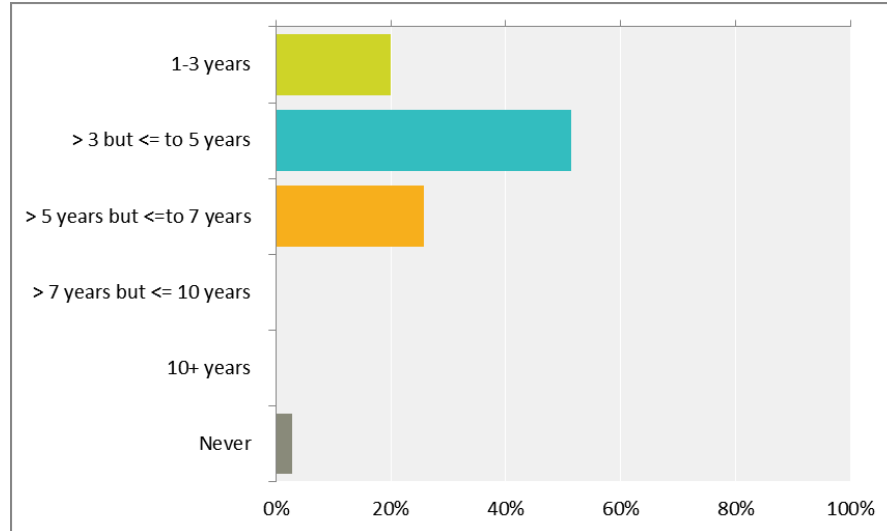


Figure 4.6. Survey 2: Market Timing for Facial Recognition.

Question 7. The seventh question asked, “Although Google has a patent for a digital wallet, many other companies are obtaining similar patents. If you were a financial institution, what would be the top digital wallets you would pursue?” The results, presented in Table 4.17,

show the general agreement in Survey 1 and Survey 2 for bank-branded and payments-branded wallets to pursue. Based on information added to the options, a carrier-agnostic solution and Apple Passbook were added to the second survey options, but no panelists selected these in the survey.

Table 4.17

Digital Wallet Solutions

	Bank branded	Carrier (Isis)	Payment Brands (AMEX, Discover, MasterCard, Visa)	Google	PayPal	Merchant branded	Cobranded wallet	White label	No solution
Survey 1	29	3	22	5	7	4			
Survey 2	27	2	21	5	7	3	3	1	1

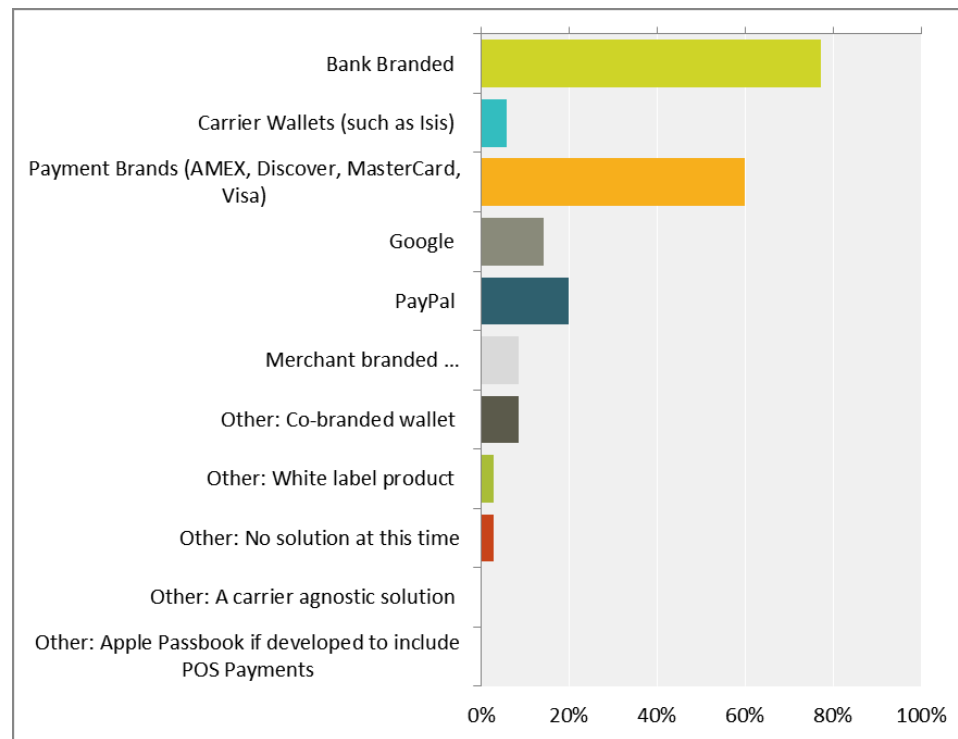


Figure 4.7. Survey 2: Digital Wallet Solutions.

Question 8. The eighth question asked, “Do you think it is likely that consumers will choose only one branded digital wallet to use?” There was general agreement in both survey rounds, depicted in Table 4.18: The panel members identified that it is likely consumers would use more than one digital wallet. This provides an opportunity for organizations to continue to compete with add-on services, develop user-friendly interface experiences, and focus their offering on the safety and security of the account information.

Table 4.18

Will Consumers Use One Digital Wallet

Survey 1	Count	%	Survey 2	Count	%
No	26	68%	No	27	77%
Yes	12	32%	Yes	8	23%
Total	38	100%	Total	35	100%

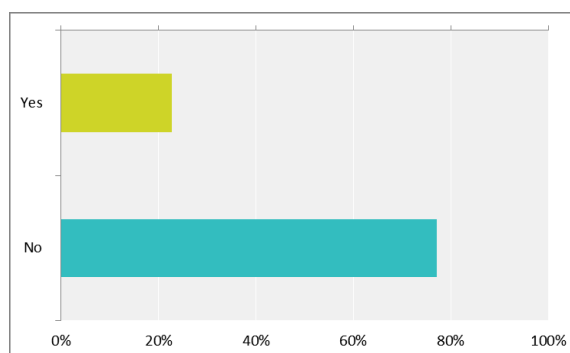


Figure 4.8. Survey 2: Will Consumers Use One Digital Wallet?

Question 9. The ninth question asked, “The ecosystem is complex to build out the capabilities to offer a digital NFC wallet. How long do you think before NFC mobile wallets will be broadly available to consumers in the United States?”

The panelists believed that this technology is still 3–5 years away (45% in the first survey and 46% in the second survey), as shown in Table 4.19. There was a noticeable increase in the number of respondents who indicated that this technology would never be broadly available to

consumers in the United States. This rate more than doubled from 11% to 23%. Another interesting point was that no one in the second survey thought the technology was more than 7 years and less than 10 years away.

Table 4.19

Years Until NFC Digital Wallets Broadly Available in the United States

Survey 1	Count	%	Survey 2	Count	%
> 3 years ≤ 5 years	17	45%	> 3 years ≤ 5 years	16	46%
> 5 years ≤ 7 years	6	16%	> 5 years ≤ 7 years	4	11%
> 7 years ≤ 10 years	1	3%	> 7 years ≤ 10 years	0	0%
1–3 years	10	26%	1–3 years	7	20%
Never	4	11%	Never	8	23%
Total	38	100%	Total	35	100%

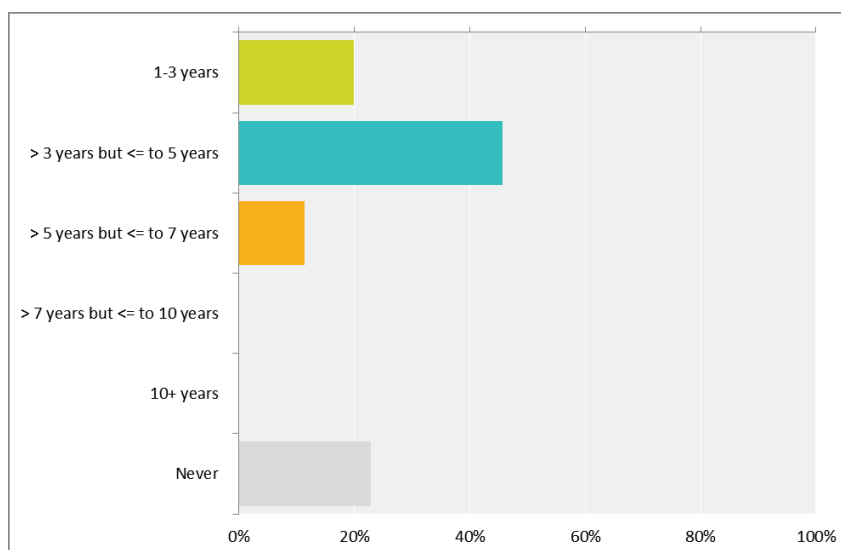


Figure 4.9. Survey 2: Years Until NFC Mobile Wallets are Broadly Available in the United States.

Question 10. The 10th question asked, “Is the NFC digital wallet technology the best technology to introduce to improve upon the experience at merchant’s point-of-sale at the checkout lane or for payment transactions?” In Question 10, an adjustment was made to the

second survey requiring all participants to answer, because few chose not to answer in Survey 1. The percentage of respondents who believed that NFC technology is not the best to introduce at this time did not change, as shown in Table 4.20, and overwhelmingly represented the agreement of the panelists that this technology was not the best. This observation is important as many are waiting for Apple to launch this technology on the iPhone. It will be interesting to determine if or when opinions begin to change. Performance of the technology, integration, availability of merchant locations, availability of handsets, and simplification of the complex ecosystem could affect these findings. With technology innovation, one main disruptor could affect the thoughts and findings.

Table 4.20

NFC Technology: Is It the Best to Introduce at the Point-of-Sale

Survey 1	Count	%	Survey 2	Count	%
Choose not to answer	2	5%			
No	26	68%	No	23	70%
Yes	10	26%	Yes	10	30%
Total	38	100%	Total	33	100%

There was consensus in Survey 1 and Survey 2 that NFC is not the best technology to introduce at the point-of-sale for payment.

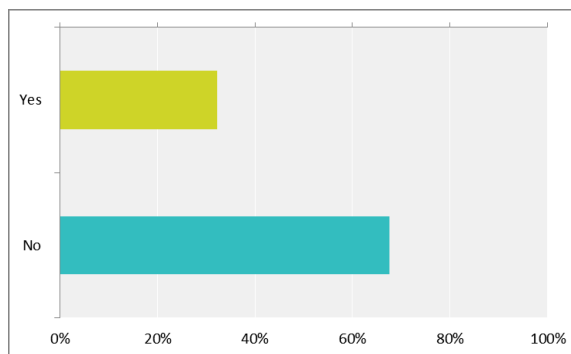


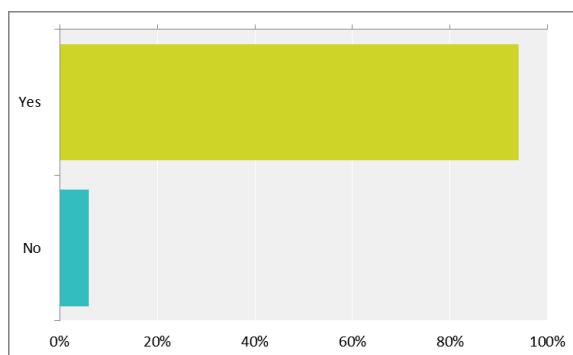
Figure 4.10. Survey 2: NFC Technology at the Point-of-Sale.

Question 11. The 11th question asked, “Should financial institutions provide the customer a choice regarding if they want to share their information or data with other companies when they participate in another company's digital wallet and then have other services available to them through that company?” The panel members’ responses to this question were consistent. A high percentage believed that customers should decide if they want to share their information with third parties, rather than ceding the decision to the financial institution. This is depicted in Table 4.21. As more digital wallet services become available, there is more opportunity to communicate with consumers and provide offers to them through the digital wallet interface. If the financial institution controls the experience, the institution may want to control what is provided to consumers, keeping their brand highly visible.

Table 4.21

Customer Choice for Sharing Data With Third Parties

Survey 1	Count	%	Survey 2	Count	%
No	3	9%	No	2	6%
Yes	32	91%	Yes	32	94%
Total	35	100%	Total	34	100%

*Figure 4.11.* Survey 2: Customer Choice for Sharing Data with Third Parties.

Question 12. The 12th question asked, “Should a financial institution make available to its customers multiple wallets to provide consumers the choice of what they prefer to use?”

Making multiple wallets available requires substantial technology integration and testing.

However, the panelists thought making multiple wallets available to customers was an important service to provide, shown in Table 4.22. Consensus was maintained in this perspective for both survey rounds.

Table 4.22

Multiple Wallets Versus Single Supported by Financial Institutions

Survey 1	Count	%	Survey 2	Count	%
No	10	29%	No	7	21%
Yes	25	71%	Yes	27	79%
Total	35	100%	Total	34	100%

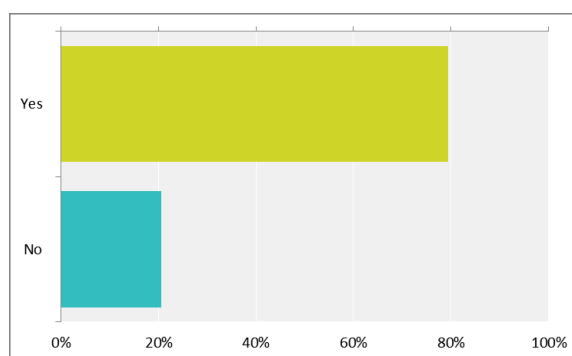


Figure 4.12. Survey 2: Multiple Wallets or Single Wallet.

Question 13. The 13th question asked, “What do you think are the most important hurdles to overcome with an NFC-enabled wallet, assuming the technology works and it meets performance on par with the magnetic stripe card?” This question had multiple response choices: (a) innovation dollars to test and bring to market a solution, (b) resolving the complex ecosystem, (c) smartphone availability and NFC capabilities, (d) point-of-sale terminals deployed in markets, (e) partnerships joining together to build a solution on the scale needed to deliver, (f) ensuring all parties share the costs based on the amount of benefit they receive, (g) industry partnerships (merchants/financial institutions/carriers), (h) broad merchant availability

throughout the United States, (i) consumer education and letting go of the plastic card, (j) marketing campaign funding to launch successfully, (k) legislation impacts, (l) Apple's integration of NFC in phones, and (m) other. From this list, those selected the least are reviewed in Table 4.23.

Table 4.23

The Least Important Hurdles to Overcome With NFC-Enabled Wallets

	Innovation dollars	Shared costs	Marketing campaigns	Consumer education	Legislative impacts	Apple's integration of NFC
Survey 1	2	5	1	6	1	5
Survey 2	1	2	0	4	0	4

The attributes that were the most important to overcome are in Table 4.24.

Table 4.24

The Most Important Hurdles to Overcome With NFC-Enabled Wallets

	Resolving complex ecosystem	Smartphone availability	POS terminals deployed	Partnerships	Industry partnerships	Broad merchant availability	Adding more value
Survey 1	22	12	18	6	10	13	
Survey 2	26	6	23	8	8	15	3

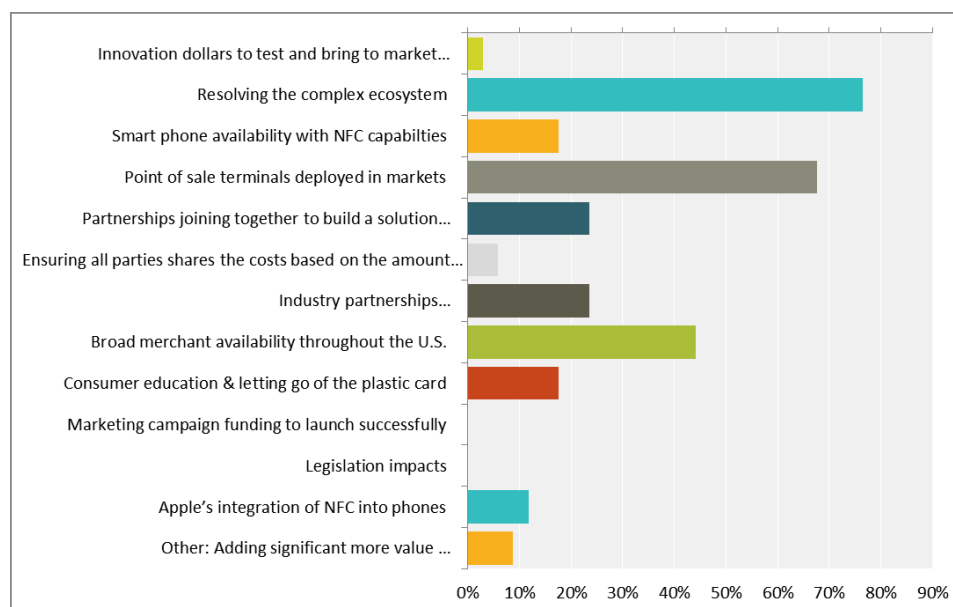


Figure 4.13. Survey 2: Important Hurdles to Overcome with NFC-Enabled Wallets.

The panelists' responses point to two major obstacles that must be overcome for this technology to be adopted and meet performance on par with the magnetic stripe card: resolving the complex ecosystem to develop and launch this type of product; and having enough point-of-sale terminals deployed by merchants to make an impact. Also resonating with the panel were broad merchant availability, partnerships, and smartphone availability.

Question 14. The 14th question asked, “Are there any other disruptor technologies for mobile digital wallets that could affect marketplace dynamics?”

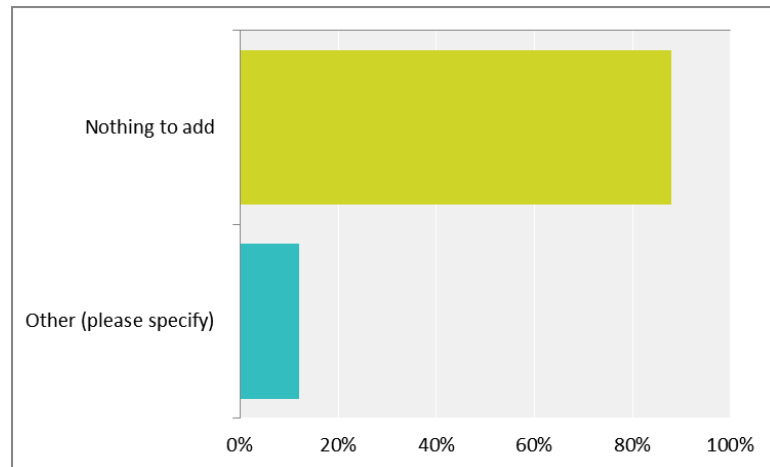


Figure 4.14. Survey 2: Additional Disruptors to Consider.

The panelists responded to the open-ended question in Survey 1. In Survey 2, they were presented with the results so they could determine if any other disruptors were apparent to add. In Survey 2, the following were identified as the potential disruptors to monitor: (a) cloud-based solution, (b) spatial location, (c) PayPal’s point-of-sale solution, and (d) geolocation based on advanced Bluetooth technology.

Question 15. The 15th question asked, “What do you believe are the two most important features for a digital wallet?” The panelists selected customer retention in Survey 1 and Survey 2 as the most important feature or reason for supporting a digital wallet. This answer demonstrates the importance of innovation for maintaining customer relationships as viewed in Table 4.25. The costs of innovation or the business case for change can be highlighted as a retention strategy.

Table 4.25

The Two Most Important Features of a Digital Wallet

	Payment device at point-of-sale	Customize offers to consumers	Electronic receipts	Eliminate mag stripe cards	Customer retention	Other
Survey 1	16	16	3	6	24	5

	Payment device at point-of-sale	Customize offers to consumers	Electronic receipts	Eliminate mag stripe cards	Customer retention	Other
Survey 2	14	15	5	1	25	0

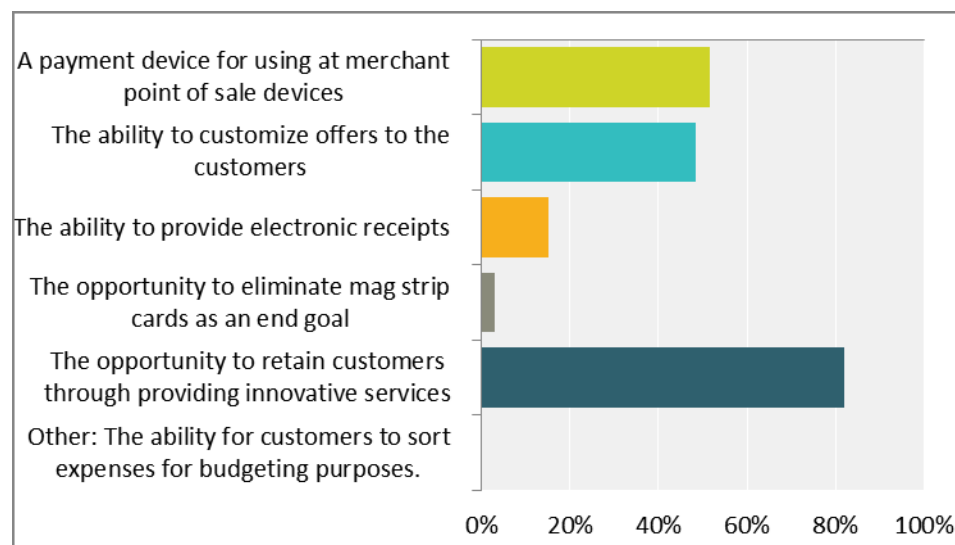


Figure 4.15. Survey 2: Important Features of a Digital Wallet.

Question 16. The 16th question asked, “Which technologies would you choose to pilot and launch to consumers at the point-of-sale over the next few years if you had an unconstrained budget and if it were your decision (assuming the technology works)?” In Survey 1, depicted in Table 4.26, the majority discussed piloting NFC wallets in 2013 and launching in 2014. In the second survey, depicted in Table 4.27, piloting NFC wallets in 2013 was still thought to be important with 2014 also an important year to pilot. However, customer launch perspectives changed from Survey 1. The thought process now evenly showed that launching NFC wallets in 2014 and 2015 was the strategic direction to consider for planning purposes.

Near Field Communication Pilot and Launch

Table 4.26

Survey 1: NFC Pilot and Launch Timeframes

Survey 1	NFC pilot	% NFC pilot	Survey 1	NFC customer launch	% NFC customer launch
2013	20	54%	2013	4	11%
2014	8	22%	2014	12	32%
2015	3	8%	2015	7	19%
Beyond 2015	2	5%	Beyond 2015	3	8%
Undecided	1	3%	Undecided	7	19%
Total	37	100%	Total	37	100%

Table 4.27

Survey 2: NFC Pilot and Launch Timeframes

Survey 2	Pilot NFC	% NFC pilot	Survey 2	NFC customer launch	% NFC customer launch
2013	14	42%	2013	1	3%
2014	11	33%	2014	10	30%
2015	4	12%	2015	10	30%
Beyond 2015	0	0%	Beyond 2015	6	18%
Never	2	6%	Never	2	6%
Undecided	2	6%	Undecided	4	12%
Total	33	100%	Total	33	100%

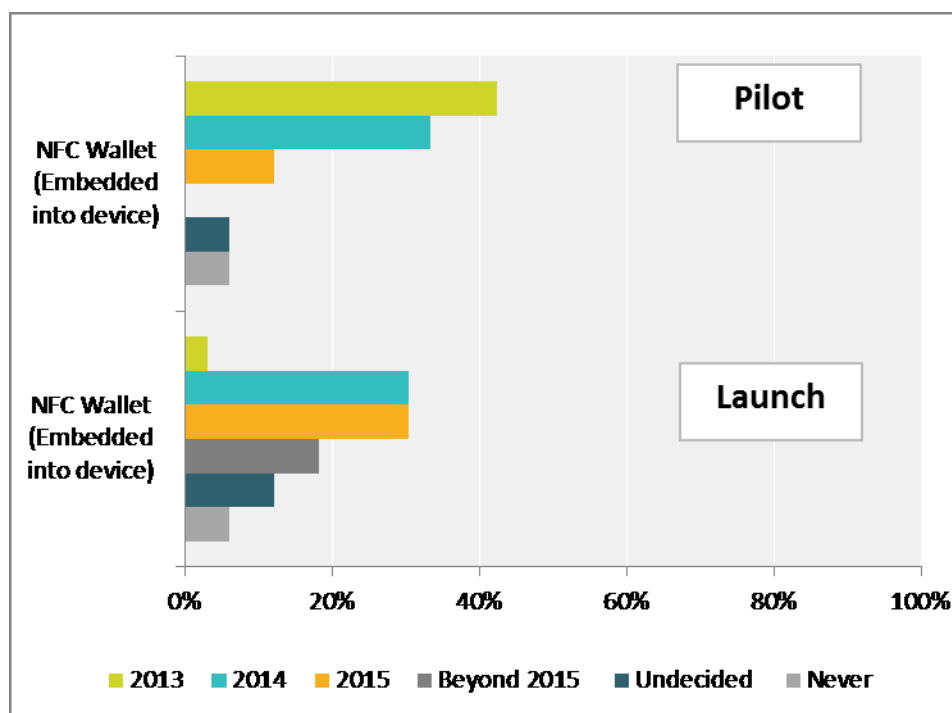


Figure 4.16. Survey 2: NFC Pilot and Launch Timeframes.

Stickers Pilot and Launch

The results depicting stickers as a technology pilot and launch are shown in Table 4.28 and Table 4.29. Opinion was overwhelming that this is not the technology to move forward with to pilot or implement at any time as indicated in both survey rounds.

Table 4.28

Survey 1: Stickers Pilot and Launch

Survey 1	Stickers pilot	% Stickers	Survey 1	Stickers launch	% stickers launch
2013	10	27%	2013	4	11%
2014	1	3%	2014	6	16%
2015	1	3%	2015	2	5%
Never	21	57%	Never	20	54%
Undecided	4	11%	Undecided	5	14%
Total	37	100%	Total	37	100%

Table 4.29

Survey 2: Stickers Pilot and Launch Timeframes

Survey 2	Stickers pilot	% stickers pilot	Survey 2	Stickers launch	% stickers launch
2013	5	15%	2013	2	6%
2014	2	6%	2014	4	12%
2015	1	3%	2015	1	3%
			Beyond 2015	1	3%
Never	23	70%	Never	24	73%
Undecided	2	6%	Undecided	1	3%
Total	33	100%	Total	33	100%

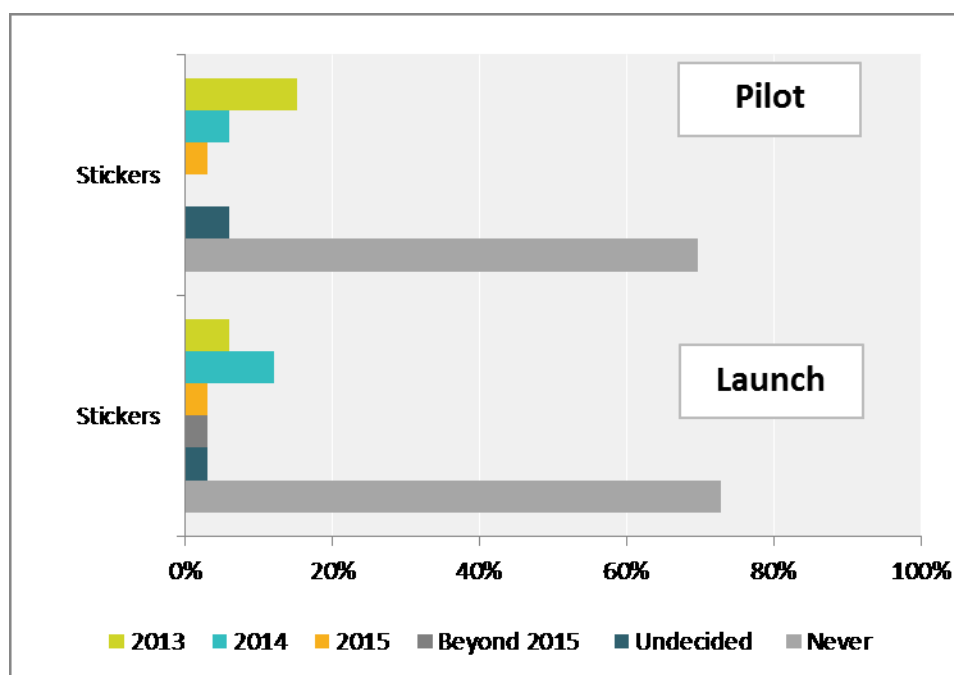


Figure 4.17. Survey 2: Stickers Pilot and Launch Timeframes.

Micro SD (Secure Digital)

Micro SD was viewed as a possible solution in the early days of evaluating pilot mobile payment solutions and has seen success in other countries. As time has passed and new technologies have emerged, panelists now think this solution should not be pursued, as depicted

in Table 4.30 and Table 4.31. The second survey saw an increase in opinions in never pursuing this as a solution to pilot or launch.

Table 4.30

Survey 1: Micro SD Pilot and Launch

Survey 1	Micro SD pilot	% Micro SD	Survey 1	Micro SD launch	% Micro SD
2013	9	24%	2013	1	3%
2014	5	14%	2014	6	16%
2015	0	0	2015	3	8%
Never	14	38%	Never	15	41%
Undecided	9	24%	Undecided	12	32%
Total	37	100%	Total	37	100%

Table 4.31

Survey 2: Micro SD Pilot and Launch

Survey 2	Micro SD pilot	% Micro SD	Survey 2	Micro SD launch	% Micro SD launch
2013	6	18%	2013	0	0%
2014	3	9%	2014	3	9%
2015	1	3%	2015	3	9%
Never	17	52%	Never	21	64%
Undecided	6	18%	Undecided	6	18%
Total	33	100%	Total	33	100%

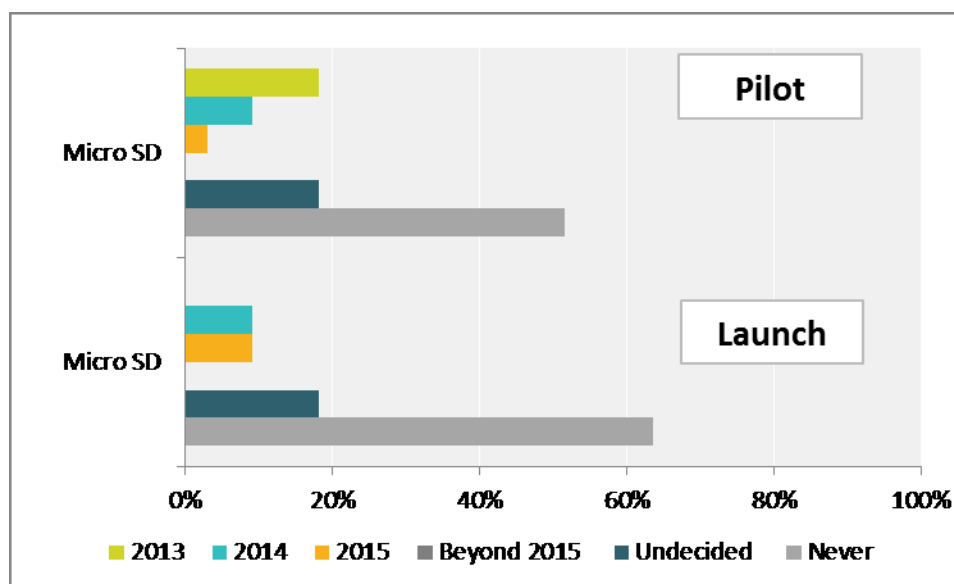


Figure 4.18. Survey 2: Micro SD Pilot and Launch.

Barcodes

Overwhelmingly and consistently, the panelists viewed barcodes as a technology to pursue and launch as represented in the data shown in Table 4.32 and Table 4.33. The number of participants who were undecided increased between the first and second survey, likely indicating that more time would be needed to assess pilots and determine whether this technology may be viable.

Table 4.32

Survey 1: Barcodes Pilot and Launch

Survey 1	Barcode Pilot	% of barcodes	Survey 1	Barcode launch	% Barcode launch
2013	23	62%	2013	23	62%
2014	5	14%	2014	5	14%
2015	2	5%	2015	2	5%
Never	5	14%	Never	5	14%
Undecided	2	5%	Undecided	2	5%
Total	37	100%	Total	37	100%

Table 4.33

Survey 2: Barcodes Pilot and Launch

Survey 2	Barcode pilot	% Barcode pilot	Survey 2	Barcode launch	% Barcode launch
2013	20	61%	2014	17	52%
2014	8	24%	2015	8	24%
2015	1	3%	Beyond 2015	1	3%
Undecided	4	12%	Undecided	7	21%
Total	33	100%	Total	33	100%

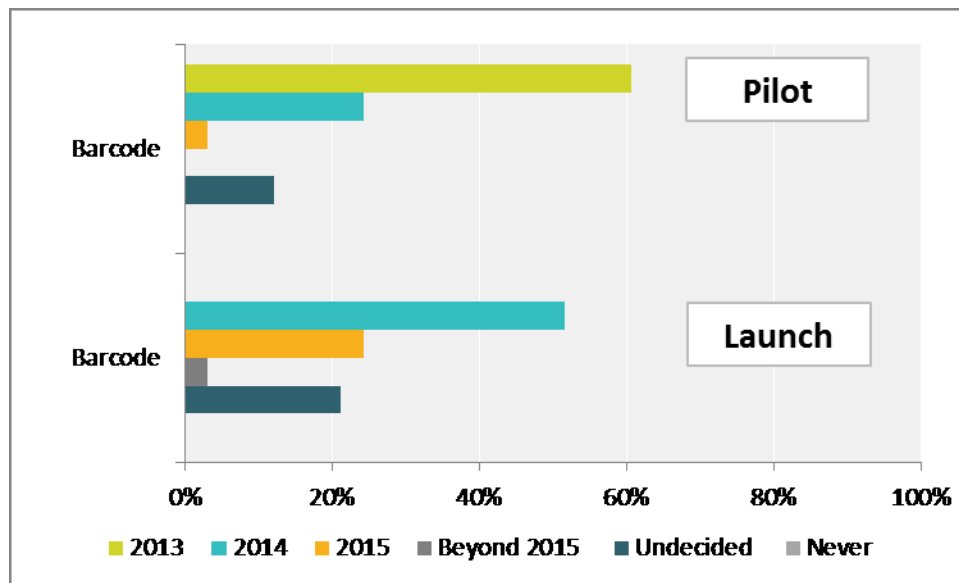


Figure 4.19. Survey 2: Barcodes Pilot and Launch.

Cloud Based

Cloud-based solutions were, from the panelists' perspectives, the technology solution to pursue and pilot in 2013 and 2014, as depicted in Table 4.34 and Table 4.35. The consensus was that this solution should be pursued to pilot in 2014 and 2015. The number of participants who thought this technology should be launched in 2015 increased. The increase may be due to a better understanding of the complexities and knowing where the industry stands with pilots and launches now.

Table 4.34

Survey 1: Cloud-Based Pilot and Launch

Survey 1	Cloud-based pilot	% Cloud-based	Survey 1	Cloud-based launch	% Cloud-based
2013	19	51%	2013	5	14%
2014	11	30%	2014	16	43%
2015	4	11%	2015	4	11%
Beyond 2015	0	0%	Beyond 2015	4	11%
Never	1	3%	Never	0	0%
Undecided	2	5%	Undecided	8	22%
Total	37	100%	Total	37	100%

Table 4.35

Survey 2: Cloud-Based Pilot and Launch

Survey 2	Cloud-based pilot	% Cloud-based	Survey 2	Cloud-based launch	% Cloud-based
2013	16	48%	2014	15	45%
2014	12	36%	2015	11	33%
2015	2	6%	Beyond 2015	3	9%
Never	1	3%	Never	1	3%
Undecided	2	6%	Undecided	3	9%
Total	33	100%	Total	33	100%

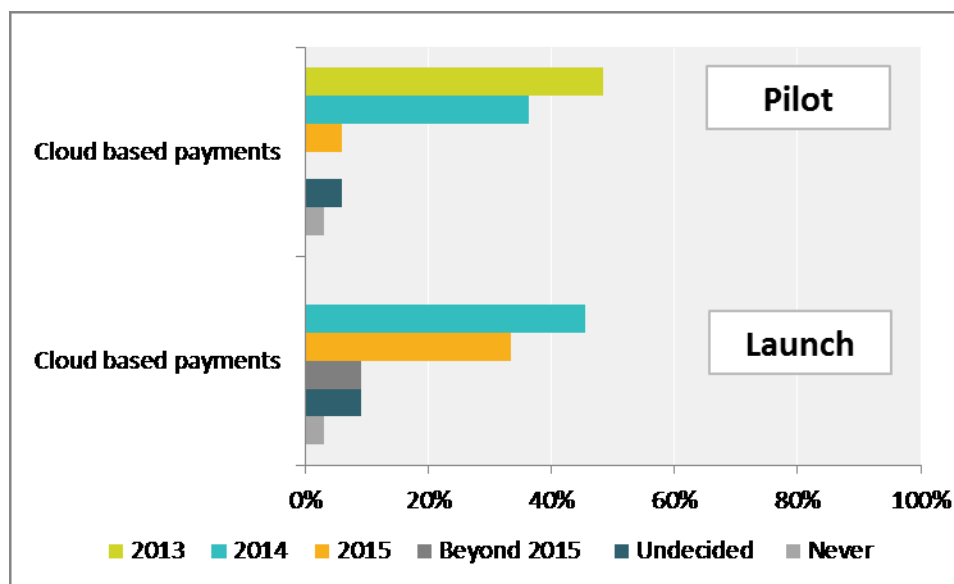


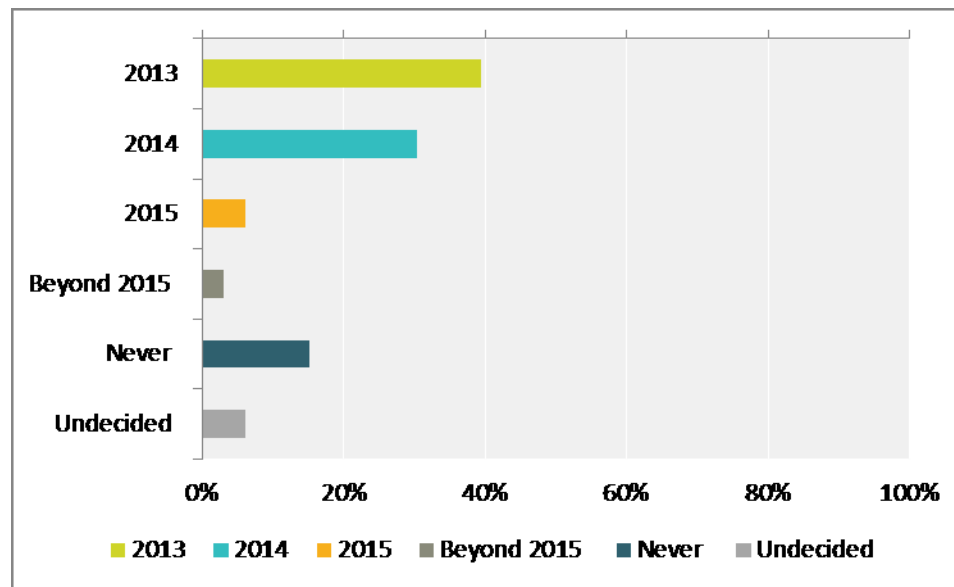
Figure 4.20. Survey 2: Cloud-Based Pilot and Launch.

Question 21. The 21st question asked, “If you managed the mobile strategy for a mid-to-large-size financial institution, when would you pilot NFC digital wallets?” Survey 1 showed, as depicted in Table 4.36, that a significant number of respondents believed piloting this technology in 2013 and 2014 was important. There was consensus in both surveys. Piloting is an important step in the innovation process to test and learn, and involves continuing to make observations and receive consumer feedback throughout the process. This process results in either making changes in the product to make it viable or deciding not to move forward with it.

Table 4.36

When to Pilot NFC Wallets

Survey 1	NFC pilot	% NFC pilot	Survey 2	NFC pilot	% NFC pilot
2013	14	38%	2013	13	39%
2014	11	30%	2014	10	30%
2015	3	8%	2015	2	6%
Beyond 2015	4	11%	Beyond 2015	1	3%
Never	3	8%	Never	5	15%
Undecided	2	5%	Undecided	2	6%
Total	37	100%	Total	33	100%

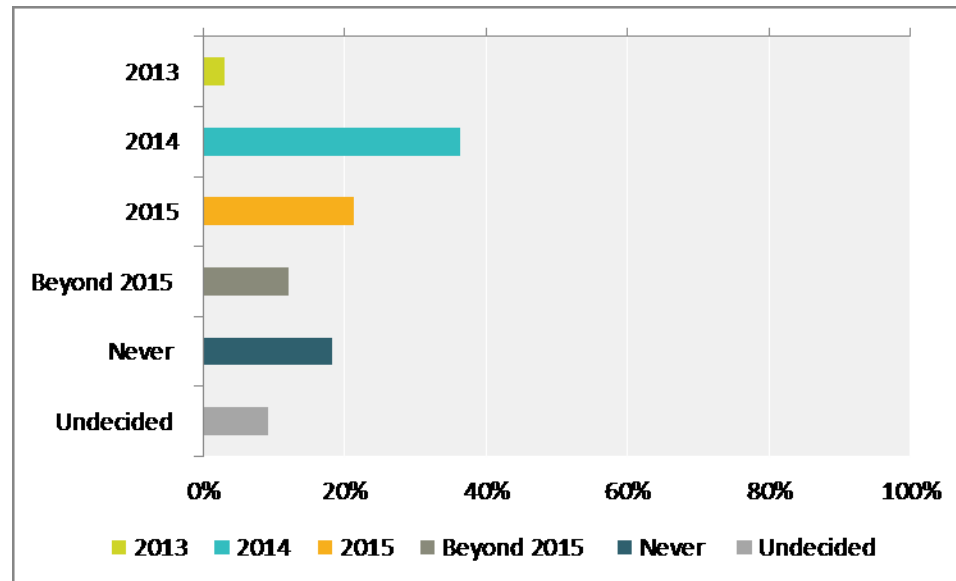
*Figure 4.21.* Survey 2: Strategy: When to Pilot NFC Wallets.

Question 22. The 22nd question asked, “If you managed the mobile strategy for a mid-to large-size financial institution, when would you launch NFC digital wallets broadly to your customer base?” The panel members believed there would be significant launches in 2014 and 2015, as shown in Table 4.37. This consensus remained in the second survey.

Table 4.37

Management of Strategy: When to Launch NFC Wallets

Survey 1	NFC launch	% NFC launch	Survey 2	NFC launch	% NFC launch
2013	3	8%	2013	1	3%
2014	12	32%	2014	12	36%
2015	7	19%	2015	7	21%
Beyond 2015			Beyond 2015		
2015	5	14%	2015	4	12%
Never	4	11%	Never	6	18%
Undecided	6	16%	Undecided	3	9%
Total	37	100%	Total	33	100%

*Figure 4.22. Survey 2: When to Launch NFC Wallets.*

Initially, the panel members believed there would be significant launches in 2014 and 2015. In the second survey, piloting this technology as an important part of the learning process was still considered highly important. The respondents still viewed NFC as likely to launch in 2014 and 2015.

Chapter V: Conclusions and Recommendations

Chapter V provides conclusions from this study based on the research question, “What is the impact of technology patents on future innovations in the financial services industry” and presents recommendations for future research.

The purpose of the Delphi study was to determine if consensus could be gained on two new patents and to understand when or if they would transform or have an impact on financial services. Changes related to these patents are highly focused on technology change. Some consumers find these types of changes complex, while others readily embrace change. Patents involve innovation that can affect short or long-term impacts on organizations and, ultimately, consumers. A review of the literature provided limited insights into patents, leadership, and change. The literature incorporates innovation from a leadership perspective as many try to understand how to be effective at introducing this type of change. Innovation requires being able to lead change whether through transformation or complexity leadership. Heifetz (1994) recognized that leadership involved having a passion for the work and people. Leading innovation requires a passion to be creative while often leading others from concept to prototype to a working product.

Innovation becomes transformational as it can involve changes in the way in which we see or do things. Innovation can also be highly complex. The complexity is involved in creating the innovation and then bringing it to market successfully. Kotter’s (1996) premise was that leading change requires ensuring a common goal is communicated to the team and that the assembled team has a passion for the work. As seen here, the technology must first be developed by the patenting company and then integrated into a complex, often older architecture supported by financial institutions. This process often takes significant time and talented employees to

bring to fruition. Bringing new patents to market requires persistence against forces that may be focused on revenue opportunities instead of customer retention.

This study found that customer retention was one of the main reasons for developing digital wallets. Innovation based on customer retention takes a skill set to sell the ideas within organizations. Developing new products or services without new revenue opportunities can be a challenge.

Research Methodology

The Delphi method was chosen for this research study due to the competitive nature of organizations' plans and strategies and the desire to ask for *individuals'* thoughts rather than those of organizations. Participants may have had undiscovered thoughts or ideas that the Delphi method could elicit.

Participants in the industry were sought through an e-mail and individual discussion. This resulted in 38 participants for the first round and 35 for the second. They were a representative sample of those involved in the industry and knowledgeable on the research topics.

The Delphi research consisted of two surveys that were completed using SurveyMonkey. Each round had 21 questions excluding demographics. The data were reviewed after the first round, and the results presented to the participants in a graphical format integrated in the second survey. This approach ensured that participants could easily review the results and provide responses to the second survey. The results were then analyzed for the final presentation incorporated in this document.

The Delphi method can be applied to this type of research especially where individuals' strategic insights are important to understand. This method allows the organization's identity to

be safeguarded. It can provide an opportunity to observe what others are thinking and contribute new insights for consideration. This method reflects a crowdsourcing approach or short-term collaborative community while maintaining anonymity. It provides value to each participant. Boudreau and Lakhani (2013) believed that success comes from communities where there is freedom to develop ideas or recombine thoughts. The Delphi method provides a way to quickly gain insights and be a valuable contributor. It can also be a way to test what one believes with others. Linstone and Turoff (1975) believed the Delphi method helped solve complex problems, which is relevant today when dealing with complex technologies that may take years to implement. This technique provides value to the business community by reducing risk through bringing together experts to discuss in an anonymous virtual way, in which every opinion is valued.

The Delphi method aided in researching these technology patents using a selected panel of industry experts throughout the United States. They represented years of financial services and innovation experience. This research approach brought experts together based on their desire to collaborate and interact regarding topics that are very dynamic, costly to implement, and risky. The risk could be financial (for their company) or to their career. This research can help with decisions to solidify plans, provide an opportunity to step back and continue to evaluate, or further test a hypothesis. The Delphi technique brings power as a research methodology in identifying trends or predicting outcomes (Bradley & Stewart, 2003).

Conclusions From the Research

The Delphi research method allows thought leaders to confidentially express their opinions, review others' opinions, and determine, based on others' opinions, whether they want to modify their thinking. This method converges opinions and ensures that opinions that might

not be heard or voiced are brought forth. For this particular type of study, the Delphi method can also uncover new insights. Newly emerging ideas can then be socialized through the business or technical community for further thoughts or opinions.

The results for this type of research rely on developing a thoughtful research question and very specific questions in the survey. It further requires a good plan for carrying out the research to ensure maximum participation through multiple surveys. The culmination is the discussion of this information and identification of future areas to study.

Patents are important to study on an ongoing basis to understand what new technologies or products will be brought to market. Technology development, piloting, and launching can be disruptive not only from a device perspective, as we saw with smartphones and tablets, but also in the change that may be required for infrastructure or other processes. The technology or innovation may be built and brought to market, but innovators who will consume the technology may require years to package it or integrate it into product offerings. In the meantime, other technologies may come along that might be better and could leapfrog current thought or technologies.

The respondents in this research had the knowledge to understand the complexity of existing financial systems or processes and what it would take to integrate these technologies for consumer use. This experience in the industry was critical to obtain credible research results.

Facial Recognition. Regarding facial recognition, the panelists saw this technology as likely to be adopted for online and mobile banking, and in the not-too-distant future. The majority in Survey 2 believed consumers would be ready in the next 1 to 5 years. This is significant. According to the second question on the survey, the “creepiness” factor is not a major consideration as in the past. Now, the challenge will be the cost of the integration efforts

and privacy concerns. This leads to different issues to resolve. Also of note is that the technology not being ready did not rank as one of the highest concerns. It may tell us that with companies such as Google and Apple designing this feature in smartphones, the technology has improved. Companies such as Google and Apple cannot afford to put this type of innovation in consumers' hands without it working properly.

When evaluating the question related to authentication becoming a commodity service for online and mobile banking, the panelists were split 50/50 in Survey 1, but worked toward an agreement of authentication becoming a commodity service in the future. Today, consumers can log in to different sites with their Facebook or e-mail login or other choices. The next generation may lead this effort and focus on integration and convenience as a driver of change for authentication.

The panelists agreed in Survey 1 and Survey 2 that consumers need time to become comfortable with this technology before it is broadly available for other services. The panelists viewed protecting consumer data as another important aspect that must be at the forefront of launching this service. Safety and security issues were also among the top three. The issues of lost phones and compromises must be considered, and more research must be conducted to understand what efforts will be needed for consumers to feel more at ease with the new technologies. It may mean customers need a way to deactivate their phones remotely. These types of concerns point out the extent of work that must be accomplished when launching a new technology. The details of the types of issues were also noted in the question related to the biggest concerns with facial recognition technology. The top concerns met with general agreement in Survey 1 and Survey 2. Security of the solution, cloning, making false IDs,

accuracy, consistency, and reliability of the solution require considerable testing to ensure the solution works and the consumer has high confidence in it.

Facial recognition will evolve as consumers start to use it on smartphones and other applications. As consumers become more familiar with it, the convenience may become more important, and the security concerns may lessen. This particular technology must be monitored, including with the Gartner Hype Cycle (Fenn & Raskino, 2008), to determine when customer adoption is appropriate for other applications. In addition, organizations will continue to pilot, test, and learn, continuing to evolve their understanding of safety and security for facial recognition as an authentication method. As we see more biometric methods become available and used by consumers, the likelihood exists for change in financial institutions. New vendors will launch solutions such as Facebanx in the United Kingdom, providing new opportunities to test and gain consumer acceptance with these technologies (PaymentEye, 2013). When these new technologies work with devices consumers already use, such as laptops, mobile devices, or tablets, familiarity and adoption may be more likely.

Digital Wallets. Digital wallets continue to be at the forefront of potential new capabilities for smartphone technology. As Ginovsky (2011) noted, there are no easy solutions. Consumers are rapidly adopting mobile banking. The Federal Reserve (2013) recently completed a study and noted that “28% of mobile phone users and 48% of smartphone users have used mobile banking in the past 12 months.” Technology companies look toward introducing new features that can radically change the consumer experience and present new opportunity for revenue. Although many different branded wallets have appeared on the market, general agreement was maintained in both surveys. The solutions to pursue were either a bank-branded strategy as the top strategy or a payments brand strategy (American Express, Discover,

MasterCard, Visa) as the second most popular solution. The solutions in the market today are a pilot with Isis (formed by AT&T Mobility, T-Mobile USA, and Verizon Wireless), which did not score well in this study, and Google, which scored only slightly higher than Isis. The top selections chosen may provide some insights into the complexity of introducing others into the ecosystem, which could increase costs or reduce revenue opportunities.

The panelists also were at consensus in their thoughts that consumers would use more than one digital wallet. Overall, the majority felt that the ecosystem to build out NFC wallet capabilities would be broadly available in the next 3 to 5 years, but it is not without major hurdles to overcome. Smartphones bring new complexities and other participants or vendors that need to be involved to provide digital wallets. This has to be done safely and securely, or consumers will quickly lose confidence. The panelists believed the most important hurdle to overcome is the complexity of involving all parties. This issue was followed by having point-of-sale terminals at the merchants capable of supporting this technology. There are many point-of-sale terminals in the marketplace, and consumer adoption of this type of technology requires that the majority be capable of processing transactions. It also requires a significant number of point-of-sale terminals in the marketplace for financial institutions to justify building the capability.

In responding to the question about the two most important features for a digital wallet, the majority of the panelists believed the most important feature is retaining customers. This points to the importance of innovation and that there is not always a bottom-line payback. Sometimes innovation is used as a means of retaining customers. It becomes an even more critical focus when others offer the innovation and lead change in the industry. Consumers quickly become aware of other financial institutions' offerings. If one meets their need, they may move their accounts. Organizations can monitor customers through continued feedback

processes when the risk of losing them is great and the innovation moves from desired by customers to required.

For other technologies, 2014 and 2015 were the significant years chosen for when NFC technologies should be piloted and tested. Some may want to wait and see the results of pilots before committing to launching any of the technologies mentioned. Other companies find testing and learning are important so they can make decisions and lead innovation. The overwhelming consensus about stickers was that they should never be deployed. Stickers provide very limited security to the consumer. Therefore, it was not surprising that the panel found them undesirable to move forward with a pilot or launch. Micro SDs are popular in China, but have faced challenges with coming to the market in the United States. In China, China Everbright Bank, China Merchants Bank, Shanghai Pudong Development Bank, CITIC, and the Bank of China (Kilhof Nielsen, 2013) are prominent in supporting this type of mobile wallet solution. The panelists felt this solution should not be piloted or launched. Barcodes provided an opportunity to pilot and launch. Cloud-based solutions are viewed as important to pilot and will continue to evolve with a focus on the security of consumer credentials.

When asked specifically if the panelists managed the mobile strategy and if they would have NFC digital wallets on their roadmap to pilot and launch, the initial survey showed many panelists would pilot in 2013. This changed in Survey 2 to the majority piloting in 2014 and then 2015. This may help some in understanding that digital wallets may not be at the top of their list this year but should continue to be monitored and considered in 2014 and 2015 strategic planning efforts.

In response to the question about whether consumer data should be shared with third parties by financial institutions, 94% believed it should be the consumer's choice. A third party

is not a principal in the transaction. For example, for a digital wallet, the main parties are the consumer, the merchant, and the financial institution. This is a radical departure from the way financial institutions develop new products or maintain customer data today. For instance, if a financial institution decides to select a third-party digital wallet product (such as Google or Isis), these companies might also have add-on services, such as loyalty programs, offers, or other products not yet developed. That digital wallet provider could insert a simple pop-up into the customer experience and ask if the customer is interested in additional services such as offers or digital coupons. A financial institution likely will not want to share its customer data with a third-party provider. The data have significant value, and providing data to other organizations would be costly, in terms of value and compromise to the financial institution's business. In certain cases, banking regulations will not allow it. Strategies giving consumers the option to share their data could be a radical shift in thinking. Companies would need to evaluate if there is more risk of losing the customer by having such a pop-up or if at some point the third party ventures into a competitive business. A more radical thought is that consumers may realize how their data benefits other companies and may want to be compensated for providing the data if used by another company to generate revenue. Imagining a technology company sending consumers a monthly statement showing credits for the use of their data is difficult. However, this could be the future. It is a departure from the norm we see today. Consumers will need to determine if there is sufficient benefit to continue to provide their data to companies at no cost. These types of considerations will continue. Leadership will evaluate strategies as new technology, emerging companies, and customers take actions on new innovations that challenge our current thinking.

Financial institutions sometimes prefer to rebrand products or services bought from other companies. The companies may also ensure customer data are protected for consumption through legal agreements. Financial institutions can analyze data through behavior analysis, determine who is using their products, and whether consumers are likely prospects for other products. The marketing aspects of using data can be increased customer loyalty or retention and additional product sales, which lead to increased revenues for the corporation and increased shareholder value. By providing additional products, data are further enriched to know more about the consumer.

Third-party services made available to consumers through the financial institution relationship could have an impact on business models. An example of this risk is large financial institutions that share data with technology companies whose business models thrive on the use of consumer data. For digital wallets, it could mean financial organizations sharing data with Google, Apple, or PayPal or with the largest mobile carriers in the country—AT&T Mobility, T-Mobile USA, Sprint, or Verizon Wireless. Sharing data may pose threats if other entities determine they want to expand into financial services and use these data as a means to compete. Obtaining the data and then knowing how to mine data and monitor trends can help transform businesses (Barton & Court, 2012). Since the Consumer Financial Protection Bureau was established, organizations have been under more scrutiny to ensure that consumer privacy is a priority. This may involve ensuring ethical practices are in place to disclose to consumers how and when their data are stored or used. Disclosures today, such as when accepting software to be downloaded, can be complex and lengthy, and consumers may simply “accept” without fully understanding the depth of what is being communicated.

Leadership can ensure that new product launches include data that provide actionable insights for change. The ability to understand the innovations and data needed requires leadership that transcends different departments in an organization. It involves understanding technology capabilities with data-gathering, analytics capabilities, and innovation. Leadership involves being able to anticipate the questions in many cases before the product launch to define the metrics that will provide rich insights.

From a consumer perspective, the opportunity for value-added services that third parties provide for products such as a digital wallet may be appealing. From an organization perspective, the opportunity may be more complex. Disclosure updates, opt-in/out preferences, developing the technology to provide third parties customer information, tracking consumers' approval, and retraction preferences would be considerations. Leading this type of change requires being able to understand the complexity of the system involved. Hiemstra (2006) observed that a future-oriented leader must be able to understand when it makes sense to make change that benefits the long-term view. Evaluating consumer benefits and the impacts on business strategies (both positive and negative) requires leadership.

The government may not regulate new products when launched, but may announce changes at a future date. All elements add cost and another layer of complexity to innovation. As consumers learn to use new products, an evolution may take place. This could mean an evolution in the business model or product design, including government regulation. Very complex issues are associated with the simple question of whether consumers are allowed to choose whether their data are shared with third parties.

Mary Meeker observed in her *2012 Internet Trends* report that we are in an age of “beautiful, relevant, personalized, curated content for consumers” (Meeker, 2012). This will be

important to keep customers engaged with new services, and those that do will attract and retain customers. Consumers will ultimately be vocal and prioritize what is most important to them as new products emerge. Adoption and defections lead to further analysis to determine the cause. We have only begun to see the evolution of services on mobile devices.

Many new opportunities will evolve, including industry consolidation, federal regulation, and the potential for new pricing models for services to emerge requiring organizational change. When an industry starts to consolidate, it can result in fewer vendors or choices, potential threats, or opportunities depending on who was acquired by whom. Innovation may slow as the purchased organization integrates. Consolidation may result in fewer or more features being available. Industry consolidation involves change.

Innovation funding may be diverted to support new federal regulations. As organizations launch digital wallets, decisions include whether the organizations will absorb all of the costs or pass on fees to consumers. For some, this involves taking a leadership position in the industry. Some may launch a service initially free and later introduce a fee; others may launch the product with a fee. These are significant leadership decisions. They can create consumer backlash if not executed well. New technologies and innovation bring change. As consumers see benefits, they will likely demand more and challenge organizations to innovate and change. Those that do not have the leadership foresight to envision change, or engage in pilots and learning early, risk losing tech-savvy customers.

Large organizations may maintain massive amounts of data in their data warehouses. A way to think about these “big data” is that it goes beyond the norm in “volume, variety [and], velocity” and because it is so massive, it is difficult to “invest, process, and visualize” (Minelli, Chambers, & Dhiraj, 2013, p. 83). The infrastructure needed for collecting, maintaining, and

warehousing data requires substantial investment (Farber, 2013). These data have significant potential value because of the immense amount of customer behavior information that can be unlocked. In analyzing these data in general, care must be given that the data may not be relevant to the specific individual making the purchase. For instance, if the purchase is a gift, it could result in inaccurate assumptions about the individual who made the purchase. The data do not capture that type of detail today. In other cases, Vaitheeswaran (2012) warned that we cannot overgeneralize or use averages as that could lead organizations in wrong directions. Consumer data often become aggregated with no specific identification to an individual; often, they are viewed a subset of customers with certain attributes or qualities. Solove (2006) equated consumers with becoming formulas in the bigger picture.

Managing and analyzing all of these data is not an area where we can reach out and find precedence. It lends itself to what Peter Senge (2008) discussed as a “part of the learning process” (Senge, Smith, Kruschwitz, Laur, & Schley, 2008, p. 302). It is about bringing the vision to reality of what all the data means. As part of the innovation launch process, the data measurement plan is critical. Collecting and analyzing behaviors is crucial for measuring success (Hemann & Burbary, 2013) and rapidly identify if change is required. Weiner (2011) observed what was once wisdom-based information is now a “comprehensive knowledge base with methods required for rapidly accessing, organizing and using the data, [and it] could constitute the 21st century contribution of continual learning.” What becomes important is looking at the patterns in the data (May, 2009) which requires large amounts of data to analyze. Organizations are still in the learning mode of making meaning out of data. Managing and gaining insights into such massive amounts of data continue to evolve. Some organizations collect data just to have the information and do not know what to do with it. From a leadership

perspective, organizations need to understand the costs of maintaining data and the value provided. Some organizations may have customer data that may be rarely or never accessed. If a leadership direction exists to keep only the most important data that have immediate use and no more, data collection might be scaled down.

Leaders may want to have a data sustainability advocate in their organization to diffuse and manage the continued growth of data collection. McAfee and Brynjolfsson (2012) noted that the amount of data being created each day was about 2.5 exabytes and would double every 40 months. McKinsey reported in 2009 that banks and capital market firms have amassed massive amount of data estimated at more than 1 exabyte. To visualize this amount of data, consider 2,000 file cabinets in a four-story data center taking up a city block (Techshortly, 2012). They also noted that Walmart collects more than 2.5 petabytes of data every hour from customers in their stores doing transactions. To put this in perspective, that is 20 million, four-drawer file cabinets filled with text (Mozi.com, 2009).

Using data and analytics for business decisions has emerged a critical way for an organization to make better decisions (Davenport, 2009). The massive amounts of data maintained and the ongoing additions to databases based on product launches continue to provide complexity but can also be used to gain profound insights. Collecting massive amounts of data may provide an opportunity to understand pain points or what may provide future opportunities (Edwards, 2012). Marble (2013) observed organizations such as PayPal strongly believe in the importance of data emphasizing the critical role they have in the organization and are a strong focus. The ability to gather the data, provide the insights, develop behavior patterns, or derive analytics continues to be a focus. Organizations want managing and using data to be seen as one of their core competencies (Woledge, 2011).

Organizations benefit by being able to develop the analytics and deep insights to understand consumer behaviors from the data. Giving consumers the choice to share their data with others may provide other companies with the benefit of using data at little to no cost to them to obtain. Organizations continue to look for ways to effectively and efficiently bring together all types of data, including web information (site tracking and purchases), mobile devices (tracking information), and social media (blogs). Managing and mining structured transaction data and unstructured text data will take pilots and tests to determine if there is enough value in marrying the two. Today, conducting such pilots is difficult since in many cases there is no way to connect the data to a specific consumer. Consumers may use multiple blog names or choose not to be tracked on their computer. Maintaining mobile tracking coordinates may result in privacy issue risks for a financial institution. As new technologies such as facial recognition and digital wallets are introduced, some organizations may take a conservative privacy approach and choose not to maintain any data. Others may not recognize the risk and choose to maintain data. These issues require further in-depth research. Even then, consumers may be more vocal about their privacy, requiring change after a product is launched.

As Davenport (2009) believed, competing on analytics can provide a sustainable advantage, and we are only in the early stages of the possibilities. As new products launch, new opportunities to gain more data to add to powerful data warehouses increase. Organizations that understand the rich value of the insights can lead the way in proving the value in the data.

In summary, Table 5.1 provides an overview of the leadership and change aspects that are relevant to the patents described and the innovation processes. Innovation involves complex, transformational change that can be short lived or long lasting. The topics covered in this study, including leadership and change, will be of increasing relevance for two reasons. These

discussions involve complex issues that will require leaders to work together to bring these innovations to the market. These leaders will be change agents as they promote and work with others to understand the dynamics and impacts that change can make. Second, the technology continues to evolve and improve, other products will incorporate these technologies, and financial services will continue to evaluate and find the right benefits to justify change.

Table 5.1

Summary of Concepts for Leadership and Change

	Role as leader or change agent	Guiding principles
Leadership and innovation	Listen to the customer	Innovations require ongoing customer feedback to engage customers and gain adoption. Leaders listen to customers in all aspects of design. They watch customers use the products and learn from what they see.
	Prototype, pilot, and learn as part of your process	Important for the innovation process is the opportunity to learn from customers. Use the pilot for this opportunity, make changes, and continue to learn. Determine if the product is ready for release or if the technology, consumers, or the market is not ready. Recognize this and do not force it. Sometimes, you are better off holding the launch until the product is further refined.
	Develop a data sustainability program	Determine the right data to maintain for future analysis. Lead your organization's data sustainability strategy to efficiently manage the amount of data captured and retained.
	Know your customer	Leaders monitor signals in the data to quickly react to issues. They use data to make decisions. It is important to know your customers as individuals but also what the data tell you. Never average the data as doing so will mask important characteristics. Be respectful that consumers have allowed you to have their data.
	Be prepared for acceleration and disruption	The rate of technology change and innovation will continue rapidly and continue to be complex. Recognize the individuals who can effectively lead change.

(Table 45 *continued*)

		Role as leader or change agent	Guiding principles
Leadership values	Leading creativity		Innovation leaders do not have all the answers. Trust in the team. Provide them guidance and empower them to be creative.
	Next generation leadership		Be prepared for the next generation of leaders who may think differently, be willing to try new ideas, and find ways to innovate in ways that might not have succeeded or been thought about before. Embrace and be open-minded.
Leadership and strategy	Understand the market		New technologies continue to be developed. Evaluate whether the technology will impact other products outside your industry and, if so, how it can benefit or hinder your market timing.
	Find opportunities in challenges		It is often easier to resist change than embrace it and make it happen. Products such as facial recognition for authentication and digital wallets require an open mind to work through all the challenges that could become opportunities.
	Understand business models may change		Be open-minded to the possibility that the innovation could cause a change in your business model. Determine if you want to be a leader or follower. Some change could be radical.
	Be prepared for the industry to evolve and change		Be prepared for new dynamics as these innovations bring industry consolidation, regulation, and new options for pricing products to consumers.

This study shows the complexities for the patent inventor and those involved in delivering new products based on new technology. New technologies may take years to evolve with innovators discovering new uses and championing change in the marketplace. Patents do not mean that innovation will happen quickly. The transformation can take years depending on the complexities involved and consumer adoption. There can also be a point when organizations speed up the rate of diffusion or adoption because of other benefits that the technology may provide (Rogers, 1995). These types of discoveries could happen over time as new ideas

emerge. Thus, from the perspective of the research question, we will likely see transformational changes based on these patents, but it will take some time for organizations to build the capabilities, integrate the technology, and inform and teach consumers. However, this could change as the benefits to change become substantial and obstacles are removed.

Consumers are involved and collaborate in creating innovations, and this will continue. They will have a strong voice based on their adoption of products. Through leadership and listening to consumers and teams, ideas will continue to evolve with the risk minimized, and innovation will reap rewards. It is a privilege to lead innovation and to be able to potentially have significant impacts on change in consumers' lives. These times are turbulent and complex, and organizations should be prepared for a constant state of disruption, which brings new, exciting opportunities for leaders chosen to lead innovation.

Limitations and Assumptions

Several limitations and assumptions existed. The research method limited the number of questions that can be asked of the panelists so the surveys could be completed within a reasonable amount of time. The Delphi method allows for different panel sizes. A panel can be small with knowledgeable experts who make contributions to the research. With a small panel, responses can be returned quickly to the panelists and follow-up concluded in a timely manner (Hsu & Sandford, 2007).

There are also limitations in representation from all involved in this complex environment. For instance, this work focused on the financial institution business-related aspect of the product launches for these patents. Others involved in the complex ecosystem include the security perspective, technical infrastructure architects, regulators, merchants, privacy advocates, all the payment brands, and technologists. Surveying representatives from each type of

organization with this method is difficult. This could lead to future work with the industry. This method also excludes consumer research. The consumer perspective is difficult to obtain with the Delphi method. Consumers need to be able to visually see and understand the experience, and focus groups may be more relevant. Focus groups provide an opportunity to work with prototypes about which thoughts and ideas can be generated. Prototypes provide an opportunity to visually understand the product concept.

Research Recommendations

This research can be pursued in many directions in the future. This work could be conducted every few years to see if thoughts have changed and new ideas have emerged. As part of the technology evolution, researchers could consider changing timeframes (the solutions are either delivered sooner or pushed back due to industry dynamics). Considerations could also include even newer technologies that could make those discussed here outdated.

Another aspect of leadership in innovation that could be studied further is the success rate of organizations with patents. Studies could be conducted on how many patents are filed in which products were brought to market and whether they were successful. This combined with knowledge of the leadership in place and involved in developing the patents could help assess what worked, what did not, and what they would do today.

In addition, due to the complexities of these innovations, researchers could include factors such as the technical aspects, customer experience, privacy, security, industry perceptions, leadership, and change. Each area could lead to specific research and investigation over many years to understand change in industry dynamics, perceptions, and attitudes. Significant information could be learned from each area. This research could include

stakeholder manufacturers, vendors, consultants, customers, or emerging companies to understand the changes that each sees and the potential impacts.

Practice Recommendations

From a leadership and change perspective, studies that investigate leadership changes in organizations over time that could affect these views would be beneficial. Many participants in this study are seasoned industry individuals. As retirement nears for many and the next generation takes over leadership roles in financial institutions, studies could focus on the new leaders' views of change, whether these leaders find ways to implement innovations more quickly, and whether they are successful with consumer adoption. Baby Boomers are getting ready to retire. *Human Resource Management International Digest* (2007) reported, "half the senior managers in America's top 500 companies will be retiring over the next five years." However, that does not mean that jobs immediately become available as continued market compression forces more organizational efficiencies. Organizations may struggle to find leaders with the experience required for these positions. In other situations such as with mobile app development, talent is in short supply (Stackpole & Betts, 2011). Venture capital firms continue to invest in what they believe could be breakthrough ideas or technologies. Those also need to be monitored since they could affect what we know or believe today.

Innovation continues at a rapid pace. Although innovation may have subsided during the recent recession, it is coming back. Prahalad and Mashelkar (2010) observed that there has been a shift from abundance to value-based products, affordability, sustainability, and environmentally-friendly. These attributes of success and aspects of innovation should be examined.

Leadership studies will continue to find the traits or characteristics that highly visible leaders attribute to their success. Studies continue to focus on the right formula for success in innovation. Authors continue to focus on corporate culture, leadership in place, economic conditions, and other attributes to determine the right mix for success. People need to be at the forefront in a complex environment of innovation to ensure they have the capabilities and their skills are the right match for an environment that thrives on change (Kegan & Lahey, 2009). However, we may need to refer to leadership theories to help guide us or modify leadership theories as we learn over time. This can provide the opportunity to continue to review what we understood from the leadership theories and, as with innovation, what we can further contribute to provide additional value or insights to future leaders.

Financial services are ripe for continued innovation. Through continued customer involvement and feedback or even cocreation (Füller, Mühlbacher, Matzler, & Jawecki, 2009), innovation will continue. We will likely see some financial institutions lead with unique strategies. Some financial institutions may focus on attracting certain market segments that may be technology-savvy and want to bank in new ways. This strategy might capture customers, but are they profitable customers? This question will evolve as new technologies are launched and integrated and business cases are compiled to justify the development. Some projects may be justified based on the benefit or monetization (Manyika et al., 2011) for providing or enhancing data to their organization.

Leadership and change involving innovation can be risky, but those who have the innovation mindset understand there will be more failures than successes. One breakthrough success can reap substantial rewards. We have to use pilots for innovation and understand that they are to test and learn, and understand that pilots will not always be brought to market. EBay

has a culture of experimentation in which testing and refinement are core attributes of the process (Ignatius, 2011). Intuit also uses experiments to learn from customers (Martin, 2011). It can be difficult to accept this since in financial services a product built for pilot is often near customer-ready. Substantial costs are involved in bringing a solution to pilot. Continued efforts can focus on determining ways to reduce that expense and gain knowledge. McQuivey (2013) posited that inventions based on patents do not create huge value unless they are disruptive. Disruption involves embracing change and being able to lead through the whitewater. Northouse (2010) contributed to the perspective of leadership by expressing the importance of being true to ethical leadership and respecting others as inherent traits. The desire to compete can become strong, but ethical behavior commands people's respect.

This study has provided a method for engaging and capturing thought leaders in the industry to collectively collaborate and share their thoughts. The study provided the opportunity to engage with them to conduct thoughtful research and an important perspective on the industry. The dialogue related to these patents may continue with these thought leaders as innovations evolve. As the patents develop or new ones are granted that could impact these insights, it will be important to ask questions related to their implications and discuss those through such outlets as articles, white papers, blogs, research studies, or conference panel discussions. Johnson (2010) recognized that organizations should be sensitive to changing market conditions. Research and collaborative communities can aid in recognizing those shifts to help gauge market timing for change. Then it becomes a question of leading the market or being a fast follower. Transformative shifts can be detrimental to businesses if they are unprepared.

The opportunity to collaborate in research in this way provides value to the industry in bringing forth creative ideas.

Facial Recognition

As the technology continues to develop, ongoing research can help to dissuade consumer concerns as a part of the product development process. Consumers may require a high confidence level that the technology works in order to adopt the technology. Threats and compromises of photos or with the technology could thwart this technology from moving forward. New technologies will continue to emerge that will improve authentication and validation. Through continued consumer research, analysis can determine how concerns change over time as technology finds ways to address concerns. Continued prototype and pilots will help to determine when and if this technology is suitable for replacing existing processes.

From a practice perspective, ongoing review of published materials is important to understand the advances in this technology. Recognizing gaps in the literature and identifying where scholarly practices can add value can help organizations advance this technology. Continued research needs to include the consumer and business aspects related to this technology. The software and algorithms associated with this technology will continue to be addressed from a scientific perspective. Patents will continue to be approved as new technical advances to improve performance or new technologies are developed. Continued consideration of bridging the gaps between industry and scholarly work can help to move this technology forward and understand the challenges.

Digital Wallets

Patents give us the opportunity to stretch our minds about what is available today and what the future may be. NFC is not just a technology that will bring innovation to banking. NFC will have an impact on the medical field, for example, with the development of a bandage

with physiological sensors that can pull information and send it to a medical facility or monitor medication compliance (Perna, 2013).

Innovation provides a scholarly practitioner the opportunity to research and provide insights that create change, especially in environments that are highly competitive but require collaboration. These technologies will take many years to bring to fruition. It will be through further studies, discussions, piloting, and learning that we will evolve to bringing these technologies and innovative products to the market. Innovation requires the desire to be involved in lifelong learning and what Vaill (1996) called “whitewater.” Learning is constant and uncomfortable in an environment where clarity does not exist.

Studying and being involved in innovation leads to investigating not only the creative aspects but also the corporate culture, leadership theories, professional development needs, and constant discovery of ourselves and others. The Delphi methodology filled a void and provides thought leaders with tangible, credible research on some very challenging industry issues. Innovation requires change, something that can bring new energy, enthusiasm, and passion where perhaps none existed before. Innovation requires a consciousness to lead change, clarity of a vision, self-awareness, management of stressful environments, and success at leading people (McKee, Johnston, & Boyatzis, 2008). For those involved in innovation, it is exciting and creative, and provides a sense of making a difference through bringing new visions to the consumers in the marketplace. The discovery and learning in innovation never ends.

Appendix

Appendix A

Survey 1 Questionnaire



Financial Institution Innovation: Facial Recognition & Digital Wallets

Introduction - Welcome To This Important Industry Research Study

Facial Recognition and Digital Wallets - Results provided to participants at no cost

Congratulations on taking the first step to participate in this important industry research work.

The first survey is ready for you - simply click on next.

You will receive notice when the second survey is ready. You will be asked if you want to change any of your opinions based on seeing the respondents answers from the first survey.

1st Round Survey Close Date: March 25, 2013 | Time to Complete: 15-30 minutes.

As a reminder, all participant names and organizations will be kept confidential.

Thank you in advance for your participation and now on to the 1st survey!

Financial Institution Innovation: Facial Recognition & Digital Wallets

*** 1. As Google and Apple provide capabilities to unlock phones with facial recognition, when do you think mobile banking consumers might be open to use this technology to authenticate themselves for their mobile banking rather than using an online ID and Passcode?**

- ☐ Yes, they are ready now.
- ☐ In more than 1 year but less than or up to 3 years
- ☐ In more than 3 years but less than or up to 5 years
- ☐ Longer than 5 years
- ☐ No
- ☐ Choose not to answer

*** 2. What do you think has prevented facial recognition technology from being introduced as an authentication method for online or mobile banking?**

(Please select three; you may add additional thoughts in other).

- ☐ Cost of the technology
- ☐ Cost of integration of the technology into existing systems
- ☐ The "creepiness" factor; consumers are uncomfortable with this technology
- ☐ The limited appeal it may have to many customers
- ☐ Privacy concerns
- ☐ Security of information
- ☐ The technology hasn't been ready

Other (please specify)

*** 3. Will authentication for online and mobile financial service become a commodity service such that facial recognition used by other companies such as Apple or Google could be integrated into banking applications to eliminate multiple log in names and pass codes?**

- ☐ Yes
- ☐ No
- ☐ Choose not to answer

***4. From a consumer perspective, what do you think the industry will need to work through for facial recognition for authentication for online and mobile to be successful?**

Select the top three.

- ☐ Consumers will need to become comfortable with using facial recognition in order for it to be considered for additional use
- ☐ Consumers need a comfort level that their data is protected and safe from compromise
- ☐ The safety and security issues of protecting facial recognition information
- ☐ The amount of data storage needed to maintain this information
- ☐ The processing requirements to respond on par with passwords
- ☐ The cost for facial recognition will need to be on par or lower than existing authentication costs
- ☐ Regulation impacts that have not been developed yet
- ☐ This technology isn't likely to be adopted for online or mobile authentication
- ☐ Other (Please specify below)

Other (please specify)

***5. What would be your biggest concern with facial recognition technology used for gaining access to online banking instead of using a log in and password?**

***6. How long do you believe it will be before facial recognition technology is used to log into financial institution accounts?**

- ☐ 1-3 years
- ☐ Greater than 3 but less than or equal to 5 years
- ☐ Greater than 5 years but less than or equal to 7 years
- ☐ Greater than 7 years but less than or equal to 10 years
- ☐ 10+ years
- ☐ Never

*** 7. While Google has a patent for a digital wallet, many other companies are obtaining similar patents. If you were a financial institution, what would be the top digital (mobile) wallets you would pursue?**

(Select two; you may add additional options in other)

- ☐ Bank Branded
- ☐ Carrier Wallets (such as Isis)
- ☐ Payment Brands (American Express, Discover, MasterCard, Visa)
- ☐ Google
- ☐ PayPal
- ☐ Merchant branded

Other (please specify)

*** 8. Do you think it is likely that consumers will choose only one branded digital (mobile) wallet to use?**

- ☐ Yes
- ☐ No

*** 9. The ecosystem is complex to build out the capabilities to offer a Digital NFC wallet. How long do you think before NFC mobile wallets will be broadly available in the United States?**

- ☐ 1-3 years
- ☐ Greater than 3 years but less than or equal to 5 years
- ☐ Greater than 5 years but less than or equal to 7 years
- ☐ Greater than 7 years but less than or equal to 10 years
- ☐ 10+ years
- ☐ Never

*** 10. Is the NFC digital wallet technology the best technology to introduce to improve upon the experience at merchant's point of sale at the check out lane or for payment transactions?**

- ☐ Yes
- ☐ No
- ☐ Choose not to answer

Yes - Best technology to introduce to support mobile payments

*** 11. Why do you believe it is the best technology?**

Not best technology solution or product to introduce to support mobile payments

*** 12. Why do you think NFC is not the best technology?**

Digital (Mobile) Wallets

*** 13. Should financial institutions provide the customer a choice on if they want to share their data with other companies in order to participate in another company's digital wallet and potentially have other services available through that company?**

☐ Yes

☐ No

*** 14. Should a financial institution make available to their customers multiple wallets in order to provide consumers the choice of what they prefer to use?**

☐ Yes

☐ No

Digital (Mobile) Wallets

*** 15. What do you think are the most important hurdles to overcome with an NFC enabled wallets assuming the technology works and it meets performance on par with the magnetic strip card?**

(Please select three; you may add additional comments in other)

- ☐ Innovation dollars to test and bring to market a solution
- ☐ Resolving the complex ecosystem
- ☐ Smart phone availability with NFC capabilities
- ☐ Point of sale terminals deployed in markets
- ☐ Partnerships joining together to build a solution on the scale needed to deliver.
- ☐ Ensuring all parties shares the costs based on the amount of benefit that they receive
- ☐ Industry partnerships (merchants/financial institutions/carriers)
- ☐ Broad merchant availability throughout the U.S.
- ☐ Consumer education
- ☐ Marketing campaign funding to launch successfully
- ☐ Legislation impacts
- ☐ Apple's integration of NFC into phones

Other (please specify)

Digital (Mobile) Wallets

16. Are there any other disruptor technologies for mobile digital wallets that could impact marketplace dynamics?

*** 17. What do you believe are the two most important features for a digital (mobile) wallet?**

(Select two; you may add additional features in other if you think it is one that should be in the top two)

- ☐ A payment device for using at merchant point of sale devices
- ☐ The ability to customize offers to the customers
- ☐ The ability to provide electronic receipts
- ☐ The opportunity to eliminate mag strip cards as an end goal
- ☐ The opportunity to retain customers through providing innovative services

Other (please specify)

Digital (Mobile) Wallets

***18. Which technologies would you choose to pilot and launch to consumers at the point of sale over the next few years if you had an unconstrained budget and if it were your decision (assuming the technology works)?**

[illegible]

*** 19. If you managed the mobile strategy for a mid to large size financial institution, when would you pilot NFC digital (mobile) wallets?**

Please answer even if you don't work for a financial institution. It is important to understand the industry view.

- ☐ 2013
- ☐ 2014
- ☐ 2015
- ☐ Beyond 2015
- ☐ Never
- ☐ Undecided

*** 20. If you managed the mobile strategy for a mid to large size financial institution, when would you launch NFC digital (mobile) wallets broadly to your customer base?**

Please answer even if you don't work for a financial institution. It is important to understand the industry view.

- ☐ 2013
- ☐ 2014
- ☐ 2015
- ☐ Beyond 2015
- ☐ Never
- ☐ Undecided

Concluding Thoughts/Comments

21. Are there any other comments you would like to share regarding facial recognition or digital (mobile) wallets that haven't been covered above?

Demographic Information

*** 23. What type of firm do you work for?**

- ☐ Association
- ☐ Consultant
- ☐ Credit Union
- ☐ Financial Institution
- ☐ Payment/Network Services
- ☐ Research Firm
- ☐ Vendor - Hardware (primary business)
- ☐ Vendor - Software or technology solutions (primary business)
- ☐ Vendor - Software and hardware
- ☐ Other (Please specify below)

Other (please specify)

*** 24. What is the job title for your current position?**

- ☐ Assistant Vice President
- ☐ Chairman
- ☐ Chief Executive Officer
- ☐ Chief Information/Technology Officer
- ☐ Consultant
- ☐ Director
- ☐ Executive Vice President
- ☐ Manager
- ☐ Managing Director
- ☐ Partner
- ☐ President
- ☐ Senior Vice President
- ☐ Vice Chairman
- ☐ Vice President
- ☐ Other (Please specify below)

Other (please specify)

Demographic Information

***25. How many years have you worked in financial services?**

- ☐ Less than or equal to 1 year
- ☐ Greater than 1 year but less than or equal to 3 years
- ☐ Greater than 3 years but less than or equal to 5 years
- ☐ Greater than 5 years but less than or equal to 10 years
- ☐ 10+ years

Demographic Information

***26. How many years have you worked in financial services innovation?**

- ☐ Less than or equal to 1 year
- ☐ Greater than 1 year but less than or equal to 3 years
- ☐ Greater than 3 years but less than or equal to 5 years
- ☐ Greater than 5 years but less than or equal to 10 years
- ☐ 10+ years

Demographic Information

*27. What area do you work in?

- ☐ Business Development
- ☐ CEO/President; C-Level Executive
- ☐ Consultant
- ☐ Marketing
- ☐ Operations
- ☐ Other (Please specify below)
- ☐ Product Management/Product Development
- ☐ Project Management/Implementation
- ☐ Research
- ☐ Strategy
- ☐ Technology

Other (please specify)

Demographic Information

Q28

Edit Question ▼

Add Question Logic

Move

Copy

Delete

*28. What is your age?

- ☐ 18 to 24
- ☐ 25 to 34
- ☐ 35 to 44
- ☐ 45 to 54
- ☐ 55 to 64
- ☐ 65 to 74
- ☐ 75 or older
- ☐ Choose not to answer

The End - Thank you for your participation!

Thank you for your participation in this valuable research. I will be notifying you of the 1st round of results which will include the link to the second survey.

Look for the follow-up survey within approximately one week after the close of this first round.

Many thanks for your participation and warmest regards,

Debbie Bartoo

Appendix B

Survey 2 Questionnaire



Final Survey (#2) : Facial Recognition & Digital Wallets

Welcome To The Second & Final Research Survey

This is your second and final survey for Facial Recognition and Digital Wallets.

This survey provides the panel's insights and the opportunity to reassess your thoughts based on information from other thought leaders. You will be able to review their thoughts as you go through each question while still selecting again what you believe to be the most appropriate answer now with this new information.

Simply click on next.

2nd Round Survey Close Date: Friday, April 5 | Time to Complete: 10-20 minutes.

Note: In some cases, Survey Monkey reduces the amount of content seen in the graphs. However, each item in the graph aligns to the copy in the selection list so you can easily correlate the information.

As a reminder, all participant names and organizations will be kept confidential. You will receive an Executive Summary of the results.

Thank you in advance for your participation and now on to the 2nd and last survey!

Facial Recognition Technology

*** 1. As Google and Apple provide capabilities to unlock phones with facial recognition, when do you think mobile banking consumers might be open to use this technology to authenticate themselves for mobile banking rather than using an online ID and passcode?**

In seeing thought leaders answers, what would your answer be now?

- ☐ Yes, they are ready now.
- ☐ In more than 1 year but less than or up to 3 years
- ☐ In more than 3 years but less than or up to 5 years
- ☐ Longer than 5 years
- ☐ Not at any time

*** 2. What do you think has prevented facial recognition technology from being introduced as an authentication method for online or mobile banking?**

Select the top three.

- ☐ Cost of the technology
- ☐ Cost of integration of the technology into existing systems
- ☐ The "creepiness" factor; consumers are uncomfortable with this technology
- ☐ The limited appeal it may have to many customers
- ☐ Privacy concerns
- ☐ Security of information
- ☐ The technology hasn't been ready
- ☐ Other: Will first be accepted outside of payments, then it will be adopted by consumers
- ☐ Other: This is a solution looking for a problem
- ☐ Other: Consumer demand has not justified the expense
- ☐ Other: Consumer education; they don't know enough about how it works yet
- ☐ Other: the challenges for bank's to integrate and launch new technologies

*** 3. Will authentication for online and mobile financial services become a commodity service such that facial recognition used by other companies such as Apple or Google could be integrated into banking applications to eliminate multiple login IDs and passcodes?**

- ☐ Yes
- ☐ No

***4. From a consumer perspective, what do you think the industry will need to work through for facial recognition for authentication for online and mobile to be successful?**

Select the top three.

- ☐ Consumers will need to become comfortable with using facial recognition in order for it to be considered for additional use
- ☐ Consumers need a comfort level that their data is protected and safe from compromise
- ☐ The safety and security issues of protecting facial recognition information
- ☐ The amount of data storage needed to maintain this information
- ☐ The processing requirements to respond on par with passwords
- ☐ The cost for facial recognition will need to be on par or lower than existing authentication costs
- ☐ Regulation impacts that have not been developed yet
- ☐ This technology isn't likely to be adopted for online or mobile authentication
- ☐ Other: Embracing one technology to prevent fraud
- ☐ Other: Reliability of the technology
- ☐ Other: There isn't an industry need yet.

Facial Recognition Concerns for Using it with Online or Mobile Banking	
Security of the solution; cloning information; making false IDs	High
Accuracy, consistency, and reliability of solution	High
Privacy related to this information	Medium
Consumer education and adoption	Medium
Cost with little to no benefit over existing solutions	Medium
Integration with existing technology	Low
A complex enrollment process	Low
Battery drain on the mobile device	Low
Concern if used as a replacement for existing fraud prevention techniques	Low
Ensuring there was a secondary method if facial recognition failed	Low
Multi-user access of shared accounts	Low

*** 5. The table above represents the panelists thought on concerns for use of facial recognition technology for online and mobile banking.**

Select your top two concerns with using facial recognition technology for gaining access to online or mobile banking instead of using a login ID and passcode.

High was the most mentioned; low was the least mentioned.

- ☐ Security of the solution
- ☐ Accuracy, consistency, and reliability of solution
- ☐ Privacy related to this information
- ☐ Consumer education and adoption
- ☐ Cost associated with the solution with little to no benefit over existing solutions
- ☐ Integration with existing technology
- ☐ A complex enrollment process
- ☐ Battery drain on the mobile device
- ☐ Concern if it would be used as a replacement for existing fraud prevention techniques
- ☐ Ensuring there was a secondary method if facial recognition failed
- ☐ Multi-user access of shared accounts

*** 6. How long do you believe it will be before facial recognition technology is used to log into financial institution online banking or mobile accounts?**

- ☐ 1-3 years
- ☐ Greater than 3 but less than or equal to 5 years
- ☐ Greater than 5 years but less than or equal to 7 years
- ☐ Greater than 7 years but less than or equal to 10 years
- ☐ 10+ years
- ☐ Never

Digital (Mobile) Wallets

***7. While Google has a patent for a digital wallet, many other companies are obtaining similar patents. If you were a financial institution, what would be the top digital (mobile) wallets you would pursue?**

Assumption: they are all equally secure and provide similar features and functionality.

Select the top two.

- ☐ Bank Branded
- ☐ Carrier Wallets (such as Isis)
- ☐ Payment Brands (American Express, Discover, MasterCard, Visa)
- ☐ Google
- ☐ PayPal
- ☐ Merchant branded (including when/if MCX adopts digital wallets)
- ☐ Other: Co-branded wallet
- ☐ Other: White label product
- ☐ Other: No solution at this time.
- ☐ Other: A carrier agnostic solution
- ☐ Other: Apple Passbook if developed to include POS payments

***8. Do you think it is likely that consumers will choose only one branded digital (mobile) wallet to use?**

- ☐ Yes
- ☐ No

***9. The ecosystem is complex to build out the capabilities to offer a digital NFC wallet.**

How long do you think before NFC mobile wallets will be broadly available to consumers in the United States?

- ☐ 1-3 years
- ☐ Greater than 3 years but less than or equal to 5 years
- ☐ Greater than 5 years but less than or equal to 7 years
- ☐ Greater than 7 years but less than or equal to 10 years
- ☐ 10+ years
- ☐ Never

Why NFC Is Best Technology (Yes: 28.67%)*	Why NFC Is Not Best Technology (No: 65.71%)*
It is becoming a global standard.	Cost to implement big hurdle for merchant community; requires consumer and merchant to change
It works online and offline.	Lower cost or better and easier alternatives to implement
It is a secure form factor.	Security is an issue.
Once fully deployed, it will eliminate the need for a physical wallet. It provides many additional services such as coupons/discounts, electronic receipts.	Smart phone integration has not kept pace with imagined demand
It leverages the EMV specifications.	The solution is complex in many ways.
It is the best available today providing a better experience (faster and more reliable) than rendering and scanning barcodes.	It is device reliant.
It can be tokenized to access account credentials in the cloud.	It is today, slower than magnetic stripe cards.
It is focused on convenience.	NFC hasn't been widely adopted.
It has a lower cost of implementation than other solutions.	There is limited handset availability at this time.
It is a holistic solution.	Cloud based is preferred to secure the data including potential biometric methods.
*Does not add up to 100% Due to "Choose Not To Answer" selection	

***10. In reviewing the comments above, do you now believe the NFC digital wallet technology is the best technology to introduce to improve upon the consumer experience at merchant's point of sale for payment transactions?**

- ☐ Yes
- ☐ No

*** 11. Should financial institutions provide the customer a choice on if they want to share their information or data with other companies when they participate in another company's digital wallet and then have other services available to them through that company?**

- ☐ Yes
☐ No

*** 12. Should a financial institution make available to their customers multiple wallets in order to provide consumers the choice of what they prefer to use?**

- ☐ Yes
☐ No

*** 13. What do you think are the most important hurdles to overcome with NFC enabled wallets assuming the technology works and it meets performance on par with the magnetic stripe card?**

Select the top 3.

- ☐ Innovation dollars to test and bring to market a solution
- ☐ Resolving the complex ecosystem
- ☐ Smart phone availability with NFC capabilities
- ☐ Point of sale terminals deployed in markets
- ☐ Partnerships joining together to build a solution on the scale needed to deliver.
- ☐ Ensuring all parties shares the costs based on the amount of benefit that they receive
- ☐ Industry partnerships (merchants/financial institutions/carriers)
- ☐ Broad merchant availability throughout the U.S.
- ☐ Consumer education & letting go of the plastic card
- ☐ Marketing campaign funding to launch successfully
- ☐ Legislation impacts
- ☐ Apple's integration of NFC into phones
- ☐ Other: Adding significant more value for consumers to adopt the technology

*** 14. The following are identified as potential disruptor technologies for mobile digital wallets based on the panel comments that could impact marketplace dynamics.**

- Cloud based options such as QR codes, biometrics
- Barcodes
- Geolocation based on advanced bluetooth technology
- PayPal's POS solution
- Private label merchant programs
- QR codes
- Spatial location

Please review and identify if there are any others to add in "other" and specify or click "nothing to add".

- ☐ Nothing to add
- ☐ Other (please specify)

Other (please specify)

*** 15. What do you believe are the two most important consumer features for a digital (mobile) wallet?**

Assumption: a valid business case exists; consumers desire options to manage spending and saving.

Select two.

- ☐ A payment device for using at merchant point of sale devices
- ☐ The ability to customize offers to the customers
- ☐ The ability to provide electronic receipts
- ☐ The opportunity to eliminate mag strip cards as an end goal
- ☐ The opportunity to retain customers through providing innovative services
- ☐ Other: The ability for customers to sort expenses for budgeting purposes.

***20. Cloud Based: Based on the above thought leaders responses, reconsider the pilot and launch time frames to consumers at the point of sale if you had an unconstrained budget assuming the technology works and there is a solid business case.**

	2013	2014	2015	Beyond 2015	Undecided	Never
Cloud based payments pilot and learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cloud based payments customer launch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***21. If you managed the mobile strategy for a mid to large size financial institution, when would you PILOT NFC digital (mobile) wallets?**

Please answer even if you don't work for a financial institution. It is important to understand the industry view.

- ☐ 2013
- ☐ 2014
- ☐ 2015
- ☐ Beyond 2015
- ☐ Never
- ☐ Undecided

***22. If you managed the mobile strategy for a mid to large size financial institution, when would you LAUNCH NFC digital (mobile) wallets broadly to your customer base?**

Please answer even if you don't work for a financial institution. It is important to understand the industry view.

- ☐ 2013
- ☐ 2014
- ☐ 2015
- ☐ Beyond 2015
- ☐ Never
- ☐ Undecided

23. Are there any other comments you would like to share regarding facial recognition or digital (mobile) wallets that haven't been covered above?

*** 24. Please provide the following:**

Name:

Email Address:

The End - Thank you for your participation!

Thank you for your participation in this research study. You will be receiving the Executive Summary soon after the research results are compiled. Many thanks for your participation and warmest regards,

Debbie Bartoo

Appendix C

Participation Consent

Facial Recognition & Digital (Mobile) Wallets Research Study

Participate and Hear From Industry Thought Leaders

Find out what should be in your 2013, 2014, and 2015 strategic plans

Receive Research Results!

Survey Link: (<https://www.surveymonkey.com/s/5TQKY3F>)

Requires two surveys to be completed

Complete 1st survey by March 25, 2013

The second survey will be provided after compiling the data from the first survey so you can review and modify any answers.

I am seeking your participation with a research study to review impacts of technology patents on future innovations in the financial services industry, specifically digital wallets and facial recognition. The responses to this study are your personal opinions rather than your organization. The findings from this study can help to inform the industry.

Reason for Study:

This research study will be part of my doctoral dissertation work in Antioch University's Ph.D. program in Leadership and Change.

Research Method:

The research process is the Delphi method. This approach provides a survey based method using Survey Monkey with two iterations of survey questions.

First Survey Round:

- The purpose is to gather initial insights from the group.

Second Survey Round:

- Once all participants complete the first round (by March 25), responses will be returned to you so that you can complete the second round taking into account any changes you may want to make after seeing the overall groups responses.

What is in it for you?

- Industry insights at no cost to you except for time to complete the survey
 - Gain valuable insights to help with your 2013, 2014, and 2015 strategic and product plans
 - Gain a perspective from the industry on these key technologies

Participate Now!

If there is a more appropriate colleague in your organization to participate, please feel free to forward this to them. Multiple responses may be received from one organization.

Additional Information:

Privacy: No individual or organization will be identified in this study.

Time Commitment: 15-30 minutes depending on additional contributions.

If you have any additional questions regarding your rights as a research participant, contact me, Debora Bartoo at dbartoo@antioch.edu.

Your participation is voluntary and you may discontinue participation at any time. You have the right to express any concerns or complaints to the University Committee on Research Involving Human Subjects at Antioch University.

If you require any additional information, do not hesitate to contact me, or the Chairman of my dissertation committee, Dr. Mitchell Kusy (mkusy@antioch.edu).

If you have any concerns about the ethical aspects of this study, contact Dr. Carolyn Kenny, Chair, Institutional Review Board, Antioch University Ph.D. in Leadership and Change, ckenny@antioch.edu or (phone number).

Thank you in advance for your participation in support of my dissertation.

Warmest Regards,

Debora Bartoo

Doctoral Student

Antioch University

Ph.D. Program in Leadership and Change

E-mail: dbartoo@antioch.edu

Phone:

Appendix D

Researcher Profile

Debora S. Bartoo

Bank of America

Senior Vice President



Figure A-1. Debora S. Bartoo--Photo

Debora Bartoo, Senior Vice President, is responsible for Product Strategy & Business Performance focused on emerging capabilities within the Connected Commerce team at Bank of America (BAC). Her focus is on understanding customer needs and finding innovative solutions for the broader market. Her experience spans innovation, strategy, payments, online, mobile, ATM, smart cards, fraud and analytics.

She previously managed Online Banking, Mobile & Social Competitive Intelligence with a combined role in Business Development focused on the digital landscape. She has also managed the Business Research & Analytics function at BAC for Online, Mobile & Social. She has also held positions in product execution and product development.

Prior to BAC, Ms. Bartoo managed Product Development for processing solutions at STAR Systems, now owned by First Data.

Ms. Bartoo has participated on various industry boards in the past including the NCR Aptra Advisory Board and the ATMIA Association. She maintains active participation in the community through volunteer work with the Blumenthal organization, focused on arts and culture.

Ms. Bartoo holds a Masters in Business Intelligence from St. Joseph's University Erivan K. Haub's School of Business (rated in the Top 50 Worldwide programs) and a Masters in Organizational Dynamics with an emphasis on strategy and product development from the University of Pennsylvania including studying at the University of London. She has also published in the International Journal of Business Intelligence Research.

She is currently a Ph.D. doctoral candidate at Antioch University in the Leadership and Change program.

Appendix E

Invitation to Participants With Survey Link

Thank you for agreeing to participate in the following research study with other industry thought leaders. The following is the link to the 1st survey:

Facial Recognition & Digital (Mobile) Wallets Research Study

Survey 1 Link: (<https://www.surveymonkey.com/s/5TQKY3F>)

Complete by March 25, 2013

The second survey will be provided to you along with the results from the first survey so you can review and modify any answers.

As a reminder, it is your personal opinions that are important to this research study rather than your organization. There are two rounds that will be completed for this research work. You can complete this first survey anytime between now and March 25. All answers will then be compiled and returned for your review within 5-7 days and then based on the findings you will be able to review and determine if you want to change any of your answers based on the group's thoughts, leading to the final report. Instructions will be included in the follow-up e-mail.

Privacy: No individual or organization will be identified in this study.

Time Commitment: 15-30 minutes depending on additional contributions.

What is in it for you?

- Industry insights at no cost to you except for time to complete the survey
- Gain valuable insights to help with your 2013, 2014, and 2015 strategic and product plans
- Gain a perspective from the industry on these key technologies

Warmest regards and many thanks for your participation in this research work in support of my dissertation.

Debora Bartoo

Doctoral Student

Antioch University

Ph.D. Program in Leadership and Change

E-mail: dbartoo@antioch.edu

Phone:

Note: You have been blind copied on this e-mail to retain confidentiality.

Other Information Previously Communicated:

If you have any additional questions regarding your rights as a research participant, contact me, Debora Bartoo at dbartoo@antioch.edu.

Your participation is voluntary and you may discontinue participation at any time. You have the right to express any concerns or complaints to the University Committee on Research Involving Human Subjects at Antioch University.

If you require any additional information, do not hesitate to contact me, or the Chairman of my dissertation committee, Dr. Mitchell Kusy (mkusy@antioch.edu).

If you have any concerns about the ethical aspects of this study, contact Dr. Carolyn Kenny, Chair, Institutional Review Board, Antioch University Ph.D. in Leadership and Change, ckenny@antioch.edu or [\(phone number\)](#).

Appendix F

Invitation for LinkedIn Panel Members

The following message will appear in the discussion group if additional participants are needed for the research study:

Innovation Research: Participate and Receive Research Results!

Topic: Digital Wallets and Facial Recognition.

What is in it for you?

- Industry insights at no cost to you except for time to complete the survey
- Gain valuable insights to help with your 2013 and 2014 strategic and product plans
- Gain a perspective from the industry on these key technologies

Research Approach: Respond to two surveys

U.S. based participants only please.

Find out what thought leaders are saying!

Survey Link: (<https://www.surveymonkey.com/s/5TQKY3F>); Optionally:

Contact Debbie Bartoo (e-mail address).

LinkedIn participants will agree to participation through the copy on the survey.

Appendix G

Antioch.edu Mail - RE: Permission For Use of Table In "The Smartphone... <https://mail.google.com/mail/u/0/?ui=2&ik=5b44b9244&view=pt&sc...>



Debora Bartoo <dbartoo@antioch.edu>

RE: Permission For Use of Table In "The Smartphone Patent Wars"

1 message

Safiullah, Rehan <rsafiullah@akingump.com>
 To: Debby Bartoo <dbartoo@antioch.edu>
 Cc: "Williams, Fred" <fwilliams@akingump.com>

Wed, May 29, 2013 at 10:51 AM

Debbie,

Thank you for reaching out to us. You have permission to use the table. I note one correction:

· "PG Electronics" should be "LG Electronics"—I believe the published version of the paper had the correct name

Rehan M. Safiullah

Direct: +1 713.220.8104 | Internal: 18104

From: Debby Bartoo [<mailto:dbartoo@antioch.edu>]
Sent: Saturday, May 25, 2013 3:42 PM
To: Williams, Fred; Safiullah, Rehan
Subject: Permission For Use of Table In "The Smartphone Patent Wars"

Dear Mr. Williams and Mr. Safiullah:

I am a student at Antioch University in their Leadership and Change Ph.D. program. My dissertation is on Financial Services Transformation based on patents, specifically facial recognition and digital wallets and I am requesting permission to use the following chart from your paper referenced above in my document. Would you grant me permission to use this table including appropriate references to your work?

Patents Owned by Technology Companies

Company	Number of patents
Apple	>3,800 patents + 6,000 Nortel patents/apps

Antioch.edu Mail - HTC: Permission For Use of Table In "The Smartphone... <https://mail.google.com/mail/u/0/?ui=2&ik=bf1659244&view=pt&src...>

Company	Number of patents
Google	760 U.S. patents + >1,000 IBM patents (Acquired Motorola Mobility since publication resulting in an additional: 17,500 patents + 7,500 apps)
HTC	127 U.S. patents + 22 patents from ADC & 253 3G Graphics patents/apps
Kodak	About 10,000 patents in total portfolio > 1,100 digital imaging patents
PG Electronics	>9,600 patents
Microsoft	>18,000 U.S. patents + >6,000 Nortel patents/apps
Nokia	>10,000 patent families
Oracle	>10,000 U.S. patents
RIM	About 10,000-15,000 patents + >6,000 Nortel patents
Samsung	>36,000 patents
Sony Ericsson	>27,000 U.S. patents + 6,000 Nortel patents/apps

(Williams & Safiullah, 2012)

With much appreciation,

Debbie Bartoo | *Antioch University Leadership and Change PhD Program | Cohort 11*

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