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Serving the IS Customer in Good Times and Bad: Pathways to Satisfaction and Value

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SERVING THE IS CUSTOMER IN GOOD TIMES AND BAD: PATHWAYS TO SATISFACTION AND VALUE

by

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DEDICATION

I want to thank Allah Almighty for making this dissertation possible. I dedicate this dissertation to my father Dr. Said Najjar who is always there for me, my mother Susan Blaibleh who is simply indescribable by words, my brothers Osama Najjar and Hani Najjar who are my soul mates, my wife Zainab Mansour who is my best friend and lifetime partner, my aunt Amal Blaibleh who always prays for me, my in-laws Nabeel Mansour and Heyam Kanaan for raising my precious wife, my friends Jeff and Suzanne Presley for helping me and my family, and, last but not least, my son Kareem and, by Allah's will, his siblings to come.

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To all my family and friends who believed in me, thank you!

ABSTRACT

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Serving and satisfying customers are everlasting goals for organizations. This two-essay dissertation delves into two innovative ways in which a company and its information systems (IS) service providers can better serve internal and external customers. The first essay examines the concept of Data Monetization, whereby a company sells its customer data to upstream suppliers to ensure that the source company receives optimized inventory levels and unique consumer insights. In today's era of big data, business analytics, and cloud computing, this case demonstrates that the elusive goal of data monetization has become achievable. In a second essay, we build on service marketing and social capital literature to understand factors that influence IS service recovery satisfaction following an IS service failure. This empirical study advances our theoretical understanding of internal customer satisfaction by theorizing that the success of IS service recovery depends on the way the IS Function (ISF) responds to an IS service failure and the ISF's investment in building social capital with its internal customers.

Essay 1 is a case study of a Fortune 500 drug store chain that has been successfully monetizing its data by selling it to its upstream suppliers. We present a four-stage model that illustrates the stages the retailer went through on its data monetization journey. We identify the characteristics of each stage that differ in the technical and analytical capabilities required, the type of trust built, the focus of the retailer's information strategy, governance mechanisms, and the costs incurred and benefits achieved by various stakeholders. It was shown that a company could gain new revenue streams by

selling its customer data while exploiting its suppliers' technical and business analytical resources to ultimately serve the retailer's customers.

In Essay 2, we recognize that when IS service failures are encountered, IS service providers have to respond with an IS service recovery. Internal customers' (employees) satisfaction with a recovery after a failure is important to restore an employee's overall satisfaction with the ISF. We empirically examine the effect of the social capital shared between the ISF and employees as well as the dimensions of recovery procedures, interactions, and outcomes on IS service recovery satisfaction and overall satisfaction. Our results indicate that following a service failure, the recovery satisfaction has a direct effect on overall satisfaction with the ISF. We find that recovery procedures (effort and fairness) and the recovery outcomes (speed and level of recovery) influence recovery satisfaction. We do not find support that social capital dimensions affect recovery satisfaction; however social capital has a direct effect on overall satisfaction with the ISF. Moreover, we find that recovery interaction (apology and explanation) does not affect recovery satisfaction. These findings paint the picture whereby the ISF must continually build social capital to sustain overall satisfaction among employees but in the case of a IS service failure, employees are mainly concerned with being treated fairly and earnestly in getting their problem fixed fast and reliably, and they do not consider social capital or recovery interaction as factors that will make them more satisfied with the failure's recovery.

PREFACE

The first essay of this dissertation "Data Monetization: Lessons from a Retailer's Journey" was published in MIS Quarterly Executive, issue 12, volume 4, December 2013.

The second essay "Just Get IT Fixed: Social Capital and Service Recovery Practice in Achieving Satisfaction" is to be submitted to MIS Quarterly.

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CHAPTER 1

INTRODUCTION

This paper proposes ways for a company and its information systems (IS) service providers to better serve internal and external customers. In the first essay, we introduce the concept of Data Monetization, whereby a company sells its customer data to upstream suppliers to ensure that the source company receives optimized inventory levels and unique consumer insights. In the second essay, we investigate the factors that influence IS service recovery satisfaction following an IS service failure.

In today's era of big data, business intelligence and analytics, and cloud computing, the previously elusive goal of data monetization has become more achievable. In essay 1, we analyze the four-stage of data monetization journey of a leading U.S. retailer that identifies the potential benefits and drawbacks of data monetization. Based on this company's experiences, we provide lessons that can help other companies considering data monetization initiatives.

Information Systems (IS) service failures are inevitable in organizations. We recognize that when IS service failures are encountered, IS service providers have to respond with an IS service recovery. Internal customers' (employees') satisfaction with a recovery after a failure is important to restore an employee's overall satisfaction with the IS Function (ISF). In essay 2, we empirically examine the effect of the social capital shared between the ISF and employees as well as the dimensions of recovery procedure, interaction, and outcome on IS service recovery satisfaction. Our results indicate that following a service failure, the level of recovery satisfaction has a direct effect on overall satisfaction with the ISF. The results also show that recovery procedure (effort and

fairness) and the recovery outcome (speed and level of recovery) influence recovery satisfaction. We do not find support that social capital dimensions affect recovery satisfaction. We also find that recovery interaction (apology and explanation) does not affect recovery satisfaction. These findings indicate that the ISF must continually build social capital to sustain overall satisfaction among employees, but in the case of a IS service failure, employees are mainly concerned with being treated fairly and earnestly in getting their problem fixed fast and reliably, and they do not consider social capital or recovery interaction as factors that will influence their recovery satisfaction.

CHAPTER 2

DATA MONETIZATION: LESSONS FROM A RETAILER'S JOURNEY

Data Monetization in the Supply Chain

Data is now being created and transferred at an unprecedented rate, fueling the growth in business intelligence and analytics (BI&A)[1] to discover opportunities for improving and innovating in supply chains and to enhance supply-chain collaboration.[2] In retailing, new supplier/customer ecosystems are emerging in which BI&A services are offered through a supplier portal, which can be cloud-based. Cloud-based BI&A platforms allow retailers and their suppliers to share data and analytics, often for a price. Or a company may monetize its data by exchanging it for other benefits (e.g., merchandising benefits). These data-sharing ecosystems often involve new players (e.g., public cloud platform providers and/or third-party data coordinators, negotiators or analysts).

Many companies would like to monetize their data. *Data monetization* is when the intangible value of data is converted into real value, usually by selling it or avoiding analytical cost by leveraging suppliers' resources. Data may also be monetized by converting it into other tangible benefits (e.g., supplier funded advertising and discounts), or by avoiding costs (e.g., IT costs). Potential buyers of an organization's data include a direct supplier, an upstream supply-chain partner, a data aggregator, an analytics service

[1] For background information on big data and BI&A, see: Chen, H., Chiang, R. H. L. and Storey, V. C. "Business Intelligence and Analytics," *MIS Quarterly,* (36:4), 2012, pp. 1165-1188; Hopkins, M. S., LaValle, S., Lesser, E., Shockley, R. and Kruschwitz, N. "Big Data, Analytics and the Path from Insights to Value," *Sloan Management Review,* (52:2), 2011, pp. 21-32; and Wixom, B. H., Watson, H. J. and Werner, T. "Developing an Enterprise Business Intelligence Capability: The Norfolk Southern Journey," *MIS Quarterly Executive,* (10:2), 2011, pp. 61-71.

[2] For a discussion on BI as an IT capability for supply-chain collaboration, see Rai, A., Im, G. and Hornyak, R. "How CIOs Can Align IT capabilities for Supply Chain Relationships," *MIS Quarterly Executive,* (8:1), 2009, pp. 9-18.

provider or even a competitor. Three current IT trends are enhancing the potential for data monetization: big data, BI&A and the cloud.

Retail firms, with their exacting merchandising strategies and tight supply-chain relationships, have taken the lead in demonstrating that monetizing data can provide a significant revenue stream and be an IT cost-sharing mechanism. Point-of-sale, consumer-loyalty and inventory data can be sold to suppliers, and some of the cost of analyzing a retailer's data can be recovered from its suppliers.

Research has shown that data sharing in the supply chain improves supply-chain performance. Suppliers typically are interested in using a retailer's point-of-sale data to enhance planning and better manage inventory, thus reducing the bullwhip effect[3] (i.e., the phenomenon of demand variability amplification). Manufacturers can use downstream data about retail sales to improve product design, optimize operations and develop fact-based marketing and promotional campaigns. The availability of sales data to the supply chain means that demand can be more accurately forecasted and, hence, inventory levels can be better predicted; in some cases, assemble-to-order can be achieved. Some suppliers may even use such data for strategic decisions by looking for product affinities to make merger or acquisition decisions.

Furthermore, data sharing can be a strategic tool in managing supply chains and channel relationships; sharing consumer or market data with supply-chain partners can

[3] See Lee, H. L., Padmanabhan, V. and Whang, S. "The Bullwhip Effect in Supply Chains," *Sloan Management Review*, (38:3), 1997, pp. 93-102.

influence their behavior.[4] Nevertheless, a company must decide whether and when sharing its data with suppliers and other partners will pay off. The benefits a data-sharing strategy will have for the overall supply chain and distribution channel must be balanced against the benefits of holding data close to the chest.[5] While the improvement in supply-chain performance might be a good reason for companies to share data with supply-chain partners, a more explicit direct dollar value of the data can be another tempting motivation.

There are several challenges in involving suppliers in monetizing data. Selling data to suppliers may eliminate the competitive advantage that can be gained from asymmetric[6] information. Contracts have to be carefully prepared to ensure the data sold or shared is used for the mutual benefit of the firm and its partners. Trust has to be nurtured. The privacy and security of a company's data may be at risk if appropriate assurance practices are not established. Data packaging has to be considered to identify what data can be made available for sale and in what format and at what price. Pricing models need to be developed to take account of the associated cost of making data available and its value to

[4] For more discussion on the benefits of data sharing in the supply chain, see: Zhou, H. and Benton Jr., W. C. "Supply Chain Practice and Information Sharing," *Journal of Operations Management,* (25:6), 2007, pp. 1348-1365, Eyuboglu, N. and Atac, O. A. "Information Power: A Means for Increased Control in Channels of Distribution," *Psychology & Marketing,* (8:3), 1991, pp. 197-213; Waller, M., Johnson, M. E. and Davis, T. "Vendor-Managed Inventory in the Retail Supply Chain," *Journal of Business Logistics,* (20:1), 1999, pp. 183-203; and Lee, H. L., Padmanabhan, V., and Whang, S., op. cit., 2004, pp. 1875-1886.

[5] For more discussion on the benefits of data sharing in the supply chain, see: Zhou, H. and Benton Jr., W. C., op. cit., 2007; Eyuboglu, N. and Atac, O. A., op. cit., 1991; Waller, M., Johnson, M. E., and Davis, T., op. cit., 1999, pp. 183-203; and Lee, H. L., Padmanabhan, V., and Whang, S., op. cit., 2004.

[6] Information asymmetries occur when two people have different information about the same thing. If one has additional inside information, he or she can leverage or take advantage of that information.

the buyer. A company must identify a suitable marketing model for its data. Overall, best practices in this area have yet to be identified.

Pathways to Data Monetization

Data monetization requires a strategic choice on which of several pathways to follow. It is important to assess the technical (data infrastructure) and analytical (human) capabilities of the company to determine which strategic pathway a company should choose for monetizing its data. The data infrastructure capability includes the hardware, software and network capabilities that enable the company to collect, store and retrieve its data. The analytical capability is the mathematical and business analytical knowledge and skills of the employees in the company or in supplier firms. A company that has the data and the know-how (i.e., people and BI&A) to use the data properly will have an advantage in the era of big data. If both capabilities are low, then the company has three potential pathways to transition to the high capabilities that will enable it to monetize its data (see Figure 1).

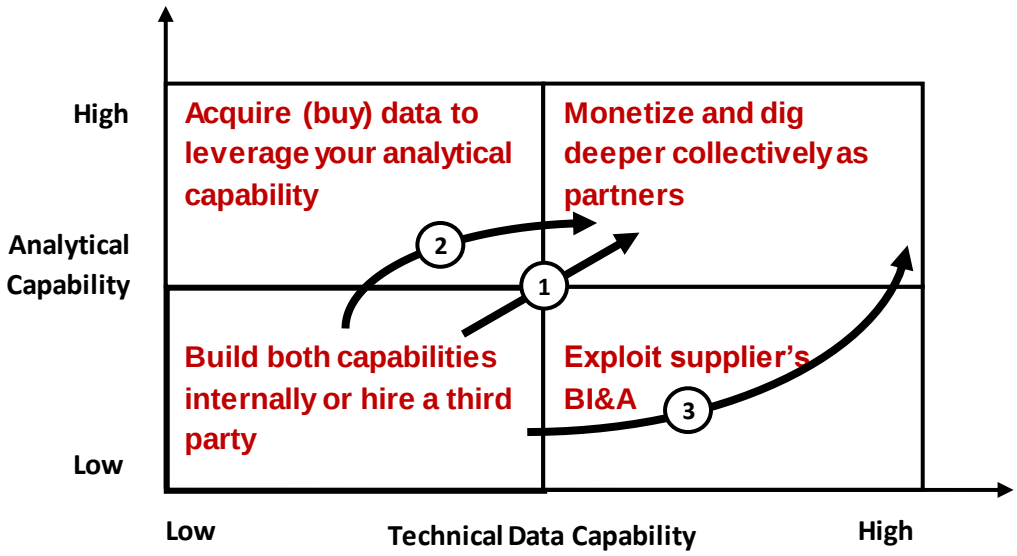

Figure 1: Three Pathways to Data Monetization—Moving From Low-Low to High-High Capabilities

Pathway 1: Move Direct to Higher Risk and High Reward

This direct pathway can be a risker path to data monetization as it requires simultaneously building both technical (data) and analytical capabilities. As such, it requires the largest initial investment of the three alternative pathways. To follow this pathway, a company must invest in developing its technical infrastructure while hiring and training employees with the required business, mathematical and analytical skills. While costly, following this pathway will quickly position a company to be ready for monetizing its data and collaborating with partners.

Pathway 2: Build Analytical Capability First

Following this pathway, a company chooses to develop its analytical (human) capabilities first. This requires training employees and/or hiring business analysts with the required set of business, mathematical and analytical skills. As its analytical capabilities grow, the company may leverage them by generating more data (from

internal sources) or buying data (from external sources). But growing in-house human analytical capabilities may not be sufficient to reach the point where the company can demonstrate the value of its big data and thus pave the way to data monetization. It may also require the company's technical data infrastructure capability to be expanded. This pathway requires a higher internal investment to develop the in-house human analytical capabilities.

Pathway 3: Build Technical Data Infrastructure First

Instead of first developing its own human analytics capabilities, a company may choose to extend or outsource its technical data infrastructure to produce an attractive collection of data that can be sold to suppliers. The creation of an appropriate digital platform is a prerequisite for a company and its suppliers to share data securely. A company can build this platform internally or use the expertise of a service provider; the use of cloud-based infrastructure can increase the flexibility, scalability and speed of developing the platform. By building a platform that will enable it to market its saleable data, a company can more quickly monetize its data and possibly avoid some analytical costs by leveraging the analytical capabilities of its suppliers rather than developing the analytical capability in-house. This pathway maximizes the potential data monetization pay-off because it enables sales of data and reduces startup costs. However, it does make the company more reliant on its partners as major sources of analytics.

The Data Monetization Journey of "DrugCo"

The case of "DrugCo," a U.S.-based Fortune 500 drug retailer with several thousand stores in more than half of U.S. states, illustrates a company that has followed Pathway 3. This company, which wishes to remain anonymous, is recognized as being relatively

mature in BI and data use and it has been monetizing its data for almost 10 years. The case shows how cost and the willingness to work with external parties and openly share data were important issues that motivated it to monetize its data.

Like other companies in the small-box retailing sector, DrugCo has:

- Many retail locations with narrowly defined geographical boundaries
- Limited shelf space
- Many stock-keeping units (SKUs) across the company
- A diverse customer base
- Differing inventories within each location to satisfy the local customer needs.

For DrugCo, data analysis is crucial for accurately assessing marketing campaigns, analyzing sales patterns, examining on-shelf availability and inventory levels, and customizing SKUs for each store based on its unique local consumer demand.

We describe key events that took place in the company and we present a four-stage model that illustrates the four key stages it went through on its data monetization journey (the stages are depicted in Figure 2). We also provide lessons learned from DrugCo's journey for other managers as they grapple with their data monetization decisions.

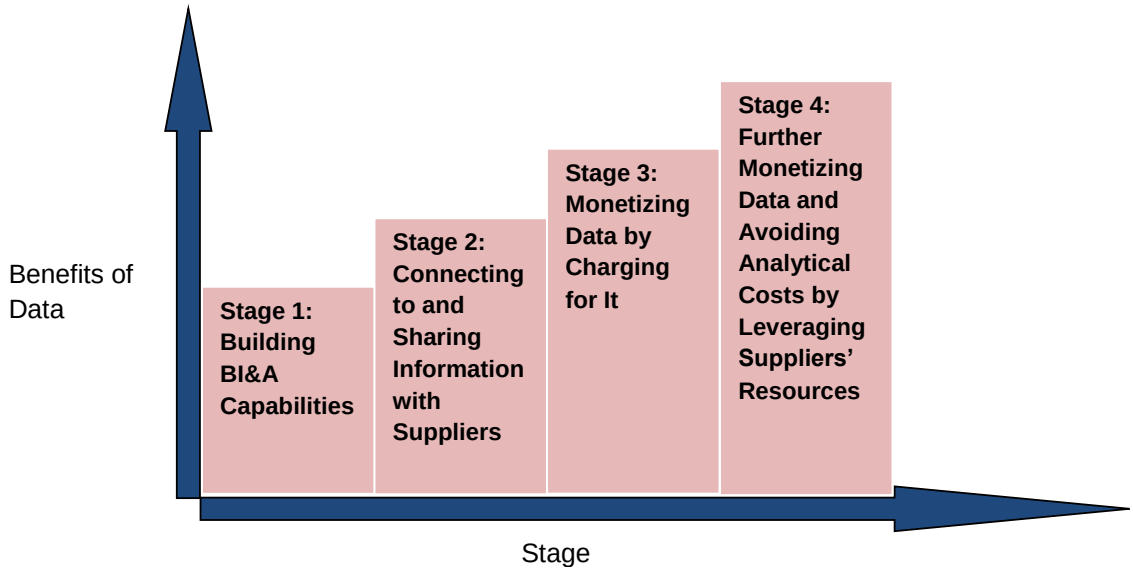

Figure 2: DrugCo's Four-Stage Data Monetization Journey

In Stage 1, *Building BI&A capabilities*, DrugCo built its technical and analytical capabilities to address internal business needs.

In Stage 2, *Connecting to and sharing information with suppliers,* DrugCo connected to its supply-chain partners and started to share information with them through DrugCo's cloud-based supplier portal, hosted by 3PP (a third party data analytics firm that works with DrugCo, and which also wishes to remain anonymous).

In Stage 3, *Monetizing data by charging for it,* DrugCo started selling its data to suppliers via its supplier portal.

In Stage 4, *Further monetizing data and avoiding analytical costs by leveraging suppliers' resources,* DrugCo leveraged its suppliers' data analytical capabilities and avoids some of the costs of its analytical function. This stage continues to the present day.

The characteristics of the four stages are described in Table 1. The stages differ in the data infrastructure and analytical (especially in people) capabilities the company

required, the type of trust[7] built, the focus of DrugCo's information strategy, governance mechanisms, and the costs incurred and benefits achieved by various stakeholders. While there has been ample discussion of the first two stages, we were surprised by the third stage and even more surprised by the fourth.

As DrugCo moved from one stage to the next, the benefits realized from its data increased. DrugCo's data was monetized in the form of revenue generated directly from selling the data, as well as through a decrease in labor and infrastructure costs for analysis. The company also realized benefits from new business opportunities associated with new analytical insights and enhanced its collaboration with suppliers.

Stage 1: Building BI&A Capabilities

The growth of DrugCo's data sources meant that its traditional databases, database management systems and analytical tools became slow and inefficient. DrugCo's VP of Pharmacy Services described this environment:

> *"The database … probably had about 1.2 to 1.3 million transactions a day and those transactions were very long … there were literally hundreds of fields on one of these transactions that could be evaluated."*

[7] Trust is categorized into contractual, goodwill and competence; see Sako, M. *Prices, Quality and Trust: Inter-firm Relations in Britain and Japan,* Cambridge University Press, Cambridge, 1992.

Table 1: Characteristics of the Four Stages of Data Monetization

	Stage 1: Building BI&A Capabilities	**Stage 2: Connecting to and Sharing Information with Suppliers**	**Stage 3: Monetizing Data by Charging for It**	**Stage 4: Further Monetizing Data and Avoiding Analytical Costs by Leveraging Suppliers' Resources**
Technical Data Capability	Implementing data warehouse with basic analytical tools	Developing a supplier portal	Extending the supplier portal with data integration and customized reporting capabilities for data	Offering a scalable data platform to accommodate expanded use of the suppliers' analytical capabilities
Analytical Capability	Internally focused, limited functional analytical capability	More fully developed internal and inter-organizational analytical capability	Matured internal and inter-organizational analytical capabilities; learning what data is saleable	Exploiting analytical capabilities of suppliers
Building Trust	Not an issue as BI&A is internally focused	Contractual trust	Contractual trust; Goodwill trust	Contractual trust; Goodwill trust; Competence trust
Information Strategy	Informing internally	Supply-chain optimization	Revenue generation	Information transparency
Governance Mechanisms	Basic performance metrics; Information assurance	Information sharing contracts; Data presentation mechanisms and standards; Non-disclosure agreements (NDAs)	Pricing structure; Data purchase agreement; NDAs	Evaluation of supplier-provided analytics
Achieved Benefits/Associated Costs				
Achieved Benefits (DrugCo)	Data is used to meet specific business needs and solve problems	Data is shared across boundaries for supply-chain efficiency	Data is sold to generate monetary value and/or share technical costs	Data is traded for analytics to gain new insights; Cost savings and revenue growth
Associated Costs (DrugCo)	Technical cost; Analytical cost	Technical cost; Analytical cost; Contracting cost; 3PP's fee	Contracting cost; 3PP's fee	3PP's fee
Achieved Benefits (Suppliers)		Refined BI&A using the accessed data	Increased sales through better understanding of markets and DrugCo's business	Enhanced collaboration with DrugCo; Increased sales by shelf monitoring
Associated Costs (Suppliers)		Analytical cost; Contracting cost	Data cost; Analytical Cost; Contracting cost	Data cost; Analytical Cost

In response, DrugCo improved its in-house technical data capability by developing a data warehouse and using basic data analytical tools (e.g., Microsoft Access and Excel). Limited functionally based BI capability was used to analyze and understand the implications of DrugCo's data. Business users would attempt to perform basic ad hoc queries and, when faced with more complex or time-consuming analyses, would ask the IT department for help. The main focus of this stage was to use data to meet business needs and solve internal problems. DrugCo's CIO described how limited capabilities meant limited analyses:

> *"If it takes you 45 minutes or an hour to get an answer… you're probably not going to do a lot with it. But if you can do it within 30 seconds or a minute or two, you are more likely to do more analytics and what-if cases."*

Because all data use was internal to DrugCo during Stage 1, inter-organizational trust was not an issue. Information was used to inform internal stakeholders and to run the business more efficiently. Data exploitation was judged to be going well since problems were being solved and new insights were being generated. Various policies were enforced to maintain the internal security and privacy of DrugCo's data.

The data exploitation costs in this stage were the technical cost of building the data warehouse and connecting it to the reporting tools, and the analytical cost of analyzing the data.

Stage 2: Connecting to and Sharing Information with Suppliers

In Stage 2, DrugCo created a secure, cloud-based portal for communicating with its suppliers. The portal provided access to point-of-sale, customer-loyalty and transactional data (e.g., purchases from DrugCo's suppliers) and various BI&A applications. As an

analytical data warehouse platform, it allows suppliers to work with and analyze DrugCo's data so the company and suppliers could collaborate on mutual business goals. DrugCo's Senior Director of Category Management Support (CMS) explained the importance of the supplier portal:

> *"The great thing about this portal and this information is [that DrugCo and its suppliers are] working on the same set of reports a lot of times and we're using the same information."*

DrugCo owned the data it put on the supplier portal, while 3PP offered data analytics, data-cleansing and consulting services, and owned the portal infrastructure. DrugCo sent its data to 3PP, which cleansed it and then uploaded it to the portal. Data security was enforced by preventing suppliers from copying or downloading data from the portal; they could only work with the data while it was still on the portal. Once it was connected with its suppliers, DrugCo had to further develop its analytical capabilities so it could respond to new inter-organizational analytical needs, which imposed additional analytical costs on DrugCo.

Trust is an important factor when external parties are involved with data monetization. In Stage 2, the data-sharing relationship between DrugCo and its suppliers was still somewhat immature. Non-disclosure agreements (NDAs) were used to specify what suppliers could and could not do with the data. These agreements created contractual trust—a mutual understanding between DrugCo and its suppliers based on the agreements. The Senior Director of CMS of DrugCo described DrugCo's contracting approach:

"We've limited the use of the data. It's specifically limited to the purpose of growing the business of our company."

3PP acted as a liaison between DrugCo and its suppliers, providing value-adding activities by hosting DrugCo's data on the supplier portal, providing BI&A services, administrating the information-sharing contracts, contracting directly with some suppliers (e.g., alcohol suppliers, which legally are not allowed to contract directly with DrugCo to purchase its data), and managing different aspects of the relationship such as negotiating pricing of DrugCo's data.

During this stage, data was shared for supply-chain optimization. The suppliers accessed part of DrugCo's data, analyzed it and were able to enhance their marketing campaigns, production planning, pricing and inventory management.

The governance of DrugCo's supplier portal was designed to be collaborative. Major suppliers joined an advisory board that oversaw how the supplier portal was implemented. Voting was used to prioritize enhancements and to determine data presentation mechanisms and standards. The VP of Retail Solutions at 3PP explained the structure and function of the advisory board:

"[At any time] there's around 18 to 20 suppliers on [DrugCo's] advisory board and there are eight that are on their senior council … the larger group meets twice a year and the senior group meets four times a year ... they prioritize the changes or enhancements they want to see in the program and pass them to DrugCo ... DrugCo is only a member … It's a user-driven advisory board."

DrugCo's costs during Stage 2 were the technical cost of building the supplier portal, the analytical cost for the additional inter-organization analyses, and the contracting cost

for preparing contracts and NDAs with suppliers and third parties. 3PP incurred the cost of hosting the portal and providing additional analytical services. Suppliers connected to the portal also incurred contracting costs for the NDAs and analytical costs for analyzing the data they accessed. With direct access to the portal, suppliers could dynamically manipulate vast amounts of DrugCo data to answer questions on the fly.

Stage 2 laid the technical foundation (i.e., in the supplier portal) for data monetization and showed that DrugCo's data was valuable to its suppliers.

Stage 3: Monetizing Data by Charging for it

In Stage3, with the supplier portal running successfully and suppliers having a good feel for DrugCo's data and its value, DrugCo began to extract more value from its data by monetizing it:

> *"They [retailers in general] accumulate billions of records every year of point-of-sales transaction data and they are taking that huge amount of data and creating their own commercial data clouds for their suppliers to analyze … A consumer-packaged-goods brand can just log in and see not only how their own products are doing in those stores but also how a competitor's products are doing in those stores."* VP of Marketing, 3PP

The supplier portal was enhanced by adding additional data sets (particularly loyalty data) and customized reporting capabilities to provide a wider range of reports to the data-buying suppliers. DrugCo's internal and inter-organizational analytical capabilities matured and it started to identify what data was saleable.

Data was offered in different packages, each of which had a different data granularity, reporting capability and price tag. By now, DrugCo had a dedicated executive on its

merchandising team for selling its data, and this executive worked with 3PP to market these data packages directly to DrugCo's suppliers. Prices were often negotiated. If a supplier chose a higher level of information access and granularity, the price increased. There were four levels of data packaging—Basic, Bronze, Silver and Gold—for point-of-sale data (see Table 2). Only a limited number of DrugCo's major suppliers were allowed to purchase the highest Gold level package. As discussed later, a supplier had to invest resources in its relationship with DrugCo to become a candidate for the Gold level.

A data purchase agreement and NDA were prepared for DrugCo and any supplier who wanted to buy data. Trust in Stage 3 included goodwill trust (based on beliefs) in addition to contractual trust (based on written agreements). When goodwill trust exists, partners are willing to go beyond stipulated contractual agreements. Thus, DrugCo trusted that the supplier would not only adhere to the data purchase agreement, but would also use the data for the benefit of the both parties. In essence, DrugCo's major suppliers learned to tell DrugCo when they saw a problem that needed to be addressed, regardless of whether doing so was of immediate benefit to the supplier.

Big suppliers (such Johnson & Johnson, Procter & Gamble, Coca Cola, PepsiCo, 3M, Novartis and Unilever) have been applying analytical tools for a long time to better predict demand and develop successful marketing campaigns; they are equipped with significant know-how in terms of BI&A:

Table 2: Four Levels of Data Packaging

Level	Data Access and Analytics Provided	Current No. of Suppliers	Percentage of Suppliers
Basic	• Supplier items only at POS transaction level detail filtered by SKU • Information provided shows supplier inventory level status • Access provided only through prebuilt reports	358	55.3%
Bronze	Basic Package plus: • Summaries for all approved classes/categories provided by a few prebuilt reports	128	19.8%
Silver	Bronze Package plus: • All items at POS transaction level detail for approved classes filtered by class • Ability to upload up to 10 GB of DrugCo's data for enhanced analysis by supplier • Third-party analysis tool provided for ad-hoc analysis by supplier • (Limited) basket view of categories a supplier operates in	82	12.7%
Gold	Silver Package plus: • (Full) basket view for all baskets, regardless of categories or supplier • Custom reports built for individual supplier or built for a set timeframe	79	12.2%

> *"There are hundreds of CPG [consumer packaged goods] companies … analyzing detailed data from retailers … mixing it together with econometric and demographic data, weather data, various kinds of geographic data, and trying to better understand the markets and figure out how to better sell the products."*
>
> Cofounder and CEO, 3PP

With access to more granular data, suppliers were able to fine-tune their operations by predicting sales trends more accurately and thus better develop marketing and promotional campaigns:

"They [suppliers] can see a trial and repeat. They can see how a BOGO [Buy One Get One] type of promotional offer is performing, how our customers react to that

differently than maybe a BOGO 50 [50% off] or a price point." Senior Director of CMS, DrugCo

During Stage 3, 3PP provided additional services to DrugCo, including training and supporting suppliers, negotiating and administering data-package contracts, BI&A services and marketing of DrugCo's data.

The information strategy of DrugCo at this stage shifted toward revenue generation; data was being sold and was generating a revenue stream for DrugCo. This revenue offset some of the costs of the underlying infrastructure such as the data warehouse, the supplier portal and the reporting tools.

Although DrugCo did not need to make additional investments in technical and analytical capabilities during Stage 3, it was still bearing 3PP's ongoing costs for hosting the cloud-based data and portal, and providing additional analytical services. It also incurred contracting costs for preparing the purchase agreements with data-buying suppliers. Suppliers were incurring the costs of buying DrugCo's data, negotiating the contracts for the data and analyzing the data. The suppliers benefited by understanding the markets and DrugCo's business better. They were able to increase their sales by using DrugCo's granular data to design promotions and to leverage product affinities for additional promotional effectiveness. The Chairman & CEO of Procter & Gamble stressed the value of real-time, granular data:

"For companies like ours who rely on external data partners, [getting the data] becomes part of the currency for the relationship. So as we deal with retailers, I may not be interested in getting that Tide ad this week, but if you give me your data in real time for the next four weeks, that's more valuable to me … It would be

heretical in this company to say that data is more valuable than a brand, but it's the data sources that help create the brand and keep it dynamic."[8]

Stage 4: Further Monetizing Data and Avoiding Analytical Costs by Leveraging Suppliers' Resources

The final stage extended the data monetization journey to new horizons, which enabled DrugCo to take even greater advantage of the analytical capabilities of its suppliers:

"The purpose of that [supplier having access to our data] is for them to be able to help us be smarter about how we run our business." CIO, DrugCo

The technical platform for DrugCo's data was expanded to meet new scale requirements arising from the suppliers' use of the platform to perform advanced analyses on the data. Also, advanced human capabilities were required to use applications that incorporated advanced analytical techniques (such as optimization, predictive modeling, simulation, time series modeling and principal component analysis). However, DrugCo avoided these additional analytical costs by exploiting its suppliers' analytical capabilities; it began to rely more on the business insights generated by suppliers' analytics on the data they purchased from DrugCo. The Cofounder and CEO of 3PP elaborated on the symbiotic relationship between retailers and the CPG suppliers:

"CPG companies are often quite sophisticated … The retailers look at the CPG companies for advice [on] how to stock their shelves, how to do promotions, what products to sell, to whom [and] under what circumstances … There's a symbiotic

[8] Interview with Robert McDonald, Chairman & CEO of Procter & Gamble, downloaded from: http://www.mckinsey.com/insights/consumer_and_retail/inside_p_and_ampgs_digital_revolution

relationship in the sense that the retailer gets advice from the CPG company, and the more information the CPG company has about what's going on at the retailer and in the market, the better advice they would get, and of course there's the money angle … Retailers, like anyone else, are always looking for revenue sources and retail is a tough market, [with] very tight margins, and the more revenue they can get the better."

With access to DrugCo's data, suppliers started to understand the markets and DrugCo's business better; a supplier could get better insights into how it and DrugCo could together grow their businesses. This led, in turn, to DrugCo gaining a better understanding its own promotions and its customers, and how they were buying products over time.

DrugCo's suppliers can now develop affinity analysis reports—which show what products are usually sold together—faster and more accurately, and pass these reports to DrugCo. The reports enable DrugCo to run separate promotions and advertisement campaigns for highly related products instead of promoting and advertising them at the same time. The shift of data analytics to the suppliers resulted in a reduction of analytical costs for DrugCo.

Major suppliers offer insights to DrugCo through direct interaction on a daily basis between DrugCo's merchandising team and the suppliers' sales agents, often supported by BI&A analysts. In addition, supplier and DrugCo representatives are both involved in meetings of the supplier portal advisory board, where entire sessions may focus on analytics insights of benefit to DrugCo. For example, one major supplier presented a co-merchandising affinity analysis program it had recently implemented, which predicts

what third product will be purchased when two other products are sold. After reviewing the program, the advisory board voted and approved that the program should be made available to Gold members, and it was included in the Gold level of data access.

In Stage 4, suppliers enhanced their collaboration with DrugCo and increased their sales*;* for example, they could use a shelf-monitor program that looks at sales of their products and detects a potential out of stock, which may cause a consumer to switch and buy a competitor's product. Some suppliers became trusted sources of data analysis. Based on these analyses, suppliers developed merchandising strategies and targeted promotional programs that DrugCo could implement:

> *"What we do with retailers [is] what we call Joint Business Planning or Joint Value Creation … For us, getting data becomes a big part of value whereas for the retailer they have the data, so that's become a big part of our work together, and then how can we use this data to help them, because we have analytical capabilities that many retailers don't have, so often times we can use the data to help them decide how to merchandise or market their business in a positive way."*
>
> Chairman & CEO, Procter & Gamble[9]

An additional form of trust, competence trust, was needed in Stage 4. DrugCo trusted that its partners had the superior managerial and technical capabilities needed to analyze its data. The company trusted that some suppliers had the capability and the willingness to use and analyze its data in a way that benefitted both parties while refraining from any misuse or misconduct regarding the data. 3PP's VP of Retail Solutions described how DrugCo's supplier portal enabled the formation of competence trust:

[9] Interview with Robert McDonald, Chairman & CEO of Procter & Gamble, downloaded from http://www.mckinsey.com/insights/consumer_and_retail/inside_p_and_ampgs_digital_revolution

"[A retailer] would let their [suppliers] see the actual performance of the SKUs by day by store in a [market] basket level perspective because they were starting to trust the advice and counsel that their suppliers were giving them … DrugCo can watch how the analysis was done by the [supplier] and argue it. The [supplier] really can't be sneaky because everything they do is wide open."

As DrugCo reached the fourth stage of the journey to data monetization, it shifted to a transparency strategy.[10] With this strategy, a company realizes that the benefits of sharing data with external partners exceed those of withholding information from them. DrugCo recognized the importance of limiting strategic information partnerships to the suppliers entitled to the highest Gold level data package. Allowing a supplier to purchase the Gold level package is viewed as a strategic merchandising decision and is based on the volume of transactions with the supplier, the number of people (i.e., the supplier's data analysts and salespeople) who are dedicated to work only with DrugCo, and DrugCo's recognition of the supplier as a trusted advisor. Suppliers now compete to be designated by DrugCo as a "category captain." These suppliers review the performance of the entire category and recommend a store-level sales strategy, including assortment, shelf-space assignments, promotion, and pricing.[11] Category captains have the closest and most regular contact with DrugCo and invest time, effort and resources into the strategic development of their categories within DrugCo. They deploy dedicated analysts who only

[10] A transparency strategy is defined as one that selectively discloses information outside the boundaries of the firm to buyers, suppliers, competitors and other third parties like governments and local communities; see Granados, N. and Gupta, A. "Transparency Strategy: Competing with information in the Digital Age," *MIS Quarterly*, (37:2), 2013, pp. 637-641.

[11] For an analysis and recommendations for choosing a category captain, see Subramanian, U., Raju, J. S., Dhar, S. K. and Wang, Y. "Competitive Consequences of Using a Category Captain," *Management Science,* (56:10), 2010, pp. 1739-1765.

work with DrugCo and thus become trusted partners. In return, category captains have some degree of decision-making authority and an influential voice at DrugCo. DrugCo evaluates its suppliers' analytical performance based on the value of the analytics and recommendations provided by them and their track-record of promoting DrugCo's business.

Lessons Learned

Several important lessons emerge from the DrugCo case. We believe the following practices will contribute to the successful monetization of data.

1. Consider How Creating and Sharing Data Will Change Relationships and Business Models

It is important to consider the dynamics among supply-chain members and to think about how data monetization might change the traditional relationships in the supply chain. Retailers can expect their major suppliers to compete for a category captain role to become a trusted advisor and a source of valuable business recommendations. Companies need to carefully consider the trade-off between higher levels of information transparency with their supply-chain partners and the possible risk of losing information advantages over suppliers, customers and competitors.

Data monetization creates a new business model for the company, in which revenue generation, cost structure, value proposition and relationships change. The company's data is not only used to run the business, but also becomes a digital product the company can use to generate revenue and cover the costs associated with creating and gathering data. Leveraging suppliers' analytical capabilities introduces a new era of informational collaboration among partners and supply-chain members. Suppliers can add value to their

relationships with retailers by offering business insights and new business-growth opportunities. Third parties can provide value-adding services to create and sustain a data monetization platform.

As the dynamics of competition and cooperation among companies continue to evolve, IT provides opportunities for value co-creation. A data monetization relationship is a good example of the co-creation of IT-based value between companies at the assets, complementary capabilities, knowledge-sharing and governance levels.[12]

2. Identify Where You Currently Are in the Data Monetization Journey and Where You Want to End Up

An ideal end state of a data monetization initiative will result in deeper insights from this ecosystem, a revenue stream, a reduction in infrastructure and analysis costs, and trusted use of data by partners. The following are several aspects that concerned stakeholders have to pay attention to, prior to and during their data monetization journey.

Prepare Your Data for Sale. The integration of additional relevant data sets into the company's data will increase the value of the data to data buyers. For example, DrugCo enhanced the value of its data to its suppliers by adding loyalty data. Companies should also package the data for sale to meet different needs, analytical capabilities and willingness to pay. Multiple levels of data packaging (see Table 2) is a useful approach to follow.

Assess the Need for Value-Adding Third Parties to Join the Data Monetization Ecosystem. Third parties can provide various value-adding activities in the data

[12] For more discussion on co-creating IT value, see Grover, V. and Kohli, R. "Cocreating IT Value: New Capabilities and Metrics for Multifirm Environments," *MIS Quarterly*, (36:1), 2012, pp. 225-232.

monetization ecosystem. Examples include orchestrating the relationship between the company and the data buyer by hosting the data, contracting with data buyers, offering training and support, and providing technical and analytical capabilities. A third party can also be instrumental in the company's effort to obtain and build the required technical and analytical capabilities. Assessing what can be outsourced can be instrumental to building and sustaining a data monetization initiative.

Market Your Data and Challenge Your Suppliers to Get Onboard. A marketing strategy is needed to advertise and promote the value of the company's data. The company has to approach potential data buyers and highlight how and why the data is useful, as suggested by DrugCo's Senior Director of CMS:

> *"Challenge them saying: "Well, your competitors understand this better now. You know you're falling behind."*

Even when third parties participate in the data monetization initiative, the company still has to be involved in selling its data:

> *"You have to be involved with pushing it and selling it. You don't really outsource the selling of the data."* Senior Director of CMS, DrugCo

Avoid Some Analytical Costs by Leveraging Suppliers' Analytical Resources. A data monetization initiative can create new opportunities for the company to exploit its suppliers' ability to analyze data. It is not uncommon for there to be more analytical resources on the supplier's side dedicated to working on and analyzing the company's data, as highlighted by DrugCo's CIO:

> *"More [analytical] people on the [supplier] side have access to [our data] than we do internally."*

Recognize and Reward Your Top-Performing Supplier Partners. Determining appropriate measures to identify top-performing suppliers in your data monetization ecosystem and rewarding them will establish a collaborative relationship in which actions are guided by the principle of mutual benefit. A supplier can be rewarded by allowing it to have a higher level of data package and by nominating it as a category captain. Decisions to recognize top performance should not only be based on transaction volume but also on the supplier's provision of human capabilities and the quality of advice provided. The performance of existing category captains should be continuously monitored so that underperforming category captains can be replaced with new ones.

3. Develop Contracts to Ensure Adherence to Data Monetization Policies

Several contracts were developed between DrugCo, 3PP and DrugCo's suppliers throughout the data monetization journey, notably NDAs and data-sharing and purchase contracts. These contracts restricted the use of the shared or purchased data to specific purposes. Suppliers were obliged to use the data they purchased for the sole purpose of growing the mutual business of the suppliers and DrugCo.

4. Nurture Trust Between the Involved Parties

Different forms of inter-organizational trust exist between business partners. Trust can lower the contracting cost and conflict level required to reach a data-purchase agreement. The progression from trust based on written agreements to trust based on beliefs contributes to the formation of a collaborative relationship in which mutual benefits are considered by the parties involved. Inter-organizational trust can be built by communication of trustworthiness, inter-organizational coordination to establish governance mechanisms, and successful and repeated interactions that demonstrate each

partner's reliability. The transparency of the collaboration portal can also nurture trust between a company and its suppliers; suppliers can be held accountable for their use of the company's data and the quality of the analysis and advice they provide.

Concluding Comments

The DrugCo case demonstrates that getting direct monetary value from a company's data is no longer elusive. Data analysis tools and cloud computing have paved the way to monetizing a company's data. This article describes how a major retailer was able to monetize its data by going through four distinct stages, and ultimately increase both tangible and intangible benefits. Building technical and analytical capabilities and connecting with the retailer's suppliers facilitated the emergence of a digital ecosystem that enabled data monetization. DrugCo managed to cut its analytical costs by leveraging its suppliers' well-established technical and analytical capabilities. Joint benefits emerged from this new relationship by generating a new revenue stream and providing a cost-sharing mechanism for the retailer, and offering suppliers real-time access to the retailer's data.

Appendix: Research Approach

The topic of data monetization arose when one of the researchers interacted with an executive of 3PP, a company that provides cloud-based big data hosting as well as analytical and consulting services. This firm had considerable experience in building supplier portals and/or cloud-based data ecosystems helping companies monetize their data. At the researcher's request, 3PP identified several of its clients that had monetized their data and the researcher approached them about the possibility of in-depth cases

concerning the "how and why" of data monetization. DrugCo was willing to discuss its journey on the condition that it remained anonymous.

First, we carried out numerous rounds of interviews at 3PP with the VP of Business Analytics, VP of Retail Solutions, the Client Project Manager and a Client Relationship Manager to more fully understand data monetization in general, and 3PP's experiences with DrugCo in its role as a catalyst and facilitator of DrugCo's data monetization journey. The data provided by these interviews was analyzed and formed the initial picture of DrugCo's journey. Based on what we learned from this round of interviews, we looked into supply chain literature for potential constructs pertinent to information sharing and supply chain integration. We identified the following core constructs influential in determining BI&A and data sharing and use: technical capability, analytical capability, type of trust, information strategy, and governance mechanism.

Next, data gathered from the interviews with 3PP was used to develop the interview guide to be used at DrugCo. Executives at DrugCo who were knowledgeable about and had participated in DrugCo's data monetization journey were identified with the help of 3PP. In-depth interviews were conducted with DrugCo's CIO, the Director of Category Management Services and the VP of Pharmacy, who provided details about DrugCo's journey. Email follow-up questioning also occurred.

Finally, follow-up corroborating interviews were conducted with 3PP's VP of Retail Solutions, Client Project Manager and Client Relationship Manager to triangulate accounts. Secondary sources, including some additional interviews at 3PP and public sources, complemented our primary sources and allowed us to form an overall view of data monetization. Based on construct definitions identified in earlier rounds of interview

we observed changes in aspects of these constructs at pivotal points across time that we designated as important transitions or stages.

Future research can extend this study by either a) developing multiple game theory scenarios, with one or more retailers and suppliers, that incorporate both cost factors as well as benefits associated with a data monetization relationship to determine how the decisions of multiple agents (i.e., retailers and suppliers) affect each agent's payoff; or, b) collecting primary and/or secondary data about core constructs in current or potential data monetization relationships and examining how these constructs influence other important constructs like organizational performance and agility.

CHAPTER 2

JUST GET IT FIXED: SOCIAL CAPITAL AND SERVICE RECOVERY PRACTICE IN ACHIEVING SATISFACTION

INTRODUCTION

Prior information systems (IS) research has considered service quality and social capital as determinants of user satisfaction with IS service. Today it is held that the quality of service delivered by the Information Systems Function (ISF) and the relationships built with its internal customers will result in higher perceptions of overall satisfaction with the ISF's services. As opposed to overall satisfaction with the ISF, little is known about IS service recovery satisfaction and, in particular, how this type of service encounter satisfaction is formed after a service failure when the ISF deliberately attempts to correct the problem.

According to the service-profit chain (Heskett et al., 2008), an employee's overall satisfaction results from the receipt of continued high-quality support services that enable the employee (internal customer) to deliver value to external customers that in turn, increases external customer satisfaction, thus stimulating organizational profitability and growth. Following an IS service failure, an employee will evaluate the ISF's recovery response in such factors as speed, effort invested, and explanation provided as well the closeness of his/her relationships with the ISF, forming an assessment of the IS service 'recovery satisfaction' for that service encounter. Marketing literature tells us that such a service encounter-specific satisfaction will, in turn, influence an employee's overall satisfaction perpetuating the service profit chain (Jones and Suh, 2000).

In this way, service recovery satisfaction is based on an evaluation of a single service encounter, whereas overall satisfaction with the ISF is a holistic measure of the results from multiple previous service encounters. This study examines the impact of recovery satisfaction (i.e., a form of service encounter satisfaction) on overall satisfaction (i.e., satisfaction with the ISF).

We build on service recovery and social capital literature by theorizing that internal IS service recipients are placed in an organizational social network and have specific IS service recovery needs and expectations. Employees use organization-supported IS and cooperate with the ISF to deliver value to themselves, the organization, and end-customers. In this way, employees expect the ISF to deliver a level of IS service through which value is collaboratively created (Sun et al., 2012). Internal IS customers can collaborate with the IS service provider and contribute value if their work systems are operating reliability and effectively. This collaborative relationship enabled through social capital can focus on improving IS artifacts through processes such as requirement definition and participation in IT deployment, or, through business focused objectives such as customization and integration of goods / services and reliably delivering good customer value (Tuli et al., 2007). IS service providers are challenged to consider how accumulated social capital contributes to recovery satisfaction following an IS service failure. Social capital has been found to impact overall satisfaction with the IS service delivery unit (Sun et al., 2012), but what effect will it have on a service encounter's recovery satisfaction after a service failure? This study investigates this question.

Past research has largely focused on external customer service recovery whereas considerably less has focused on the internal IS customer. Research in service marketing

and operations views a service failure/recovery encounter as a sequence of events in which a service failure triggers a *procedure,* beginning with communicating the failure, generating a process of *interaction* across multiple potential touch-points through which an *outcome* occurs (Tax et al., 1998; Smith et al., 1999). This stream of research has also identified several dimensions of service recovery that a service provider should pay attention to in order to mitigate the effect of service failure. This study builds on this view of service recovery by introducing recovery procedure, recovery interaction, and recovery outcome as components of internal IS service recovery and discusses the extent to which these components are critical for IS service recovery satisfaction. This study also identifies dimensions that are associated with the components of IS service recovery; these dimensions are hypothesized to contribute to the procedural, interactional, and outcome recovery components of the internal IS service recovery activities performed in the case of an internal IS service failure.

In sum, the effect of recovery satisfaction on overall satisfaction with the ISF will be evaluated and the influence of social capital on IS service recovery satisfaction is theorized. In addition, a set of pertinent dimensions of IS service recovery are identified and the relationships between IS service recovery components and IS service recovery satisfaction are tested. To address the research questions and test the hypotheses we conduct two related studies; Study 1 identifies the IS service recovery dimensions that correspond to each IS service recovery component and initially establishes the relationships between the IS service recovery components and IS service recovery satisfaction; and in Study 2 we tested the complete proposed research model to validate it.

THEORETICAL BACKGROUND

Service Recovery

Customers have service needs and expectations regarding service levels to fulfill these needs (Goldstein et al., 2002). Services fail when they do not meet a need, do not offer a perceivable benefit to the customer (Rothschild, 1979), or when service delivery activities fall below the customer's expectations (Zeithaml et al., 1993). Errors in service delivery result from unique characteristics of services that distinguish them from tangible products: 1) service delivery and use are not easy to separate, which prevents quality inspections of most services prior to delivery (Hess et al., 2003) and forces the customer into an intimate contact with the production process (Carman and Langeard, 1980) and when, 2) the heterogeneity of many labor-intensive services which result in variation of service quality (e.g., Different employees may be in contact with a customer and same employee's performance fluctuates up and down, raising a problem of consistency of behavior) (Zeithaml et al., 1985).

The inevitability of service failure (Dong et al., 2008) calls for methods and procedures to minimize its effects and by effective management of the interaction between the organization and its customers, turning these dissatisfactory interactions into satisfactory ones (Bitner et al., 1990). Understanding how to mitigate the effect of service failures by providing successful service recovery is important to retain customer satisfaction and keeping them wanting to use the provider's services (Liao, 2007).

Organizations use a group of activities to respond to a perceived service failure (Gronroos, 1988), which is referred to as service recovery. Service recovery can be defined as the actions service providers take to resolve customer problems and service

failures (Smith and Karwan, 2010). Service recovery has a greater impact on overall satisfaction than any other individual aspect of the service delivery (Harris et al., 2006). Hocutt et al. (2006) show that consumer satisfaction may be even greater following a well-managed service recovery than it would be if there had been no service failure in the first place. The criticality of service recovery requires a clearer understanding of ways to improve the activities and actions performed by a service provider in a case of a service failure.

Internal IS Service Recovery

Applying a service delivery perspective to internal employees is not new (George, 1977; Gronroos, 1978). Internal service refers to how employees are served in their local units by the larger organization (Ehrhart et al., 2011). Internal service marketing is concerned with satisfying the needs of a vital internal market (employees) while satisfying the objectives of the organization (Berry et al., 1976).

Research identifies at least three unique aspects that differentiate internal customers from external customers in that most internal customers 1) are consumers of only services, not products, 2) may be more knowledgeable consumers of the services they use (Finn et al., 1996), and 3) often have little to no choice about where to do business (Finn et al., 1996; Montoya et al, 2010). Employees have similar service experiences, expectations, and perceptions as those of external customers (Gremler et al., 1994). Organizations are asking internal service departments to provide more accountable services. In many organizations, internal customers (employees) are asked to evaluate internal suppliers to ensure that the goals of the internal suppliers are congruent with

those of the firm (Hauser et al., 1996) and to apply measures of service quality to ensure satisfactory service (Gremler et al., 1994).

IS service failure are incidents where information processing and delivery services are perceived by users to be interrupted or compromised, such as hardware malfunction causing reliability problems, data loss or misrepresentation, software inaccessibility or termination, network connection problems, or inability to connect to the Internet. Basically, IS service failure is experienced when some aspects of information technology are not working properly based on the expectations of an employee. McColl-Kennedy and Sparks (2003) conclude that service failure can be attributed to one of four major areas that can be witnessed in IS services as follows: (a) problems with the service itself (e.g., a program shows a fatal error), (b) problems associated with the service provider (e.g., erroneous installation of a new system), (c) problems outside the service provider's control (e.g., electrical outage), and (d) problems related to customers (e.g., unintended deletion of data). No matter what the source of failure is, customer oriented IS service providers recognize that they are responsible for dealing with the IS service failure and solving the problem (Gremler et al., 1994).

The Information Systems Function (ISF) within the organization is responsible for providing IS products and services to customers (Kettinger and Lee, 1994). Saunders and Jones (1992) define the ISF to include all IS groups and departments within the organization charged with delivering IS services. Therefore, the ISF can be viewed as the internal service provider of IS services within the organization (Kettinger et al., 2009). The term internal IS service recovery refers to the processes and activities the ISF engages in to respond to incidents where an IS service failure is perceived by an internal

IS service recipient. In case of IS service failures, IS service providers have to deal with these failures and ideally restore their internal customers' (i.e., employees') satisfaction with the organization's ISF. The ISF provides employees with IS services and IS recovery components to ensure a better level of service to internal, and ultimately, external customers.

Montoya et al., (2010) view the IS service provider as an indirect but significant factor in the service-profit chain; they propose that internal IS service providers (i.e., the ISF) can benefit from the adoption of a marketing perspective in which the ISF may be able to actively manage its relationship with internal customers through the use of service mechanisms. IS service levels can significantly impact employees' daily jobs and frontline employees' ability to achieve results for customers. Employees expect the ISF to provide them with a level of IS service that they can rely on to effectively do their jobs.

Traditionally, organizations formalize internal services recovery processes to address employees who feel that an IS service has not performed as expected. Typically this entails the ISF being notified and the ISF attempting to address and resolve the problem. Today, it is not uncommon for organizations to have help desk and IS service recovery departments and this function may sometimes be partially outsourced (Baldwin et al., 2001; Teng et al., 1995). While IS services can be delivered from multiple service providers including informal sources, in this study we focus on the internal organizational entities formally empowered to deliver services to a specific internal IS customer (i.e., ISF).

Recovery Satisfaction

Jones and Suh (2000) differentiate between service encounter satisfaction (i.e., recovery satisfaction) and overall satisfaction (i.e., satisfaction with the ISF). Service encounter satisfaction provides specific information about a particular service encounter, while overall satisfaction is a perception of multiple transactional experiences as a whole; it accumulates across a series of transactions or service encounters and is a more fundamental indicator of past and current performance (Parasurman et al., 1994; Vazquez-Casielles et al., 2010).

After an IS service fails, the employee will contact the ISF to request an IS service recovery. This contact will typically initiate a set of service recovery procedures and interactions with the service provider and ultimately a service recovery outcome. Following the IS service recovery experience, the employee forms a recovery satisfaction. Recovery satisfaction is defined as a post service recovery assessment of how well IS service provider performed service recovery following an IS service failure.

Social Capital

Nahapiet and Ghoshal (1998) define social capital as "the sum of the actual and potential resources embedded within, and derived from the network of relationships possessed by an individual or social unit" (p. 243). Unlike other forms of capital, social capital inheres in the structure of relations between actors and among actors; it exists in the relations between persons (Coleman, 1988). There are three interrelated dimensions of social capital: the structural, the relational, and the cognitive dimensions (Nahapiet and Ghoshal, 1998).

In an organizational context, the structural dimension of social capital is the overall pattern of connections between employees (Nahapiet and Ghoshal, 1998). The structural dimension of social capital defines the structural means of formal and informal social interaction (Tsai and Ghoshal, 1998). The cognitive dimension refers to the capabilities for shared representations, interpretations, and systems of meaning among employees (Cicourel, 1973); it reflects the extent to which employees share a common perspective or understanding (Bolino et al., 2002). The relational dimension involves assets that are created and leveraged through social relationships, including trust and trustworthiness, norms, obligations, and identification (Nahapiet and Ghoshal 1998). This dimension reflects the nature of the connections between employees (Bolino et al., 2002)

Bolino et al., (2002) distinguish between the three dimensions of social capital; the structural dimension focuses on whether employees are connected at all (i.e., do employees have a way to know one another?), the cognitive dimension focuses on whether these connections have a cognitive component to them (i.e., do employees truly understand one another?), and the relational dimension focuses on the quality or nature of these connection (i.e., are they characterized by trust, intimacy, liking?).

Sun et al. (2012) define IS service delivery as a joint application of specialized competences by internal customers and the ISF. This conceptualization of IS service views employees as "endogenous to how IS service is delivered, and, those who coproduce the IS service" and suggests a more collaborative and relational nature of IS service delivery and a higher degree of social interaction between employees and ISF team members results in employees' overall satisfaction with the ISF (Sun et al., 2012).

Building and maintaining close relationships with customers are also critical in case of a failed service recovery (Mattila, 2001). We expect that, following an IS service failure, the social capital[1] built between the ISF and employees will influence employees' evaluation of recovery satisfaction. If this assumption is true, the ISF should invest in building close relationships with internal customers that will, in the case of IS service failure, influence their perceptions of recovery satisfaction.

IS Service Recovery: Recovery Procedure, Interaction, and Outcome

Marketing and operations literature has identified a service failure/recovery encounter as a sequence of events in which a service failure triggers a *procedure*, beginning with communicating the failure, generating a process of *interaction* through which an *outcome* occurs (Tax et al., 1998; Smith et al., 1999). Past research on service recovery has also identified key dimensions important in theorizing the internal IS service recovery concept (Bitner et al., 1990; Liao, 2007; Mohr and Bitner, 1995; Smith et al., 1999). For example, one study by by Liao (2007) discusses Service Recovery Performance (SPR) and proposes making an apology, problem solving, being courteous, providing an explanation, and prompt handling as dimensions of SPR.

Building on this service marketing perspective, we argue that IS service recovery consists of the following three components: a) *recovery procedure*, which refers to the means by which IS service provider attempts to resolve IS service failure, b) *recovery interaction*, which reflects the communication between IS service provider and the

[1] We theorize that cognitive and relational dimensions of social capital will have the most influence on recovery satisfaction in the case of internal IS recovery. Structural capital is not as important because most employees have and know a structural way to identify and communicate with each other; in this way the structural capital is already established and more easily documented inside the organization. Also, Sun et al. (2012) did not find a direct effect between structural capital and ISF overall satisfaction.

employee during IS service recovery, and c) *recovery outcome*, which represents the result of IS service recovery.

For every service failure communicated to a service provider and followed by a service recovery, there is a procedure that frames the structure of recovery. Employees observe how the recovery procedure is being done and how earnestly and justly the IS service provider is in following that procedure. This procedure generates the potential for interaction between employees and the IS service provider. During the recovery interaction, employees look for the IS service provider to communicate politeness, empathy, and concern and provide them with a reason for the IS service failure. At the end of the service recovery process, employees assess what happened and evaluate the final result of the IS service recovery. Employees will base their evaluation of recovery outcome on factors such as solving the problem completely and quickly. All of this will equate to an overall judgment, a post-recovery measure of the recovery procedure, recovery interaction, and recovery outcome (See Figure 1).

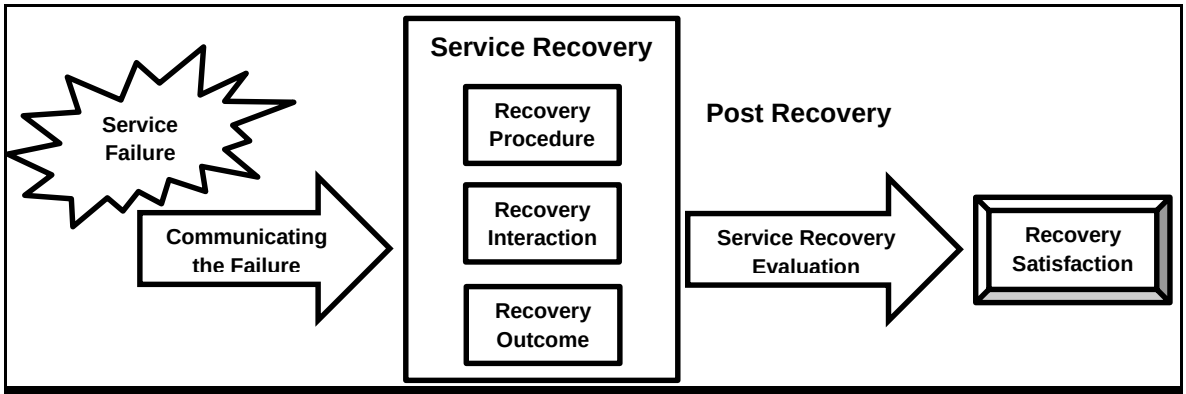

Figure 1. IS Service Recovery Framework

Guided by this IS Service Recovery Framework, and based on literature review and field investigation, our first study (See Study 1 Section) sought to identify recovery dimensions that are relevant to recovery procedure, recovery interaction, and recovery outcome in an internal IS context, which will be explained next.

Recovery Procedure

Although it is important from the employees' perspective that IS service provider fixes IS service failures, they also want the recovery procedure to be characterized by perseverance and fairness. IS service provider has to put effort into resolving an IS service failure and has to be fair while performing IS service recovery.

Recovery effort is the amount of perceived positive energy a service provider puts into resolving a problem resulting from service failure (Folkes, 1984; Mohr and Bitner, 1995). Employees may perceive that some service providers go beyond expectations, dedicating tremendous effort to solve their problem, while other service providers merely go through the motions with little or no positive energy. The best scenario is that the service provider can initiate and complete the recovery process, engage employees in a value-adding process, and avoid wasting employees' energy. Dong et al. (2008) suggest that customers engaged in the recovery process report higher levels of role clarity and are more satisfied with the service experience; however, most employees do not want to invest a lot of energy in service failure recovery attempts, especially if they perceive this energy investment as compulsory. Mohr and Bitner (1995) suggest that a perceived service provider's effort has a strong positive impact on service encounter satisfaction and is appreciated regardless of its impact on the outcome. Employees' perception of the effort

IS service provider puts into resolving the problem indicates how well IS service provider performed the recovery procedure.

Recovery fairness, defined as the degree to which the IS service provider is free from bias or injustice during service recovery, is an important aspect of service recovery (Liao, 2007; Smith et al., 1999; Tax et al., 1998; Kau and Loh, 2006). Customers tend to evaluate how their services are recovered and how the service provider addresses their service failure in comparison with other customers. Carr (2007) concludes that the IS service context allows for discussion among employees, which will lead them to form conclusions regarding the fairness of the services delivered to them. In an internal IS context, employees expect IS service provider to be consistent, just, and fair during recovery procedure; employees will compare the way IS service provider handles their IS service failure with the way IS service provider handles other employees' IS service failures.

Recovery Interaction

During service recovery, IS service provider are advised to communicate a sense of social sensitivity, such as demonstrating empathy for the employee's service failure and providing adequate explanations why the service failure happened. Recovery interaction encompasses service recovery dimensions that are relevant to the communication that takes place between the IS service provider and employees.

An *apology* may convey the service provider's politeness, empathy, and concern to customers who have experienced a service failure (Smith et al., 1999). By offering some sort of apology, the service provider accepts responsibility for the service failure and expresses regrets for what has happened to a customer (Liao, 2007). A service provider

who communicates recognition of service failure through an apologetic posture may communicate that they recognize the importance of the failure in the eyes of the internal customer (Miller et al. 2000). As IS service recipients, employees may expect some form of apology from an IS service provider during IS service recovery interactions.

Explaining the reason of IS service failure is another dimension of recovery interaction between an IS service provider and employees. An *explanation*, or a provision of the reason for a failure (Bitner et al., 2000), can help employees in understanding what has happened, why the failure has occurred, and what they can do to minimize the risk of future failure. Liao (2007) indicates that customers may view an explanation as an important piece of information, a valuable outcome, and a means to understand and control their service environment. Explaining why the service is unavailable, and assisting the customer in solving the problem by suggesting possible options can be enough to cause the customer to remember the event favorably (Bitner et al., 2000). Internal IS customers may each seek different levels of explanation and different levels of involvement. In providing explanations, employees might be considered as partners, as they can sometimes assist in the process of IS service failure prevention and at times may suggest a course of recovery based on their experience (Dong et al., 2008).

Recovery Outcome

After IS service provider performs IS service recovery activities, employees will evaluate the outcome of the recovery process. The IS service provider should attempt to resolve all aspects of the IS service failure and fix the problem fast.

Customers expect a service problem to be resolved to its pre-problem state (McColl-Kennedy and Sparks, 2003; Smith and Karwan, 2010). *Recovery level* is the degree to

which a problem is completely solved and a failure is recovered. Liao (2007) suggests that problem solving is an important service recovery performance dimension, whereby the service provider ensures the problem is completely fixed. An employee who lost his data will be more satisfied when he gets all his/her data back, not a portion of that data. Similarly, an employee who is experiencing viruses and worms on her computer would consider the problem to be solved more thoroughly if she recovered from both of these malicious programs than if only one of them. To achieve a high level of service recovery the ISF would ensure the problem was solved and the employee is back on track, and there are no negative consequences of the recovery process (Bell and Zemke, 1987). Recovery level of IS service failure will influence employees' perception of recovery outcome.

A speedy response is vital for satisfying customers in the case of service failure (Johnston and Mehra, 2002; Hocutt et al. 2006). Employees expect their IS service failures to be recovered as quickly as possible so that they can get back to performing their tasks. *Recovery speed* is the time in which problems are fixed, from the beginning of the actual recovery process until the issue is solved. Miller et al. (2000) suggest that starting the solution process soon after failure discovery and completing the process quickly influence the customers' perception of recovery. Delayed IS service recovery will negatively influence employees' perception of the IS service recovery.

Taken as a whole, to better understand recovery satisfaction following an IS service failure incident, this paper investigates a) the impact of recovery satisfaction on the overall satisfaction with the ISF; b) whether the ISF's relationships in terms of social

capital with its customers result in higher perception of recovery satisfaction; and. c) how do recovery actions influence the formation of recovery satisfaction.

RESEARCH MODEL AND HYPOTHESES

The proposed research model (Figure 2) integrates past research that has linked service recovery components to recovery satisfaction, and ultimately, overall satisfaction. The model also suggests relationships between the relational and cognitive dimensions of social capital and recovery satisfaction.

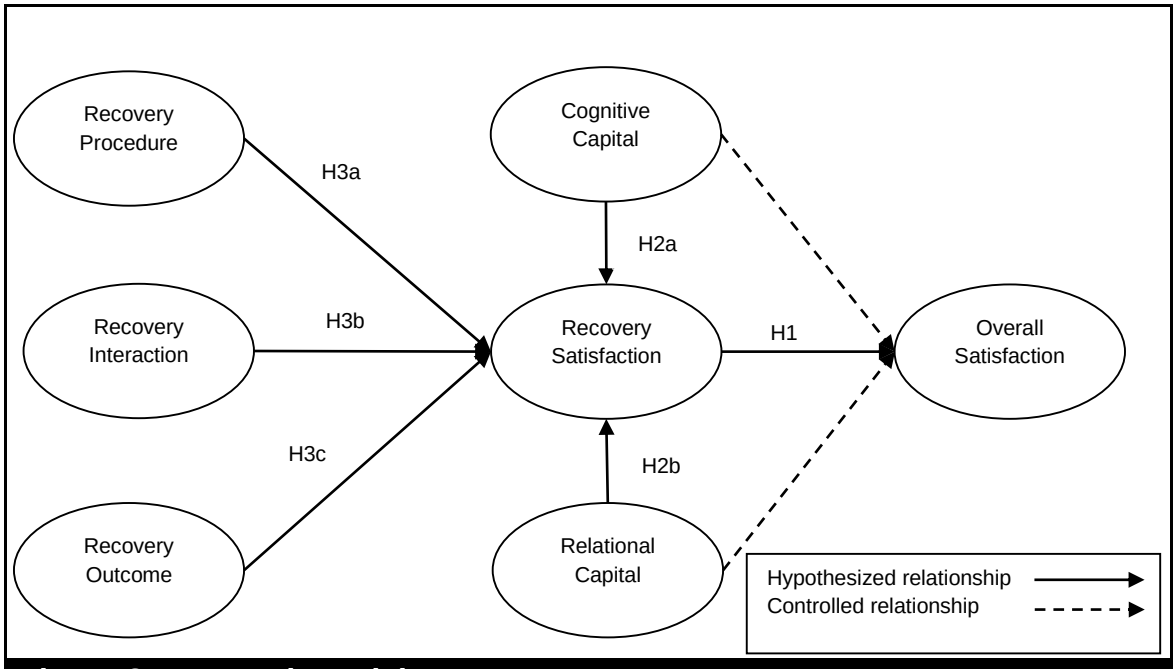

Figure 2. Research Model

Recovery Satisfaction and Overall Satisfaction with the ISF

Overall satisfaction with the ISF refers to affective and cognitive evaluation of the entire employee's experience with the ISF-provided services (Au et al., 2010). Recovery satisfaction, a form of service encounter satisfaction, is the cognitive and affective

fulfillment responses to the recovery process (La and Choi, 2012). Existing research has linked service encounter satisfaction and overall satisfaction; overall satisfaction is a function of all previous service encounter satisfactions (Parasuraman et al., 1994) and is updated after each specific service encounter (Jones and Suh, 2000; Zhao et al., 2012).

Following an IS service recovery, the employee will evaluate how well the ISF has recovered from the IS failure and will form a level of recovery satisfaction. The experience the employee has with IS service recovery and the resultant recovery satisfaction will directly influence their overall satisfaction with the ISF:

> *Hypothesis 1: Employees' recovery satisfaction is positively related to their overall satisfaction with the ISF*.

Cognitive Capital and Recovery Satisfaction

Employees can achieve mutual understanding through the existence of a shared language and from the exchange of shared narratives (Nahapiet and Ghoshal, 1998; Klimoski & Mohammed, 1994). When employees have the same perceptions about how to interact with one another, they can avoid possible misunderstandings in their communications (Tsai and Ghoshal, 1998). The existence of shared language and shared narratives facilitates the discussion of problems, ideas transfer, and effective assistance among employees and can increase the level of coordination and adaptation to changing conditions (Klimoski & Mohammed, 1994; Bolino et al., 2002).

After an IS service failure, the IS service provider will interact with the employee in an attempt to recover from that failure. According to Sun et al. (2012), the existence of shared language will facilitate the interaction between the employee and the IS service provider by 1) enabling them to discuss and exchange information, 2) preparing them to

anticipate similar values or visions, and 3) avoiding possible misunderstandings in their communication.

High levels of cognitive social capital between employees and IS service provider provide both parties with a common perspective that enables them to perceive and interpret events in similar ways (Boland & Tenkasi, 1995). This is crucial in the case of IS service failure; looking at the problem from the same perspective increases the chance to reach a satisfactory solution for both parties. A common perspective would also reduce both parties' differences regarding service recovery expectations. Shared language between employees and the ISF is important to understand employees' needs and the nature of the IS failure from employees' perspective, which helps the IS service provider to better address the IS failure, thus improving employees' satisfaction with IS service recovery:

H2a: Cognitive social capital positively influences employees' satisfaction with IS service recovery.

Relational Capital and Recovery Satisfaction

The relational dimension of social capital is characterized by trust, shared norms, and a sense of mutual identification (Nahapiet and Ghoshal, 1998). Relational capital focuses on the particular relations people have, such as respect and friendship, that influence their behavior in value creation (Nahapiet and Ghoshal 1998). Relational capital reflects the affective relationships between employees (Bolino et al., 2002).

Interpersonal trust facilitates cooperative interaction between individuals (Tsai & Ghoshal, 1998). Misztal (1996) views trust as the belief that the "results of somebody's intended action will be appropriate from our point of view". Following an IS service

failure, this view of trust indicates that a high level of trust between employees and the ISF will influence employees' belief that the IS service provider intends to recover from the IS failure and, consequently, is providing an acceptable level of IS service recovery. This cooperation may prove essential when attempting to recover from an IS service failure, where both parties work together to solve the problem.

A high level of reciprocity will encourage employees to help each other. Reciprocity between employees and the ISF facilitates the exchange of information between the two parties (Sun et al., 2012) and develops a sense of mutual indebtedness (Wasko and Faraj, 2005). When an IS service fails, the relational aspect of social capital will motivate the IS service provider to do what it takes to recover from that failure. Also, from the employee's perspective, reciprocity reduces the perception of opportunistic behavior and facilitates cooperative behavior (Villena et al., 2011).

Individuals with strong ties often identify with one another (Bolino et al., 2002). If there is a high degree of identification between employees and the employees of the IS service provider, they are more likely to work together in performing IS service recovery activities in response to an IS service failure.

Relational capital improves the ISF's understanding and appreciation of employees' business needs, which enables the ISF to deliver a level of IS service recovery that satisfies those needs (Sun et al, 2012). If employees have more confidence in and are willing to rely on the ISF to perform service recovery, this will enhance their recovery satisfaction. Moreover, when employees participate in IS service recovery, they are more likely to report higher levels satisfaction with the service recovery (Dong et al., 2008):

H2b: Relational social capital positively influences employees' satisfaction with IS service recovery.

IS Service Recovery Components and Recovery Satisfaction

Service providers have to understand the consequences of the failure and how to provide an effective recovery, so that customers' dissatisfaction following a failure can be minimized (Hess et al., 2003). Customers have service recovery expectations regarding the level of reparation that is appropriate after service failure (Zeithaml et al., 1993). Satisfaction with service recovery is achieved by meeting or exceeding customers' expectations of service recovery (Oliver and Swan, 1989). Nicholls et al. (1998) suggest that service satisfaction is a function of consumers' experiences and reactions to a service provider's behavior during the service encounter. Service recovery performance influences recovery satisfaction (Liao, 2007; Smith et al., 1999).

The ISF is the internal supplier and service provider of IS services to internal customers; therefore, the ISF should attempt to provide service recovery up to the level of employees' IS service expectations (Au et al., 2008). Customers want the recovery procedures to be properly managed (Kau and Loh, 2006). Following an internal IS service failure, employee will contact the ISF to request assistant and, consequently, initiate a recovery procedure. During the recovery procedure, the IS service provider will perform a sequence of activities in an attempt to solve the IS service failure. The manner with which an IS service provider performs IS service recovery activities is important in shaping employees' post recovery perceptions. When the IS service provider exerts effort while trying to fix the problem, employees will feel that the IS service provider is doing his/her best to serve the employee. Moreover, if the IS service provider offers a fair

service recovery, employees will have a feeling of justice when they compare the service recovery they received with the one offered to other employees:

Hypothesis 3a: Recovery procedure is positively related to the employees' perception of recovery satisfaction.

When internal IS service fails, the recovery procedure activates a sequence of interactions between the employee and the IS service provider. This interpersonal communication enacted during service recovery process and the delivery of service outcomes is important in service recovery assessment (Hoffman and Kelley, 2000). The IS service provider has the opportunity to invest in the recovery interaction with the employee to minimize the negative effects and increase the likelihood of a perceived satisfactory solution. Employees will evaluate their service encounter based on the quality of interpersonal treatment and communication during the encounter. Interacting with the employee by offering some sort of apology will show a sense of social responsibility and convey the IS service provider's concern for their IS service interruption, which will make employees evaluate the service more favorably. Providing an explanation for the IS service failure helps employees understand what happened and communicates a sense of partnership between the IS service provider and employees. This open communication will reduce the negative effect of the service failure and will result in a positive evaluation of the incident:

Hypothesis 3b: Recovery interaction is positively related to the employees' perception of recovery satisfaction.

While the actual service recovery process counts, another critical component of the IS Service Recovery Framework is the recovery outcome (McCollough et al., 2000). After

an IS service provider performs service recovery activities, the employee will evaluate the final result of the recovery, which will influence his/her satisfaction with the IS service recovery. A fast solution to the IS service failure will quickly remove the failure's negative effect and make employees assess the service recovery higher. Furthermore, when the problem is comprehensively solved, employees will view service recovery as complete and well done, which will influence their perception of recovery satisfaction:

Hypothesis 3c: Recovery outcome is positively related to the employees' perception of recovery satisfaction.

RESEARCH METHODOLOGY

Study 1

Sample and Data Collection

Guided by past service recovery literature such as Tax et al. (1998) and Smith et al. (1999), the main objective of Study 1 was to identify service recovery dimensions pertinent to the components of our IS Service Recovery Framework, determine if the dimensions fit these higher-order components, and preliminarily test the relationships between the components of IS service recovery and recovery satisfaction. To undertake this we interviewed fifteen faculty members, staff, and doctoral students at the business school of a large U.S. research university concerning their IS service recovery experiences with the local ISF. These users had all been internal customers of the local ISF services for more than one year with usage ranging from purely Internet and infrastructure access to administrative transaction dependent on the local ISF services to complete their jobs. Specific foci of the interviews concerned the service recovery of the local ISF. Example questions included: What factors mattered to you while the ISF was

resolving your IS service failure? What would you expect the ISF to communicate to you during the IS service recovery? How did you evaluate the result of IS service recovery?

This process revealed several service recovery dimensions such as speed, effort, explanation, completeness of recovery, fairness, and apology previously cited in the literature; these dimensions also appeared pertinent in the internal IS service recovery context that formed the basis for selection of relevant service recovery constructs and items. However, compensation, which was an important dimension cited in the literature related to in external customer service recovery, did not emerge as an important recovery dimension in interviews with internal customers. This is best explained by the fact that few organizations offer as tangible compensation to its internal employees after a service failure to increase the perceptions of recovery satisfaction.

Based on what was learned in the interview about the internal IS service recovery context, we developed and administered an initial survey to faculty members, administrative workers, and PhD students who receive IS services from the university's business school based ISF. A gift card was offered as an incentive to complete the survey. An invitation to participate in the study was e-mailed to a total of 270 possible respondents who experienced an IS service failure for which they had to contact the local ISF. 137 responses were received and 21 responses were deleted because of data runs or incomplete responses, thus yielding an analysis sample of 116 responses (a 43% response rate). Participants were asked to think about the most recent incident they had when their university-supported IS/IT failed to work properly requiring them to contact the local ISF for help to recover from the problem/failure.

Measures Development

As conceptualized in this study, we model recovery procedure, recovery interaction, and recovery outcome as multidimensional, second-order constructs (Jarvis et al. 2003) that have formative relationships with the dimensions of internal IS service recovery. Multidimensional constructs are constructs with more than one dimension, and each dimension can be measured using either reflective or formative indicators (Petter et al., 2007). The reason behind our modeling choice is based on our review of service recovery literature, which reveals that several distinct dimensions of service recovery process exist, and each dimension can be viewed as describing a different facet of IS service recovery. According to our proposed IS Service Recovery Framework, a service recovery consists of three main components (i.e., recovery procedure, recovery interaction, and recovery outcome), each of which includes a different set of service recovery dimensions that form the component.

MacKenzie at al. (2011) show that if the dimensions of a multidimensional construct are defining the construct and a change in only one of the dimensions could be associated with a change in the focal construct, the dimensions should be modeled as formative indicators of the second-order focal construct. Recovery procedure, recovery interaction, and recovery outcome are modeled as multidimensional constructs because each one of their first-order dimensions captures a differing component of internal IS service recovery; the dimensions are viewed as defining characteristics of IS service recovery; recovery procedure, recovery interaction, and recovery outcome are functions of their respective dimensions, and a change in only one of the dimensions of internal IS service recovery could be associated with a change in its respective second-order construct.

Where possible, measures for pertinent identified dimensions were derived from previous validated instruments (see Appendix A) and were adapted to the internal IS service recovery context. Measures for IS service recovery dimensions of explanation (Kau and Loh, 2006), recovery fairness (Carr, 2007), recovery speed (Smith and Karwan, 2010), and recovery effort (Mohr and Bitner, 1995) were developed with the assistance of similar constructs found in the literature and field interviews as discussed earlier. New items were developed for apology because it is usually measured with a single dichotomous item (Smith et al., 1999) and for recovery level because it is a new construct that emerged from our field interviews. Four items were generated for each first-order dimension of IS service recovery. Table 1 presents the proposed components of dimensions of IS service recovery, their corresponding dimensions, definitions, and source.

Content validity of the generated items was tested by consulting IS service providers and users. All items were measured using a 7-point Likert agreement scale. Several demographical variables including gender, age, job role, tenure, and computer experience, were included as control variables.

Results

Study 1's primary purpose was to establish the relationships between the higher-order components of IS service recovery (i.e., recovery procedure, recovery interaction, and recovery outcome) and their respective first-order dimensions.

We performed a confirmatory factor analysis (CFA) to load each IS service recovery dimension on its proposed recovery component. Weights from first-order constructs to their second-order constructs ranged from 0.47 to 0.63 and were statistically significant.

Results from Study 1 supported the proposed relationships between the IS service recovery components and recovery satisfaction. Relationships between recovery procedure and recovery satisfaction ($\beta = 0.22$, $p < .001$), recovery interaction and recovery satisfaction ($\beta = 0.12$, $p < .01$), and recovery outcome and recovery satisfaction ($\beta = 0.69$, $p < .001$) were all statistically significant. The complete results of Study 1 appear in Appendix B. We next moved our attention to testing the complete proposed nomological network in a for-profit context to validate our research model.

Table 1: Components and Dimensions of IS Service Recovery

Recovery Framework's Component Constructs	Dimensions	Definition	Source
Recovery Procedure	Recovery Effort	The amount of perceived positive energy an IS service provider puts into resolving an IS service failure	Effort (Folkes, 1994; Mohr and Bitner, 1995)
	Recovery Fairness	The degree to which the IS service provider is free from bias or injustice during service recovery	Justice (Smith et. al, 1999; Liao 2007)
Recovery Interaction	Apology	A communication of the service provider's politeness, empathy, and concern to customers who have experienced an IS service failure	Apology (Smith et al., 1999; Miller et al., 2000)
	Explanation	A provision of reason for an IS service failure	Explanation (Bitner et al., 1990; Liao, 2007)
Recovery Outcome	Recovery Level	The degree to which an IS service failure is perceived as completely recovered	Problem solving (Liao, 2007), Comprehensiveness (Smith and Karwan, 2010)
	Recovery Speed	The time it takes for an IS service failure to be fixed	Recovery Speed (Smith et al., 1999; Miller et al., 2000)

Study 2

Sample and Data Collection

We conduct a field study in a leading U.S. financial services company. The company has a dedicated Technology Assistance Center (TAC) that is responsible for maintaining a smooth delivery of IS services in the company. Following an IS service failure, employees would contact TAC (i.e., local ISF) to initiate a IS service recovery. During IS service recovery, employees have the opportunity to interact with the ISF team member(s) who are carrying out the IS service recovery. We prepared a list of 1031 unique employees in the company who had an IS service problem/failure in the past two months and contacted the technology helpdesk to fix their problem. We chose two months as the sampling time frame based on the CIO's[2] and Director of TAC's recommendations. These problems were not IS service requests; rather they were classified by the helpdesk as incidents that required a needed level of engagement of the IS service provider. An invitation to participate in the study was sent by email to employees on that list. An email reminder was sent after a week. Overall, 596 employees clicked on the survey link and 270 completed the survey, resulting in 26% response rate.

To test for nonresponse bias, we compared the demographic characteristics from responses received before the reminder email (i.e., first round of questionnaire) and those received after the reminder email (i.e., second round of questionnaire), with the assumption that later respondents demonstrate characteristics similar to non-respondents. We found no systematic differences between the two groups, suggesting that nonresponse

[2] This CIO has more than 20 years of experience in the IT industry overseeing resources such as IT support.

bias may not be an issue (Armstrong and Overton 1977). The respondents' demographic data is displayed in Table 2.

Table 2: Demographic Data of Respondents (Study 2, N=270)

		Percentage	Mean	Std. Dev.
Gender	**Male**	33.2	1.67	0.47
	Female	66.8		
Age	**< 20**	0	3.95	1.02
	20-29	11.5		
	30-39	19.8		
	40-49	30.6		
	≥ 50	38.1		
Job Role	**Teller**	8.2	3.47	1.75
	Financial Service Rep.	42.4		
	Customer Support	2.0		
	Manager	5.1		
	Associate	26.7		
	Other	15.6		
Tenure (Years)	**< 1**	12.7	3.22	1.09
	1-3	11.9		
	4-6	15.9		
	> 6	59.5		
Computer Experience	**< 2**	2.0	3.87	0.51
	2-4	1.6		
	4-8	4.0		
	> 8	92.4		

Notes: Gender (1 indicates "male" and 2 indicates "female"); Age (1–5, respectively, indicates "< 20"; "20–29"; "30-39"; "40–49" and "≥50"); Job Role (1–6, respectively, indicates "teller"; "financial service representative"; "customer support"; "manager"; "associate"; and "other"); Tenure (1–4, respectively, indicates "<1 year"; "1–3 year"; "4–6 year" and ">6 year"); Computer experience (1–4, respectively, indicates "<2 year"; "2–4 year"; "4–8 year" and ">8 year").

Measures

We use the same measures of IS service recovery components and the corresponding dimensions developed in Study 1 above to conduct Study 2. We incorporated items in the survey to measure cognitive capital, relational capital, and overall satisfaction with the

ISF constructs. Measures from previous validated instruments were used for these constructs (see Appendix A). IS service recovery components of recovery procedure, recovery interaction, and recovery outcome were modeled as second-order formative, first-order reflective, multidimensional constructs. All other constructs were modeled as unidirectional, reflective constructs. We slightly modified the survey instrument to fit the new context of a financial services firm. We dropped one of the four items used to measure relational capital because of its low loading.

Results

SmartPLS (Ringle et al., 2005), a Partial least square (PLS) software, was chosen as the modeling software for data analysis. For our study, we choose PLS over covariance-based (CB) SEM because 1) PLS can estimate the loadings (and weights) of indicators on constructs and the causal relationships among constructs in multistage models (Fornell and Bookstein 1982), 2) PLS, in comparison CB-SEM, is robust with fewer statistical identification issues; it is most suitable for models with formative constructs and relatively small samples (Hair et al. 2011), which is the case in our study, and 3) whereas CB-SEM is regarded as being more appropriate for theory confirmation, PLS does provide a good approximation of CB-SEM in terms of final estimates (Hair et al. 2011). Based on the above considerations, PLS was chosen for the current study.

Measurement Model Assessment

Common Method Bias

Common method bias may pose a threat if data were collected using the same method. An exploratory factor analysis was conducted and the Harman (1967) one factor extraction test was applied. Using the 38 variables, 7 factors were revealed with eigen

values greater than 1.00 with no single factor explaining the majority of the variance. Therefore, common method bias was not a threat.

We also performed a more rigorous test of common method bias suggested by Podsakoff et al. (2003) and adapted to PLS by Liang et al. (2007) (Appendix D). Based on the results of this statistical test, we conclude that common method bias is unlikely to be a serious concern.

Construct Validity

Internal consistency of all constructs supports convergent validity. Consistent with recommended values, average variance extracted (AVE) (> 0.50, Fornell and Larcker, 1981), composite reliability (> 0.60, Bagozzi and Yi, 1988), and Cronbach's alpha (> 0.70, Hair et al., 1998) for all constructs. Discriminant validity was evaluated by comparing the square root of AVE with the correlations between constructs. The square root of AVE for a construct should be greater than the correlations with any other construct. All 78 correlations met this test (Table 3).

Structural Model Assessment

A structural model was tested based on the research model. Since multicollinearity is a concern for multidimensional constructs and can lead to instability of indicator coefficients and destabilize the model (Petter et al., 2007). Variance inflation factor (VIF) values were calculated for the six IS service recovery dimensions. The values ranged from 1.43 to 2.61. This is well below the threshold of 3.3 suggested by Petter et al. (2007), indicating no serious concerns with multicollinearity in the data. All other constructs were modeled as reflective and measured using multiple indicators.

Table 3: Construct Internal Consistency and Correlations of Variables (Study 2)														
	No. of Items	**AVE**	**Comp. Reliab.**	**Cron. Alpha**	**RPRE**	**RPRF**	**RIAP**	**RIEX**	**RORL**	**RORS**	**CC**	**RC**	**RSAT**	**OSAT**
RPRE	4	0.76	0.93	0.89	**0.87**									
RPRF	4	0.75	0.92	0.89	0.68	**0.87**								
RIAP	4	0.82	0.95	0.92	0.49	0.51	**0.91**							
RIEX	4	0.83	0.95	0.93	0.64	0.54	0.57	**0.91**						
RORL	4	0.80	0.94	0.92	0.65	0.61	0.32	0.51	**0.89**					
RORS	4	0.84	0.95	0.93	0.68	0.64	0.35	0.62	0.68	**0.92**				
CC	3	0.87	0.95	0.92	0.38	0.52	0.35	0.39	0.36	0.42	**0.93**			
RC	3	0.79	0.92	0.87	0.45	0.53	0.35	0.42	0.35	0.42	0.60	**0.89**		
RSAT	4	0.92	0.98	0.97	0.76	0.74	0.43	0.60	0.84	0.83	0.45	0.43	**0.96**	
OSAT	4	0.83	0.95	0.93	0.56	0.58	0.42	0.57	0.55	0.63	0.54	0.58	0.66	**0.91**

Legend:
RPRE: Recovery Procedure: Recovery Effort
RPRF: Recovery Procedure: Recovery Fairness
RIAP: Recovery Interaction: Apology
RIEX: Recovery Interaction: Explanation
RORL: Recovery Outcome: Recovery Level
RORS: Recovery Outcome: Recovery Speed
CC: Cognitive Capital
RC: Relational Capital
RSAT: Recovery Satisfaction
OSAT: Overall Satisfaction

Notes: The recommended levels for the above statistics are as follows: Average variance extracted (AVE) > 0.50. Composite Reliability > 0.60. Cronbach's Alpha > 0.70.

Table 4 presents the results of the 6 first-order dimension path weights to the second-order constructs. As indicated by Table 4, all dimensions had significant weights to their second-order constructs.

Table 4: Path Coefficients between First- and Second-Order Constructs (Study 2)

Second-order Construct	First-order Construct	Weight to second order construct	t-value
Recovery Procedure	Recovery Effort	0.554***	25.88
	Recovery Fairness	0.537***	24.68
Recovery Interaction	Apology	0.531***	31.02
	Explanation	0.597***	27.73
Recovery Outcome	Recovery Level	0.535***	32.45
	Recovery Speed	0.556***	33.56

***p < .001

The results of the structural model analysis, including standardized path coefficients and their statistical significance are listed in Figure 3. As summarized in Table 5, three of the six hypotheses (H1, H3a, and H3c) were supported. H2a, H2b, and H3b were not supported. The controlled predictive relationships between cognitive social capital and relational social capital and overall satisfaction with the ISF were positive as predicted. Recovery satisfaction had positive and significant effects on overall satisfaction with the ISF. Recovery satisfaction, cognitive capital, and relational capital together explained 56% of variance in overall satisfaction with the ISF. Recovery procedure and recovery outcome had positive and significant effects on recovery satisfaction and both explained 86 % of the variance in recovery satisfaction. All control variables were found to be insignificant, such as failure severity ($\beta = 0.02$, $p > 0.1$), gender ($\beta = 0.06$, $p > 0.1$), age (β

= 0.07, p > 0.1), job role (β = - 0.09, p > 0.1), tenure (β = 0.02, p > 0.1), and computer experience (β = - 0.02, p > 0.1).

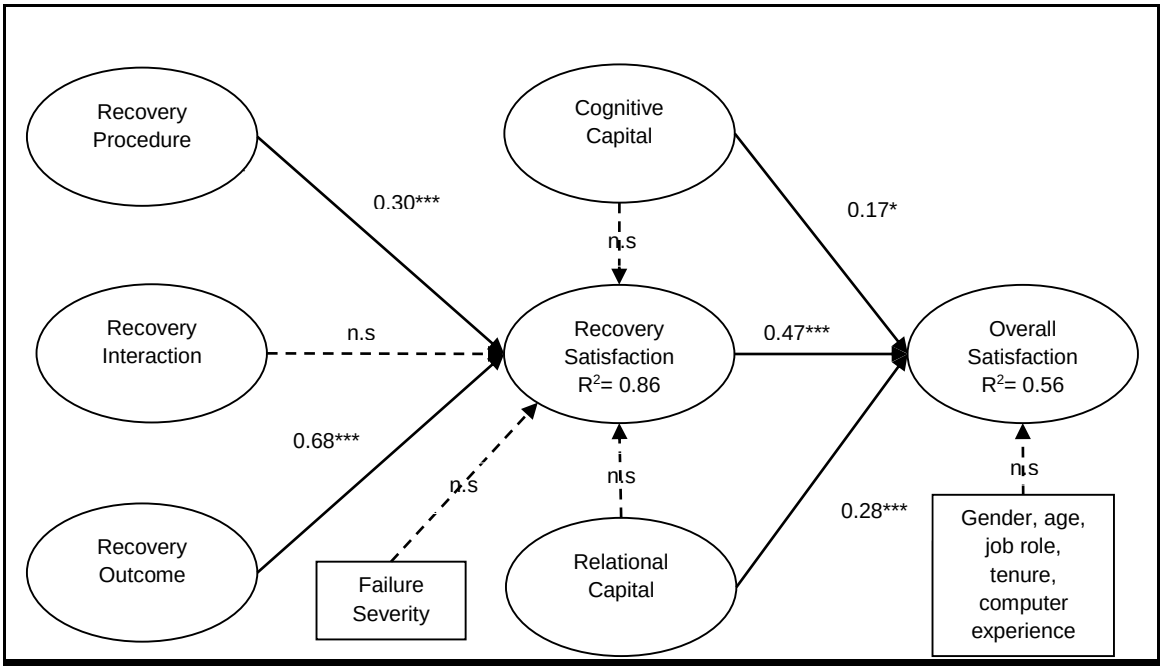

Figure 3. Structural Model Results (Study 2)

*p < .05, ***p < .001

Table 5. Results of Hypothesis Testing (Study 2)

Hypothesis	Supported
H1: (+) Recovery Satisfaction → Satisfaction with the ISF	Yes, β = .47, p < .001
H2a: (+) Cognitive Capital → Recovery Satisfaction	No, β = .03, p > .01
H2b: (+) Relational Capital → Recovery Satisfaction	No, β = .03, p > .01
H3a: (+) Recovery Procedure → Recovery Satisfaction	Yes, β = .30, p < .001
H3b: (+) Recovery Interaction → Recovery Satisfaction	No, β = .00, p > .01
H3c: (+) Recovery Outcome → Recovery Satisfaction	Yes, β = .68, p < .001

Results

H1 was supported. Following a service failure, the level of recovery satisfaction has a direct effect on overall satisfaction with the ISF. We do not find support that social capital dimensions affect recovery satisfaction; however as was suspected and controlled for, social capital has a direct effect on overall satisfaction with the ISF.

The lack of support for hypotheses H2a and H2b indicate that the cognitive and relational dimensions of social capital impact is at the overall, holistic satisfaction with the ISF level rather than at the individual service encounter level. Satisfaction can be viewed as cognitive or affective (Fournier and Mick, 1999). Recovery satisfaction, as measured in this paper, is based on a single evaluation of IS service failure/IS service recovery incident. This evaluation is cognitively formed by confirmation/disconfirmation of service standards. On the other hand, overall satisfaction with the ISF is formed over a series of interactions with the ISF over time and has a more affective nature.

H3a and H3c were also supported. Our analysis demonstrates the important role that recovery procedure and recovery outcome play in forming employees' satisfaction with IS service recovery. However, the hypothesized effect of recovery interaction (H3b) on recovery satisfaction was not supported. This indicates that in the case of IS service failure, the means by which IS service provider attempts to resolve the failure and the final result of IS service recovery are what count the most for employees. On the other hand, employees do not consider the communication that takes place between them the IS service provider as a factor that will influence their satisfaction with the IS service recovery. Employees just want to see their IS service fixed and may find explaining why the IS service failed as a waste of time after IS service provider has put energy in

providing a fair, fast, and complete solution to the problem. Furthermore, if the IS service provider merely offers an apology without fixing the problem, employees will not consider this as an effective IS service recovery.

These findings indicate that the ISF must continually build social capital to sustain overall satisfaction among employees, but in the case of a IS service failure, employees are mainly concerned with getting the problem fixed and the means by which the ISF fixes the problem. Employees do not consider social capital or recovery interaction as factors that will make them more satisfied with the failure's recovery.

DISCUSSION

The concept of IS service recovery is introduced to the field of IS. Service recovery has been widely studied in marketing, consumer behavior, and operations and service management. Little research, if any, has been conducted on service recovery in IS. We contextualize IS service recovery in an internal IS context in which it is posited in its nomological network that also encompasses recovery satisfaction, satisfaction with the ISF, and social capital. We identify IS service recovery components and their corresponding dimensions and study them in an internal organizational context. We conducted two studies to identify dimensions of IS service recovery that form IS service recovery components and examine the effect of these components on recovery satisfaction. We also empirically tested the influence of the cognitive and relational dimensions of social capital on recovery satisfaction. The conceptual model can be used to understand the impact of IS service recovery activities and dimensions of social capital in the case of IS service failure on employees' perception of recovery satisfaction and, consequently, overall satisfaction with the ISF.

Theoretical Implications

We find support for the proposed relationship between recovery satisfaction and overall satisfaction with the ISF. More specifically, the results indicate that a service encounter satisfaction (i.e., recovery satisfaction) affects overall satisfaction (i.e., satisfaction with the ISF). This is analogous to the finding of Oliver (1993) that attribute (functional) satisfaction affects overall satisfaction. When the ISF is responsible for providing IS service recovery inside the organization, employees satisfaction with IS service recovery will impact their formulation of satisfaction with the ISF. By concentrating on individual service encounters, the ISF can attempt to formulate employees' overall satisfaction with the ISF. This finding supports the view of overall satisfaction as an aggregate evaluation of individual service encounters over time.

Our findings also contribute to the IS literature by testing a social capital perspective to understand the effect of the cognitive and relational dimensions of social capital on employees' satisfaction with IS service recovery. Prior research in IS has studied the impact of social capital on cumulative, overall satisfaction with the ISF (Sun et al., 2012). We extend this view by investigating the effect of social capital on IS recovery satisfaction. We find that, in the case of IS service failure, the influence of social capital on satisfaction is only witnessed at the perception of the overall satisfaction with the ISF. We know that the existence of cognitive and relational capitals between employees and IS service provider is effective at the affective evaluation of the satisfaction with the ISF. However, social capital does not seem to operate on the cognitive appraisal of IS service recovery satisfaction. This may be due to the fact that when an IS service fails, the way IS service provider carried out the recovery process and the final result of the recovery

are what count the most. Employees will only base their assessment of recovery satisfaction on the extent to which IS service recovery activities were performed well, rather than the existing social capital between employees and the ISF.

The findings also indicate that recovery procedure and recovery outcome in the case of IS service failure will influence employees' perception of recovery satisfaction. However, we find that recovery interaction has no significant effect on recovery satisfaction. This means that, following an IS service failure, employees will base their formation of recovery satisfaction on getting the problem fixed; the procedure IS service provider carries on to resolve IS service failure (i.e., recovery procedure) and the final result of IS service recovery (i.e., recovery outcome). The communication that takes place between IS service provider and the employee during IS service recovery (i.e., recovery interaction) appears to have no effect in an internal organizational context. Driver and Johnston (2001) conclude that customers can have very different priorities in terms of hard (noninterpersonal) and soft (interpersonal) quality attributes, and these priorities vary for different types of services. For internal IS services, we find that recovery procedure and recovery outcome to be the major contributors to employees' satisfaction with IS service recovery.

Managerial Implications

This research has several implications for practitioners in the case of IS service failure and the recovery activities that take place afterward. First, by identifying the components that will ultimately influence the perception of the internal IS service recipient regarding how well the IS service recovery went on, it becomes clear what aspects of the recovery IS service providers need to pay more attention to during IS service recovery. Having

these components and the dimensions that form them in mind, IS service providers can improve the employees' experience by delivering an extensive IS service recovery to mitigate negative effects of IS service failure. When internal users are satisfied with the ISF, they feel better about the technology and are more likely to fully appropriate its use and continue to rely on ISF as their source of internal IS service. Training can be offered to IS service providers that is tailored to better address IS service recovery components and possible methods to improve recovery performance.

Second, our findings suggest that only the recovery procedure and recovery outcome are important for employees' satisfaction with IS service recovery. The weight of each IS service recovery dimension can assist IS service providers in prioritizing these dimensions when attempting to recover. Such a prioritizing technique can prove to be essential to IS service providers in guiding them to focus on one dimension more than the other, which can be especially important when resources are scarce and it is not possible to concentrate on all dimensions with the same intensity at the same time.

Third, the instrument can be practically refined and periodically administered to employees as a diagnostic tool to gauge their perception of IS service recovery and measure possible improvements achieved in the performance of IS service providers. As the results of this research suggest, increased satisfaction with IS service recovery can lead to higher levels overall satisfaction with the ISF, which is an area IS managers continuously strive to improve.

Fourth, we also offer practitioners insights on how the dimensions of social capital work at the service encounter satisfaction. Creating and maintaining cognitive and relational capitals represent a significant investment (Nahapiet and Ghoshal, 1998), IS

managers need to understand the costs and benefits associated with such investment and at what level of satisfaction the influence of social capital is expected to be of significance.

Finally, in line with the service-profit chain (Heskett et al., 2008; Montoya et al., 2010), we find that employee satisfaction with IS service recovery will influence overall satisfaction with the ISF. This finding suggests that IS service recovery can be used to increase employee satisfaction and, ultimately, could impact organizational profitability.

Limitations and Future Research

Like most empirical studies, there are limitations that should be noted with this research. First, the two studies were cross-sectional in which data was collected at one specific point in time. A longitudinal study in which satisfaction and social capital are measured over a period of time may provide additional insights. In addition, the frontend of the research model (i.e., IS service recovery and recovery satisfaction) was validated using data collected from a research university whereas the complete model was validated using data collected from a U.S. financial service company. While this study uniquely tried to study this phenomenon in multiple industries, future research might investigate additional industries and across alternative samples of employees to further strengthening the external validity.

Furthermore, collecting data using a single data collection method (i.e., survey) may raise the issue of common method bias. Although we performed several tests to rule out the likelihood that common method bias is a concern, future research can gather data from different sources at different points of time to offer more confidence in the causal relationships of the model.

This study investigates the influence of one type of IS service encounter satisfaction (i.e., recovery satisfaction) on overall satisfaction. Future research could study other types of satisfaction with IS service encounters to understand their impact on overall satisfaction.

Finally, future research might attempt to validate the IS service recovery dimensions in an external setting where IS service is delivered to an external customer. New dimensions may prove to be pertinent to an external IS service setting and the weight of dimensions may be different, indicating a different relative importance of each dimension. In addition, future research could study how different patterns (i.e., order and timing) of service recovery procedures, interactions, and outcomes influence levels of service recovery satisfaction.

CONCLUSION

Just get the problem fixed! IS as a service is expected to fail and the ISF has to mitigate the influence of the consequent negative experiences employees go through. Internal customers' (employees') satisfaction with a recovery after a failure is important to restore an employee's overall satisfaction with the IS Function (ISF). Following a service failure, the level of recovery satisfaction has a direct effect on overall satisfaction with the ISF. We find that recovery procedure (effort and fairness) and the recovery outcome (speed and level of recovery) influence recovery satisfaction. We do not find support that social capital dimensions affect recovery satisfaction; however social capital has a direct effect on overall satisfaction with the ISF. We also find that recovery interaction (apology and explanation) does not affect recovery satisfaction. These findings indicate that the ISF must continually build social capital to sustain overall

satisfaction among employees, but in the case of a IS service failure, employees are mainly concerned with the recovery procedure the ISF follows in getting their problem fixed and the recovery outcome they get.

CHAPTER 4

CONCLUSION

This dissertation offers innovative ways to serve the IS customer. Data monetization can be used to serve external customers and generate value through insights. IS service recovery can influence internal customer satisfaction following an IS service failure.

Data analysis tools and cloud computing have paved the way to monetizing a company's data. Joint benefits emerged from this new relationship by generating a new revenue stream and providing a cost-sharing mechanism for the retailer, and offering suppliers real-time access to the retailer's data.

The ISF must continually build social capital to sustain overall satisfaction among employees but in the case of a IS service failure, employees are mainly concerned with being treated fairly and earnestly in getting their problem fixed fast and reliably, and they do not consider social capital or recovery interaction as factors that will influence their recovery satisfaction.

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APPENDIX A. Instrument Items and Loadings

Table A1: Constructs, Measure Sources, and Items

Construct	Measure Source	Items and Factor Loadings	
Recovery Effort (Recovery Procedure)	Mohr and Bitner (1995)	**RE1**	Relative to the problem/failure I experienced, the IS service provider exerted a lot of energy trying to solve the problem/failure. 0.84 (30.08)
		RE2	IS service provider was very persistent until the problem/failure was resolved. 0.92 (64.94)
		RE3	IS service provider put a lot of effort into solving the problem/failure. 0.92 (57.85)
		RE4	Concerning my IS problem/failure, the IS service provider did not try very hard to solve it (R). 0.80 (20.67)
Recovery Fairness (Recovery Procedure)	Carr (2007)	**RF1**	IS service provider treated me in a fair way when addressing my problem/failure. 0.93 (90.29)
		RF2	In addressing my problem/failure, the IS service provider dealt with me in the same consistent way they deal with other users. 0.80 (28.47)
		RF3	I did not feel that the IS service provider held any bias against me when addressing my problem/failure. 0.81 (18.18)
		RF4	Overall, the IS service provider tried to meet my needs fairly when addressing my problem/failure. 0.91 (61.55)
Apology (Recovery Interaction)	New	**AP1**	IS service provider was sorry that the problem/failure occurred. 0.90 (70.50)
		AP2	IS service provider provided me with a complete apology. 0.96 (187.55)
		AP3	IS service provider communicated a clear apology to me. 0.94 (118.55)
		AP4	IS service provider did not offer me a satisfying apology (R). 0.82 (20.34)
Explanation (Recovery Interaction)	Kau and Loh (2006)	**EX1**	IS service provider informed me about the reason why the problem/failure happened. 0.94 (73.30)
		EX2	IS service provider gave me a reasonable explanation as to why the problem/failure occurred. 0.95 (99.17)
		EX3	IS service provider explained the nature of the problem/failure to me. 0.94 (73.00)
		EX4	IS service provider did not clearly tell me the cause of the problem/failure (R). 0.79 (20.67)
Recovery Level (Recovery Outcome)	New	**RL1**	Following the IS service provider's assistance, the problem/failure was completely solved. 0.96 (144.92)
		RL2	IS service provider resolved my problem/failure comprehensively. 0.96 (127.61)
		RL3	Following the IS service provider's assistance, everything was restored to a pre-problem/failure state. 0.85 (23.52)
		RL4	After the IS service provider's help, some aspects of the problem/failure were still present (R). 0.82 (27.00)

Table A1: Constructs, Measure Sources, and Items			
Construct	**Measure Source**	**Items and Factor Loadings**	
Recovery Speed (Recovery Outcome)	Smith and Karwan (2010)	**RS1**	IS service provider was quite fast in solving my problem/failure. 0.94 (84.02)
		RS2	The problem/failure was recovered in an adequate time given the nature of the problem/failure. 0.94 (84.73)
		RS3	IS service provider addressed my problem/failure in a timely manner. 0.95 (95.52)
		RS4	IS service provider was very slow in responding to my problem/failure (R). 0.83 (23.99)
Cognitive Capital	Chiu et al. (2006)	**CC1**	When employees in my department interact with employees of the ISF, we use common terms to communicate. 0.92 (67.29)
		CC2	During the discussion between employees in my department and employees of the ISF, we use understandable communication patterns. 0.94 (35.00)
		CC3	When employees in my department communicate with employees of the ISF, we use understandable terms and concepts. 0.94 (57.74)
Relational Capital	Kale et al. (2000)		The relationship between employees in my department and those of the ISF is characterized by …
		RC1	mutual respect. 0.91 (60.32)
		RC2	mutual trust. 0.92 (48.07)
		RC3	high reciprocity. 0.83 (30.25)
Recovery Satisfaction	Maxham III and Netemeyer, (2003)	**RSAT1**	I am satisfied with the way the IS service provider handled my problem/failure in this case. 0.96 (73.65)
		RSAT2	I am satisfied with the IS service provider response to my problem/failure for this incident. 0.96 (92.53)
		RSAT3	I am pleased with the IS service provider's performance in solving my problem/failure. 0.97 (88.55)
		RSAT4	IS service provider has provided me with a satisfactory solution to my problem/failure in this specific occasion. 0.95 (68.37)
Overall Satisfaction with the ISF	Bhattacherjee (2001)		Beyond this one incident,
		OSAT1	I feel satisfied with the overall service of the IS service provider. 0.97 (241.02)
		OSAT2	I feel pleased about the overall service of the IS service provider. 0.98 (323.33)
		OSAT3	I feel happy about the overall service of the IS service provider. 0.96 (127.39)
		OSAT4	I feel dissatisfied with the overall service of the IS service provider (R). 0.69 (12.16)

Notes: Factor loading t-values are reported in parentheses
(R) Reverse coded item

APPENDIX B. Study 1 Results

Table B1: Demographic Data of Respondents (Study 1, N=116)

		Percentage	Mean	Std. Dev.
Gender	**Male**	48.7	1.51	0.50
	Female	51.3		
Age	**< 20**	1	3.66	1.14
	20-29	18.1		
	30-39	27.6		
	40-49	21.0		
	≥ 50	32.4		
Category	**Faculty Member**	44.0	1.92	0.90
	Staff	19.8		
	PhD Student	36.2		
Tenure (Years)	**< 1**	1.8	2.99	0.91
	1-3	36.3		
	4-6	23.0		
	> 6	38.9		

Notes: Gender (1 indicates "male" and 2 indicates "female"); Age (1–5, respectively, indicates "< 20"; "20–29"; "30-39"; "40–49" and "≥50"); Category (1–3, respectively, indicates "faculty member"; "staff"; and "PhD student"); Tenure (1–4, respectively, indicates "<1 year"; "1–3 year"; "4–6 year" and ">6 year").

Table B2: Construct Internal Consistency and Correlations of Variables (Study 1)

	No. of Items	AVE	Comp. Reliab.	Cron. Alpha	RPRE	RPRF	RIAP	RIEX	RORL	RORS	RSAT
RPRE	4	0.76	0.93	0.90	**0.87**						
RPRF	4	0.63	0.87	0.80	0.55	**0.79**					
RIAP	4	0.80	0.94	0.92	0.41	0.26	**0.90**				
RIEX	4	0.87	0.96	0.95	0.48	0.35	0.38	**0.93**			
RORL	4	0.86	0.96	0.95	0.53	0.40	0.11	0.41	**0.93**		
RORS	4	0.84	0.95	0.94	0.67	0.53	0.30	0.45	0.65	**0.92**	
RSAT	4	0.94	0.98	0.98	0.71	0.58	0.34	0.53	0.80	0.82	**0.97**

Legend:
RPRE: Recovery Procedure: Recovery Effort
RPRF: Recovery Procedure: Recovery Fairness
RIAP: Recovery Interaction: Apology
RIEX: Recovery Interaction: Explanation
RORL: Recovery Outcome: Recovery Level
RORS: Recovery Outcome: Recovery Speed
RSAT: Recovery Satisfaction

Notes: The recommended levels for the above statistics are as follows:
Average variance extracted (AVE) > 0.50. Composite Reliability > 0.60. Cronbach's Alpha > 0.70.

Table B3: Matrix of Cross-loadings (Study 1)							
	RE	**RF**	**AP**	**EX**	**RL**	**RS**	**RSAT**
RE1	**0.82**	0.31	0.30	0.29	0.29	0.41	0.44
RE2	**0.88**	0.53	0.33	0.46	0.60	0.68	0.72
RE3	**0.93**	0.49	0.36	0.41	0.41	0.58	0.59
RE4	**0.86**	0.57	0.44	0.51	0.53	0.63	0.71
RF1	0.58	**0.95**	0.31	0.35	0.39	0.50	0.55
RF2	0.23	**0.68**	0.06	0.27	0.15	0.28	0.29
RF3	0.13	**0.54**	0.10	0.02	0.14	0.23	0.20
RF4	0.61	**0.94**	0.25	0.36	0.46	0.56	0.65
AP1	0.46	0.29	**0.87**	0.37	0.13	0.27	0.33
AP2	0.26	0.11	**0.94**	0.29	0.03	0.19	0.23
AP3	0.33	0.21	**0.94**	0.33	0.08	0.25	0.27
AP4	0.42	0.32	**0.82**	0.37	0.15	0.37	0.40
EX1	0.43	0.29	0.34	**0.94**	0.46	0.44	0.51
EX2	0.48	0.36	0.37	**0.94**	0.43	0.45	0.56
EX3	0.48	0.38	0.39	**0.95**	0.31	0.40	0.47
EX4	0.41	0.30	0.32	**0.90**	0.32	0.40	0.43
RL1	0.54	0.36	0.08	0.37	**0.95**	0.64	0.74
RL2	0.55	0.40	0.13	0.44	**0.96**	0.61	0.75
RL3	0.45	0.39	0.09	0.38	**0.90**	0.62	0.78
RL4	0.43	0.32	0.11	0.33	**0.89**	0.54	0.68
RS1	0.54	0.42	0.23	0.35	0.60	**0.90**	0.69
RS2	0.62	0.45	0.26	0.42	0.66	**0.95**	0.82
RS3	0.68	0.51	0.27	0.46	0.63	**0.94**	0.78
RS4	0.59	0.56	0.36	0.42	0.48	**0.87**	0.69
RSAT1	0.71	0.60	0.34	0.50	0.76	0.81	**0.98**
RSAT2	0.73	0.61	0.36	0.54	0.75	0.79	**0.98**
RSAT3	0.72	0.60	0.37	0.52	0.77	0.79	**0.98**
RSAT4	0.59	0.45	0.25	0.48	0.82	0.78	**0.93**

Table B4: Path Coefficients between First- and Second-Order Constructs (Study 1)			
Second-order Construct	**First-order Construct**	**Weight to second order construct**	**t-value**
Recovery Procedure	Recovery Effort	0.657***	14.61
	Recovery Fairness	0.474***	11.75
Recovery Interaction	Apology	0.515***	11.61
	Explanation	0.683***	12.34
Recovery Outcome	Recovery Level	0.554***	25.86
	Recovery Speed	0.546***	20.33

***$p < .001$

APPENDIX C. Cross-loadings

Table C1: Matrix of Cross-loadings (Study 2)

	RE	RF	AP	EX	RL	RS	CC	RC	RSAT	OSAT
RE1	**0.84**	0.47	0.41	0.50	0.43	0.48	0.24	0.30	0.54	0.39
RE2	**0.92**	0.67	0.45	0.65	0.65	0.71	0.39	0.45	0.77	0.55
RE3	**0.92**	0.60	0.47	0.59	0.58	0.57	0.37	0.42	0.68	0.50
RE4	**0.80**	0.61	0.39	0.49	0.58	0.59	0.30	0.39	0.63	0.52
RF1	0.68	**0.93**	0.50	0.56	0.60	0.65	0.46	0.51	0.74	0.58
RF2	0.52	**0.80**	0.44	0.40	0.44	0.43	0.42	0.40	0.50	0.43
RF3	0.42	**0.81**	0.32	0.36	0.38	0.45	0.49	0.42	0.50	0.42
RF4	0.70	**0.91**	0.48	0.52	0.65	0.65	0.44	0.48	0.78	0.55
AP1	0.49	0.53	**0.90**	0.53	0.30	0.33	0.36	0.37	0.41	0.38
AP2	0.44	0.45	**0.96**	0.54	0.27	0.30	0.33	0.31	0.40	0.38
AP3	0.46	0.43	**0.94**	0.56	0.33	0.35	0.31	0.32	0.42	0.40
AP4	0.39	0.41	**0.82**	0.42	0.27	0.28	0.26	0.28	0.34	0.37
EX1	0.60	0.51	0.54	**0.94**	0.47	0.56	0.34	0.40	0.55	0.51
EX2	0.62	0.49	0.53	**0.95**	0.50	0.59	0.36	0.39	0.57	0.56
EX3	0.63	0.55	0.55	**0.94**	0.48	0.62	0.36	0.39	0.59	0.53
EX4	0.48	0.41	0.44	**0.79**	0.41	0.47	0.34	0.33	0.44	0.47
RL1	0.65	0.59	0.30	0.47	**0.96**	0.68	0.34	0.33	0.82	0.54
RL2	0.67	0.62	0.37	0.56	**0.96**	0.69	0.34	0.35	0.84	0.58
RL3	0.53	0.54	0.30	0.46	**0.85**	0.56	0.29	0.27	0.71	0.39
RL4	0.45	0.45	0.17	0.34	**0.82**	0.49	0.29	0.30	0.63	0.44
RS1	0.62	0.60	0.37	0.60	0.60	**0.94**	0.39	0.40	0.74	0.57
RS2	0.63	0.54	0.30	0.58	0.69	**0.94**	0.37	0.36	0.78	0.59
RS3	0.64	0.63	0.34	0.59	0.63	**0.95**	0.42	0.39	0.79	0.61
RS4	0.60	0.57	0.27	0.48	0.57	**0.83**	0.37	0.40	0.71	0.55
CC1	0.34	0.46	0.30	0.33	0.33	0.36	**0.92**	0.54	0.40	0.49
CC2	0.38	0.50	0.31	0.35	0.33	0.42	**0.94**	0.55	0.42	0.49
CC3	0.34	0.50	0.36	0.39	0.34	0.40	**0.94**	0.60	0.43	0.53
RC1	0.40	0.51	0.37	0.40	0.31	0.38	0.61	**0.91**	0.39	0.54
RC2	0.44	0.48	0.32	0.39	0.35	0.41	0.55	**0.92**	0.42	0.56
RC3	0.35	0.40	0.24	0.32	0.28	0.32	0.44	**0.83**	0.33	0.43
RSAT1	0.72	0.71	0.39	0.58	0.79	0.79	0.47	0.41	**0.96**	0.66
RSAT2	0.73	0.70	0.38	0.53	0.79	0.80	0.40	0.39	**0.96**	0.59
RSAT3	0.74	0.73	0.47	0.61	0.80	0.80	0.43	0.46	**0.97**	0.67
RSAT4	0.71	0.71	0.41	0.56	0.85	0.76	0.40	0.39	**0.95**	0.59
OSAT1	0.55	0.55	0.42	0.57	0.55	0.62	0.51	0.56	0.65	**0.97**
OSAT2	0.55	0.56	0.44	0.55	0.54	0.62	0.52	0.57	0.66	**0.98**
OSAT3	0.53	0.52	0.41	0.54	0.53	0.59	0.53	0.53	0.62	**0.96**
OSAT4	0.41	0.46	0.23	0.42	0.35	0.47	0.40	0.42	0.45	**0.69**

APPENDIX D. Test for Common Method Bias

The following technique is performed to measure the influence of common method bias in Study 2 by including a common method factor and linking it to all indicators after converting each indicator into a single-indicator constructs (see Liang et al., 2007).

Common method bias is of little concern if the method factor loadings are generally insignificant, and the percentages of indicator variance explained by substantive constructs are substantially greater than those explained by the method construct (Williams et al., 2003).

Following these guidelines (see Table D1), average variance of indicators due to substantive constructs (83%) is substantially greater than variance due to method construct (2%). Also, the majority of loadings of the method factor are insignificant. According to these results, we can conclude that the influence of common method bias is not a concern.

Table D1: Common Method Bias Analysis (Study 2)					
Construct	**Indicator**	**Substantive Factor Loading (R1)**	**$R1^2$**	**Method Factor Loading (R2)**	**$R2^2$**
Recovery Procedure (Recovery Effort)	RE1	1.126***	1.268	-0.328***	0.107
	RE2	0.747***	0.558	0.204***	0.042
	RE3	0.958***	0.918	-0.045	0.002
	RE4	0.655***	0.429	0.160*	0.026
Recovery Procedure (Recovery Fairness)	RF1	0.774***	0.600	0.178***	0.032
	RF2	0.931***	0.867	-0.152*	0.023
	RF3	1.055***	1.113	-0.284**	0.081
	RF4	0.744***	0.553	0.200**	0.040
Recovery Interaction (Apology)	AP1	0.859***	0.738	0.059	0.003
	AP2	0.985***	0.971	-0.045	0.002
	AP3	0.930***	0.864	0.008	0.000
	AP4	0.833***	0.694	-0.021	0.000
Recovery Interaction (Explanation)	EX1	0.951***	0.903	-0.018	0.000
	EX2	0.954***	0.911	-0.002	0.000
	EX3	0.905***	0.819	0.047	0.002
	EX4	0.821***	0.675	-0.033	0.001
Recovery Outcome (Recovery Level)	RL1	0.934***	0.872	0.027	0.001
	RL2	0.843***	0.711	0.140***	0.020
	RL3	0.859***	0.737	-0.018	0.000
	RL4	0.968***	0.937	-0.178**	0.032
Recovery Outcome (Recovery Speed)	RS1	0.968***	0.937	-0.037	0.001
	RS2	0.962***	0.926	-0.032	0.001
	RS3	0.936***	0.875	0.018	0.000
	RS4	0.786***	0.617	0.057	0.003
Cognitive Capital	CC1	0.944***	0.891	-0.034	0.001
	CC2	0.937***	0.877	0.003	0.000
	CC3	0.916***	0.838	0.030	0.001
Relational Capital	RC1	0.884***	0.782	0.034	0.001
	RC2	0.886***	0.785	0.040	0.002
	RC3	0.896***	0.804	-0.081*	0.007
Recovery Satisfaction	RSAT1	0.925***	0.855	0.034	0.001
	RSAT2	1.076***	1.158	-0.125**	0.016
	RSAT3	0.860***	0.740	0.115	0.013
	RSAT4	0.969***	0.940	-0.025	0.001
Overall Satisfaction	OSAT1	0.969***	0.940	0.005	0.000
	OSAT2	0.970***	0.941	0.009	0.000
	OSAT3	0.993***	0.986	-0.037	0.001
	OSAT4	0.662***	0.438	0.032	0.001
Average		**0.910**	**0.831**	**-0.001**	**0.016**

*p < .05, **p < .01, ***p < .001