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# Understanding the Complexity of Product Returns Management: A Complex Adaptive Systems Theory Perspective

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Understanding the Complexity of Product Returns Management: A Complex Adaptive Systems  
Theory Perspective

by

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A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
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creativity, grounded theory, multiple methods research

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## **DEDICATION**

To Booma, hopefully I wrote enough! I love you and miss you every day.

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First, I would like to thank God for your guidance and support throughout my studies. This program has undoubtedly been the most challenging thing I have ever done, and I would not have made it through without my faith. Thank you to my mom and husband for listening to my numerous frustrations and encouraging me to persevere when the going got tough. Thank you to Helga and Ness for teaching me to be disciplined on the ice, which has helped me be disciplined in countless other areas of my life. Thank you to my friends- Sami, Mari, Lisa, Megan, Andrea and Shelley- for keeping me sane. Thank you to Taunte Sue and Uncle Pat for your continued encouragement.

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## ABSTRACT

The core essence of a marketing transaction is the exchange of value between two parties. Quite often, the exchange of value describes a customer purchasing a product from a company. When purchasing products, the exchange of value can often fail due to product defects or customer dissatisfaction. When the marketing exchange fails, customers often desire an avenue for recourse to right the exchange imbalance. Accepting and quickly processing product returns represents a strategic tool companies can leverage to maintain healthy relationships with customers, despite an exchange failure. Effectively managing product returns also benefits companies financially, by reducing inventory levels, costs, and the risk of product obsolescence. Despite providing both relationship management and financial benefits, numerous companies struggle to manage product returns effectively. In a time when companies are facing a growing number of product returns due to omni-channel retailing and online shopping, implementing an effective system to manage product returns has become a vital strategic tool necessary to maintain competitiveness.

First, the current research answers the question of *why do companies struggle with product returns?* by identifying the important components of an effective product returns system. Informed by complex adaptive systems theory and based on a qualitative, grounded theory analysis, the current research finds that the hidden complex nature of managing product returns prevents numerous companies from implementing an effective system to manage returns. Managing product returns requires five important components

(firm capabilities, employees, the returns management information system, organizational climate, and the customer service boundary), which interact with each other multiple times to process a product return. After identifying the important components and interactions within a product returns system, Essay I integrates the information together to form a substantive theory of the complexity of product returns management. The substantive theory implies that companies looking to improve their management of product returns need to understand and invest in multiple components within the product returns system.

Second, the current research answers the question of *how do the employees, returns management information system, and climate for creativity components of a product returns system relate to a firm's flexibility, adaptability, and performance?* To answer this research question, this dissertation empirically evaluates the role these three components play in shaping a firm's flexibility, adaptability, subjective performance and relationship quality by analyzing data collected through an online survey with 102 US managers with experience in product returns. The empirical analysis indicates that employee decision-making resources show a statistically significant negative relationship with firm adaptability, while the firm's climate for creativity and flexibility show a statistically significant positive relationship with firm adaptability. Firm adaptability shows statistically significant positive relationships with subjective performance and relationship quality. Firm adaptability acts as a partial or full mediator in all of these relationships.

The combined findings of Essay I and Essay II point to the importance of product returns as a strategic relationship management tool. Firms that can effectively manage

product returns give employees more flexibility to respond to problems, are better able to make structural changes, have higher subjective performance ratings, and better quality relationships with customers.

## CHAPTER I: INTRODUCTION

Reverse logistics, or the processing and management of returned products and materials from “the point of consumption to the point of origin for the purpose of recapturing or creating value” (Rogers and Tibben-Lembke 2001, p. 130), aims to keep customers happy when a product fails to meet the customer’s expectations (Griffis et al. 2012; Stock and Mulki 2009). Product returns cost manufacturers and retailers upwards of \$100 billion a year due to the expense of transporting, processing, restocking, reselling and/or disposing of returned items (Blanchard 2010). The National Retail Federation estimates product returns cost retailers \$267 billion in lost sales in 2013 (Penske 2014). Overall return rates vary by industry. For example, companies in the plastic toy, clothing and pet supply sectors report an average return rate of 1% or less a year (Buyer 2014; Finance 2014; Officer 2014). Comparatively, companies handling returns in the automotive and technology sectors see an average return rate of 6% and 7%, respectively (Manager 2014a; Manager 2014b). While these return rates may appear low, even low return rates cost firms substantially due to the required processing resources. While the term reverse logistics encapsulates any product or material moving in the reverse channel, this research adopts a returns management focus, and specifically studies the movement of returned products through the reverse channel (Rogers et al. 2002).

Firms can leverage returns management strategically to take care of customers when the marketing exchange fails for some reason (e.g., product broke). Effective returns processing contributes to the health of the relationship between the returner and the receiving firm by ensuring the customer’s money is refunded in a timely manner, and providing the receiving firm

with enough time to reclaim some value from the returned product by reselling, reusing, or salvaging the components of the product (Griffis et al. 2012; Stock and Mulki 2009). Effective product returns management programs represent a strategic way for companies to reduce the financial impact of returned products by reducing excess inventory, avoiding storage costs, and reducing the risk of product obsolescence (Autry, Daugherty, and Richey 2001; Blanchard 2010; Stock and Lambert 2001; Stock and Mulki 2009; Stock, Speh, and Shear 2006). A firm's product returns system and processes represent strategic tools the firm can use to build customer loyalty despite a possible product failure (Kocabasoglu, Prahinski, and Klassen 2007). Yet, despite the well-known cost reduction and relationship management benefits of effective product returns management programs, many firms continue to struggle to implement systems and processes to handle product returns. A recent Intermec survey estimates 52% of businesses do not know what to do with received product returns (Penske 2014). Additionally, most companies perceive product returns as a cost of doing business or an exchange failure, and therefore do not commit the optimal level of resources to returns management (Griffis et al. 2012; Rogers and Tibben-Lembke 2001). For example, one fashion company interviewed in the current research would love to implement an updated return management information system, but cannot justify the \$2 million price tag associated with such a system for a return rate of less than 1% of units shipped.

The trend of swelling product return rates and costs is unlikely to subside soon due to the growth of multiple retail channels, which offer customers multiple locations to purchase a product (e.g., physical retail store, online store), and the growth of omnichannels, which allow customers to start a purchase in one channel, and complete a purchase in a second, different channel (e.g., order online for in-store pick-up). Now customers can order in multiple channels, and have come to expect similar options when returning products. Omnichannel retailing



presents a unique challenge for product returns processing because customers can purchase an item on their mobile device, and after having a change of heart, return the item to the retail store. In the past, firms were primarily concerned with long return lines in stores, but increasing customer demands for more flexibility when returning products have increased the amount of returns occurring through the mail as well (Napolitano 2013; Penske 2014; Piotrowicz and Cuthbertson 2014; Xing et al. 2011). With the growth of omnichannel shopping, customers increasingly shop online, which can further increase product returns, since online shoppers are known to return a third of online purchases (Penske 2014). Customer deviance only compounds the returns situation further, since customers are increasingly trying to trick or cheat retailers by returning new, wrong or altered merchandise (Jack, Powers, and Skinner 2010; Stock and Mulki 2009). Thus, firms currently struggling to handle product returns will receive little relief in the near future, as omnichannel and multi-channel retailing continue to become more important to customers.

Despite the known financial and relationship benefits, why do firms continue to struggle to handle product returns? The existing literature suggests several reasons. First, customer motives vary for returning products. Traditionally, product failures or defects represented the most common reasons for a return, but other customer-centered reasons, such as having a change of heart about buying the product or ordering the wrong product, are outpacing returns due to defects and failures (Blanchard 2010; Powers and Jack 2013).

Second, product returns require management information systems and established processes to handle the flow of returned items, because that flow includes many different products, in different conditions, coming from different places and in different packages (Stock and Lambert 2001). However, many companies utilize legacy systems to manage product

returns, due to the negative perceptions of returns as a cost of doing business, while picking, packing and shipping outbound orders is managed through newer, more functional enterprise resource planning (ERP) systems (Griffis et al. 2012).

Third, although systematic processes help firms manage product returns, most returns cannot be completely automated due to uncertainty. Uncertainty arises in product returns because of the unpredictability of customers. While most customers return the correct item, customer opportunism and fraud remain significant concerns (Jack, Powers, and Skinner 2010; Stock and Mulki 2009). Uncertainty over the identity or condition of a returned product adds challenges to processing product returns because an employee must make a series of decisions to correctly classify the returned item's condition as perfect, imperfect but functional, defective, or defective but fixable. Employees may have to make up to 35 decisions on each return to successfully process it (Rawlings 2016). For example, a company in the current study received a returned router from a vendor, and discovered that the serial number for the returned router did not match the serial number of the router the company sold to the customer. To complicate matters, the returned router with the incorrect serial number was valued at \$800, while the router originally sold to the vendor was valued at \$2700. Should the company accept the returned router, despite the mismatches in the product serial numbers? How much should the company credit the vendor for this return?

Recapturing the optimal value from a returned product depends upon the employee correctly identifying and verifying the return, as well as assessing the condition of the return (Stock, Speh, and Shear 2006). Since an employee is necessary to verify the identity and condition of a returned item, the employee's decision-making directly impacts the efficiency of the returns process and the value recovered from the return. While some previous studies have

identified major decision-making concerns for firms developing new product return policies, (including cost, profit, market conditions, customer behavior, supply chain capabilities, regulation and environmental impact considerations; Hazen, Hall, and Hanna 2012), and developed a model describing how different disposition decisions (e.g., resale pricing of the recovered item) contribute to returns management profitability (Tan and Kumar 2006), the role of the employee in a product returns system has received less research attention.

Other topics relevant to returns management have received research attention. Prior studies have yielded insights on how to design returns management systems to avoid product obsolescence (Blackburn et al. 2004; Turrisi, Bruccoleri, and Cannella 2013), and on antecedents that alter the flow of product returns (e.g., buying during the holiday season; Jack, Powers, and Skinner 2010; Petersen and Kumar 2009; Powers and Jack 2013). Prior research also describes the different ways to disposition returned products depending upon a firm's position in the supply chain (Blackburn et al. 2004; Stock and Mulki 2009) or a firm's commitment of resources to returns management (Daugherty et al. 2005; Jack, Powers, and Skinner 2010; Skinner, Bryant, and Richey 2008). While this stream of research has produced many insights about how a firm should manage product returns, little research has studied the complexity of product returns management. If product returns management were a simple task, few, if any firms would struggle with implementing effective solutions. Since firms continue to struggle with implementing effective solutions, studying the complexity of product returns systems will reveal the hidden hurdles to implementing effective product returns systems.

Further, understanding the nature of the complexity in product returns management will also reveal insights on how firms approach product return process improvement and innovation under resource constraints. Skinner, Bryant, and Richey (2008) conclude that only firms

committing substantial technology, managerial and financial resources to product returns should consider recycling, refurbishment and remanufacturing disposition options. This recommendation excludes numerous companies who process returns with limited resources. Should these firms only destroy returned products?

### **Research Objectives**

First, the current research studies the complexity in product returns management. A better understanding of the complexities of product returns management will begin to shed light on why numerous firms continue to struggle to implement successful product returns programs, despite knowledge of the positive financial outcomes of such programs (Penske 2014; Rogers and Tibben-Lembke 2001). Complexity research studies how the looks to the interaction of components within the system as the source of complexity. In the current research, the application of a complex adaptive systems (CAS) theory perspective helps the researcher to identify the components of a product returns system (the system responsible for processing and disposing of returned products), and the interactions that occur within a product returns system. The identified components and interactions are then integrated into a substantive theory of the complexity of product returns management.

Second, the current research empirically evaluates how three components of the substantive theory- the employee, the returns management information system, and the organizational climate- contribute to the flexibility, adaptability, performance and relationships of the firm. CAS theory suggests that the ability of a system to remain flexible and adapt is vital to the overall stability and performance of the system (Holland

1995). Empirical testing of these three components originally identified through grounded theory analysis represents a way to validate the theoretical insights obtained in the substantive theory (Davis, Golicic, and Boerstler 2011), and Essay II will present empirical tests for three components presented in Essay I. The empirical evaluation of the three components is based on survey research conducted with 102 managers of US companies which handle product returns.

Third, the current research follows a multiple methods research (MMR) design to study the complex nature of product returns management. MMR, which requires a researcher to collect at least two different types of data and apply at least two different analysis methodologies, is well suited for researching complex research problems and promotes a deeper understanding of the research problems (Davis, Golicic, and Boerstler 2011). Given that previous researchers have made an argument that supply chains represent CAS (Choi, Dooley, and Rungtusanatham 2001; Nilsson and Gammelgaard 2012), following a MMR design will provide a deeper understanding of the complex nature of the product returns system.

### **Research Questions**

To address the above objectives and advance the stream of research focused on the complex nature of product returns management, the following research questions are proposed:

Essay One:

- What are the important components of a product returns system?

- How does complexity arise in a product returns system?
- To what extent does a product returns system resemble a complex adaptive system?

Essay Two:

- To what extent do the employees within the product returns system influence a firm's:
  - flexibility and adaptability?
  - performance?
  - relationships with customers and vendors?
- To what extent does the returns management information system influence a firm's:
  - flexibility and adaptability?
  - performance?
  - relationships with customers and vendors?
- To what extent does the firm's climate for creativity influence a firm's:
  - flexibility and adaptability?
  - performance?
  - relationships with customers and vendors?

### **Research Overview**

This dissertation applies a MMR approach with research collected in two stages. Chapter III contains the first stage of the research, presenting qualitative findings from in-depth, semi-structured interviews. Chapter IV contains the second stage of the research,

presenting quantitative findings from an online survey. The benefits of a MMR approach include more robust results through the triangulation of multiple perspectives and sources of information; and a more comprehensive story describing the focal research problem (Davis, Golicic, and Boerstler 2011). In the current research, MMR is employed for the purpose of development, meaning that the qualitative insights obtained in the first essay guide the conceptual development of the second essay (Davis, Golicic, and Boerstler 2011). MMR research is rare in marketing (only about 4% incidence rate in the top five marketing journals- *Journal of the Academy of Marketing Science*, *Journal of Marketing Research*, *Marketing Science*, *Journal of Consumer Research* and *Journal of Marketing*- in a recent study, see Davis, Golicic & Boerstler 2011). MMR is also recognized as an important methodology for supply chain management research because of the complexity of many of the problems involved in supply chain and logistics management (Golicic and Davis 2012). For complex constructs, MMR enables the researcher to study constructs and relationships in detail (Golicic and Davis 2012).

Essay I applies a grounded theory methodology to data collected qualitatively. Grounded theory research handles “new, dynamic, or complex” variables and new areas of inquiry well (Golicic and Davis 2012, p. 732; O'Reilly, Paper, and Marx 2012). Since the study of CAS in the returns management context represents a newer area of inquiry, a grounded theory methodological approach will provide a deeper understanding of the complexity of the product returns system, by drawing on richly detailed sources of information (e.g., in-depth interviews; Golicic and Davis 2012). Grounded theory can be defined as a research method, which consists of “systematic, yet flexible guidelines for collecting and analyzing qualitative data to construct theories from the data themselves”

(Charmaz 2014, p. 1). Grounded theorists rely upon many sources of information, such as interviews with experts, published documents, and observations (Charmaz 2014).

Grounded theory should describe the focal phenomenon in a way that makes sense to people working with the focal phenomenon, and in enough detail that other researchers could begin to generalize the findings to other contexts (Glaser and Strauss 1999).

In grounded theory research, the rigor of the research depends upon the quality of the data, and rigorous research comes from data that cover a topic deeply and under many different circumstances (Charmaz 2014). Grounded theory follows theoretical sampling, defined as the joint collection, coding, and analysis of data, which permits the researcher to constantly compare and test insights emerging from the data (Glaser and Strauss 1999). Theoretical sampling requires the researcher to maximize the amount of variation captured in the data by sampling different types of sources. Theoretical sampling is non-probabilistic because the researcher relies on his/her knowledge of the research to determine additional sources of information that will maximize variation, which prevents the researcher from developing a theory based upon a single-outlying comment made by one source (Charmaz 2014). In grounded theory, variation amongst diverse groups provides the most extreme test of a construct (Glaser and Strauss 1999). If a hypothesized relationship between two conceptual categories holds across a highly diverse group of subjects, the researcher feels more confident in the stability of the relationship between those two conceptual categories (Charmaz 2014).

Diverse groups continue to be sampled in grounded theory research, until a point of theoretical saturation emerges, defined as a point where no new information emerges about a construct (Charmaz 2014; Glaser and Strauss 1999). The researcher determines



when theoretical saturation occurs by constantly comparing data (termed 'constant comparison'; Charmaz 2014; Glaser and Strauss 1999). In Essay I, data sources include in-depth interviews, published documents and researcher observations with six US companies. Theoretical saturation occurred with the six US companies, as the sixth firm provided similar information to previous firms. The constant comparison method is applied to the data collected from these six companies in Essay I, and results in the creation of a substantive theory of the complexity of product returns management, which focuses on the interaction of five main components of the product returns system. Essay I presents 14 theoretical propositions describing how interactions among the components of a product returns system create complexity.

In Essay II, a hypotheses related to the components of the substantive theory developed in Essay I are conceptualized and tested empirically. Empirically testing a subset of the components in this way begins to validate the theoretical insights obtained in Essay I by considering additional, different sources of information (Davis, Golicic, and Boerstler 2011). A quantitative, online self-administered survey was developed to examine the influence of three of the components of the product returns system on firm adaptability, firm performance, and relationship quality outcomes. To keep the scope of Essay II manageable, only the impact of employees, the returns management information system and climate will be studied. These three components were selected out of the five identified in Essay I because they were the most frequently discussed problematic components of the product returns system. The data collected in the survey are analyzed through a series of regression equations (Hair et al. 2010). In summary, this dissertation applies a MMR approach consisting of two different methodologies (qualitative in-depth,

semi-structured interviews and quantitative survey research) and applies two different analysis procedures (grounded theory and multiple regression analysis).

## CHAPTER II: LITERATURE REVIEW

In this chapter, previous research in returns management and types of problems will be reviewed, before a more thorough examination of complex problems and solutions to complex problems.

### Returns Management

A firm's product returns system depends upon the interactions of many parts- customers, customer service, the shipping carrier, employees and the returns management information system- to name a few. The interactions of these different entities facilitate the movement of an unwanted, unneeded, or defective product back through the logistics channel to the retailer, manufacturer or a third-party (Stock and Lambert 2001). The configuration and structure of product returns systems differ across firms, and emerge from the interactions of entities involved in the reverse channel. In the current research, the firm's product returns system describes the configuration and structure of the different processes and interactions that must occur for a returned product to move back through the logistics channel. The product returns system aims to recover value from returned products to support the profitability of the firms within the channel through information sharing and visibility (Langley and Holcomb 1991). Visibility, or an awareness of the products being returned and their location within the channel, increases the efficiency and effectiveness of the product returns system by enabling labor, transportation, and storage resources to be allocated appropriately (Blanchard 2010).

To illustrate the importance of visibility for returns management, consider a distributor accepting a product return from a customer. The return begins with the customer contacting the

company to obtain a return authorization for the product (customer contact may be in a physical retail store, online, or over the telephone). This communication enables the distributor to process and handle the return as quickly as possible once the item arrives at the distribution center, since the distributor knows the identity of the return, who returned it and where the return comes from, which maximizes the potential for value recovery. Once the returned product is shipped back to the distributor, the returned product enters the product returns system and travels through a series of steps to be processed (Rogers et al. 2002; Stock, Speh, and Shear 2006).

Stock, Speh, and Shear (2006) describe a series of five steps a product within the product returns system follows, including the 1) Receive, 2) Sort and Stage, 3) Process, 4) Analyze and 5) Support Steps. Returning to the previous illustration, the distributor first receives the returned product from the customer (the customer varies by supply chain, and may be an end-user, a company's own retail store, or another company), and stores the product in a staging area (*Step 1: Receive*). Next the distributor sorts all of the returned products, organizing returned items on to pallets, by type of product or date received (*Step 2- Sort and Stage*). As employees process the products returned to the distributor, additional sorting and staging may occur. Additional sorts separate product returns re-entering inventory from other returns going back to a vendor (*Step 3- Process*). Employees at the distributor next inspect the condition of the returned product and make a decision on the future of the returned product (*Step 4- Analyze*). The decision made by the employee directly shapes how much value the distributor can recover for all types of returned products. If the employee makes a poor decision (e.g., destroy an unopened iPad), the distributor will recover less than optimal value. Following the employee's decision, the returned product moves to the location selected by the employee (*Step 5- Support Steps*). While these five steps describe the general product returns system used to process returned products, the unique nature

of a firm's reverse supply chain often alters the order or number of steps a returned product travels through. For example, one distributor of technology products interviewed in the current research analyzes product returns (*Step 4*) before separating returns going back into inventory from returns going back to the vendor (*Step 3*).

Rogers et al. (2002) describe a series of six steps a product a customer desires to return must travel through, including: 1) Receiving the return request, 2) Determining routing, 3) Receiving the return and processing it, 4) Disposition decision, 5) Issuing credit, and 6) Monitoring return rates. Rogers et al. (2002) take a broader look at the series of steps returned products travel through than Stock and colleagues (2006), beginning with issuing a returns authorization, and ending with issuing credit to the returner and monitoring return rates to improve the firm's financial performance. Rogers et al.'s (2002) *Receiving the return and processing it* and *Disposition decision* steps largely overlap with Stock and colleague's (2006) series of five steps.

Common disposition decisions employees will make include reselling the returned item, upgrading/fixing the item, selling the returned item for scrap value, and recycling or trashing the returned item (Hazen, Hall, and Hanna 2012; Tibben-Lembke 2002). Typically, reentering an unopened returned product back into inventory and reselling it recovers the most value from a product, however, the value recovered for any of the disposition options depends upon the nature of the product and structure of the product returns system. Not all companies find value recovery a desirable outcome of product returns. In some cases, firms prefer to destroy the product instead of attempting to recover value from it to protect the integrity of the brand (Dwyer 2010). For example, one company interviewed in the current research mentioned that the National Football

League (NFL) requires all defective returned products be destroyed to protect the integrity of the NFL brand.

Since the disposition decision (*Step 4*) influences the value recovered from a returned product, employee decision-making in the analysis step of processing product returns will next be discussed.

### **Analysis & Decision-Making**

The analysis step (*Step 4*) represents the most critical stage of the return process because the disposition option chosen by the employee determines how much value can be recovered from the returned product. Naturally, firms would like to recover as much value as possible from a returned product, but optimizing value recovery depends upon the employee weighing the various labor, storage and transportation costs associated with each disposition option (Stock, Speh, and Shear 2006; Tibben-Lembke 2002). Knowing and weighing the possible disposition decisions for a returned product contributes to the difficulty of the disposition decision by consuming the employee's decision-making resources. A disposition decision with only two options will consume less decision-making resources than a disposition decision with four options because the employee makes fewer mental comparisons with two versus four options.

Employees each have a reservoir of decision-making resources to fuel decision-making (Baumeister and Tierney 2011; Vohs 2006; Vohs et al. 2008; Vohs et al. 2005). When making a disposition decision, the employee weighs the costs associated with each option against the estimated value obtained from each option to determine which option yields the most value for the cost. Decision-making resources permit the employee to pay attention to and process the pertinent information for the task at hand (Patten et al. 2006). As the employee's decision-

making resources decrease, the employee has a harder time paying attention to and processing the pertinent information for a particular task (Tierney 2011; Vohs 2006). For example, an employee processing a returned electrode from a titration machine faces only two disposition options: 1) resell the electrode if it is in pristine, unopened condition for the original value, or 2) trash the electrode if opened for little value. The electrode must be trashed if opened, because the electrode may have come in contact with any number of chemicals, which could create an adverse chemical reaction if resold to a second customer. Contrastingly, consider an employee processing a returned iPad. The iPad packaging is opened, but the iPad is still in working condition. The employee considers multiple options: 1) sell the iPad as is for some value, 2) refurbish the iPad and recover additional value, 3) liquidate the iPad to a third-party for some value, or 4) recycle the iPad and recover some value for the component materials. While evaluating the potential disposition options for either the electrode or the iPad, the employee must also weigh the costs associated with storing, moving and/or repairing the returned product for each option. The employee processing the returned electrode requires less decision-making resources for the decision than the iPad employee, because the employee weighs two black and white options. On the other hand, the employee processing the returned iPad requires more decision-making resources for the decision, because the employee weighs four options, and the differences in value recovery and cost are not as distinct as the electrode example.

Breaking a difficult decision like the returned iPad example above into a series of smaller decisions represents an effective way to resolve difficult decisions by letting each small decision, guide the next small decision (Rahman and De Feis 2009). Over time, the series of small decisions leads to an overall resolution. However, by breaking a difficult decision down into a series of decisions, each small decision presents an opportunity for human errors in processing

information relevant to each small decision (Dellaert, Donkers, and Van Soest 2012). In addition, the employee's decision-making resources will influence the level of attention and information processing the employee can utilize for each decision (Campbell 1988). If the employee has consumed most of his decision-making resources, the employee is at a higher risk for erring when making a difficult decision, because the employee cannot devote enough attention to the decision or process the pertinent information fully (Patten et al. 2006).

In addition to decision-making resources, the employee's perception and cognition can reduce the effectiveness of decision-making, because the employee relies upon only a small portion of the environment and a limited number of the characteristics of the environment to make a decision (Simon 1959). For example, perceptions of pressures, such as difficulty and time pressures, can increase cognitive biases (e.g., memory errors), leading to the overestimation or underestimation of information (Rahman and De Feis 2009; Sargut and McGrath 2011). Additionally, perceptions about the self (e.g., self-efficacy), can influence how efficiently an individual makes a decision, and subsequently the quality of the decision (Wood and Bandura 1989). Limited perception and cognition result from the employee's decision-making limitations, where information exceeding a person's attention or processing capabilities is filtered out (Schroder, Driver, and Streufert 1967; Simon 1959). Filtering out information can increase the likelihood of making decision errors, leading to incorrect decisions.

Research on self-regulation and ego-depletion in social psychology suggests that the number and types of decisions an individual makes have the ability to reduce the quality of decisions (Converse and DeShon 2009; Tierney 2011; Vohs et al. 2005). One way employees make a decision is through systematic processing, where many pieces of information relevant to the decision are weighed and considered, so that the employee makes an optimal decision



(Tversky and Kahneman 1974; Vohs et al. 2005). While the complex comparisons and calculations of systematic processing benefit some decisions, this type of decision-making behavior consumes the employee's decision-making resources faster than heuristic decision-making behaviors (Vohs et al. 2008). Employees often rely on heuristics, or mental shortcuts, to conserve decision-making resources when making a decision; otherwise, no decision may be made at all, because the brain enters a cognitive miser mode and shuts-off the areas of the brain responsible for conducting complex trade-offs (Hagger et al. 2010; Tierney 2011; Tversky and Kahneman 1974). The reliance on heuristics and the inability of the individual to conduct complex comparisons can reduce the effectiveness of decisions made by employees.

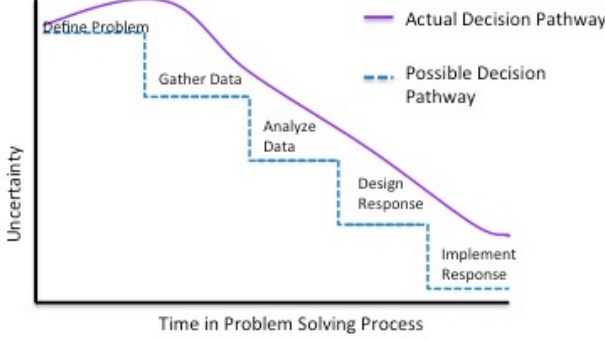
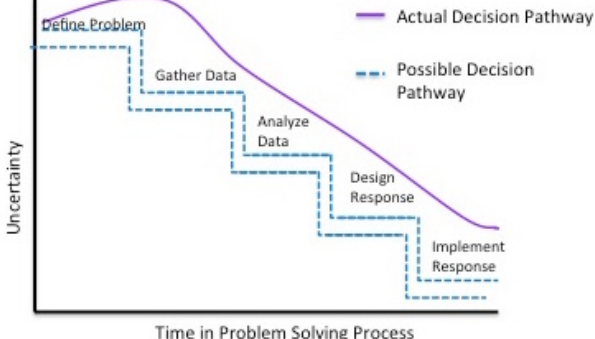
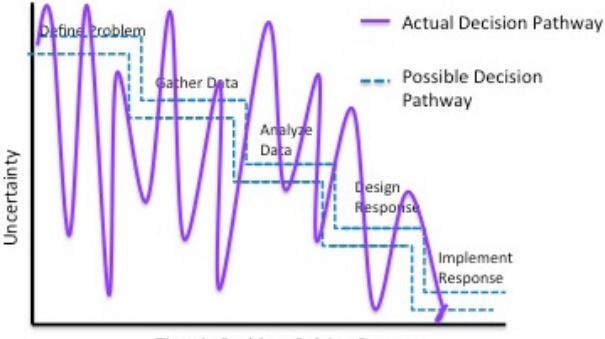
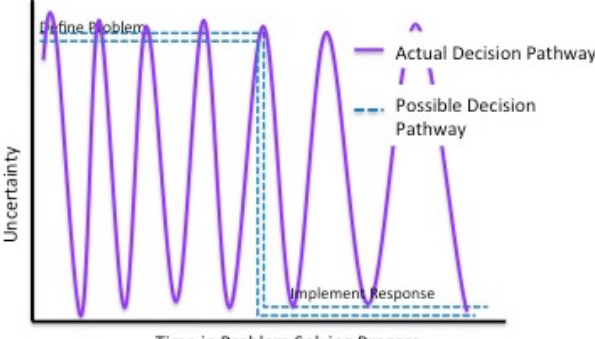
While employee decision-making resources influence the disposition decision, employees face different types of problems when processing product returns, which will require different decision strategies and resources. Inherently, in order for an employee to make a decision, a problem must occur, since a problem describes a discrepancy between a current and desired state (Anderson et al. 2011). Without such a discrepancy, no decision would be necessary.

### **Types of Problems**

The discrepancies between a current state and a desired state can be of four general types: simple, complicated, complex, or wicked. This section describes each of the four types of problems, and also draws some comparisons between the different types. Table 1 displays a summary of the four types of problems and each type of problem's key characteristics.

The first type of problem- a simple problem- describes a discrepancy where the decision necessary to move the system from the current state to a desired state is obvious to all decision-makers, and all decision-makers suggest the same decision (Snowden and Boone 2007). Simple

**Table 1.** Summary of Simple, Complicated, Complex and Wicked Problems

Simple Problem	Complicated Problem
 <ul style="list-style-type: none"> <li>• Problem known</li> <li>• Only one decision pathway</li> <li>• Knowledge sufficient to solve</li> <li>• Problems reoccur and can be solved in the same way</li> <li>• Example: Customer return due to a miss-shipment</li> </ul>	 <ul style="list-style-type: none"> <li>• Problem known</li> <li>• Different decision pathways possible</li> <li>• Requires knowledge and expertise to solve</li> <li>• Problems reoccur and can be solved in different ways</li> <li>• Example: Customer return due to a change of heart</li> </ul>
 <ul style="list-style-type: none"> <li>• Problem unclear</li> <li>• No clear decision pathway because they emerge from interactions of decision-makers</li> <li>• Iterations between stages of the problem-solving process required to solve</li> <li>• Problems reoccur, but decisions are unique each time because the interactions of decision-makers are different each time.</li> <li>• Example: Customer returns a product different than the authorized return</li> </ul>	 <ul style="list-style-type: none"> <li>• Problem unknown</li> <li>• No clear outcome or stopping point</li> <li>• Decision pathways emerge from attempts to define the problem and implement a response steps of the problem-solving process</li> <li>• Problems do not reoccur; each is unique</li> <li>• Example: Upgrading a firm's returns management information system.</li> </ul>

problems require only some knowledge of the correct procedure to follow to resolve the problem, and can be repeatedly solved in the same way (Allen 2013). Looking at the upper left pane of Table 1, the problem solving process for simple problems occurs in a linear pattern, moving from understanding the problem, to gathering data, to analyzing data, to designing a response, and to implementing a response (Conklin 2005). Additionally, only one expected problem-solving process pathway appears, since decision-makers see only one solution to simple problems. For example, a customer shipped the wrong product represents a simple problem with an obvious decision. The customer returns the wrong product, in pristine condition, so the returned product is returned to saleable stock.

The second type of problem- a complicated problem- describes a discrepancy where the decision necessary to move the system from the current state to a desired state is known, but multiple, viable decision pathways exist, so decision-makers may hold different opinions on the best solution (Snowden and Boone 2007). With complicated problems, knowledge of the correct procedure to follow is not sufficient for handling the problem, and additional expertise is required to analyze the situation, and reduce the level of uncertainty and risk associated with the problem (Allen 2013; Snowden and Boone 2007). Looking at the upper right pane of Table 1, the problem-solving process for a complicated problem follows the same steps as a simple problem, but multiple decision pathways exist. The decision-maker must decide among the multiple pathways to handle the problem. For example, a customer wishing to return an opened product due to a change of heart represents a complicated problem with multiple decision pathways. The returned item could be resold as a used product. Alternatively, the product could be re-boxed, rebuilt or reconfigured and then sold.

The third type of problem- a complex problem- describes a discrepancy where the decision necessary to move the system from the current state to a desired state is unclear, because the problem has multiple causes, and involves the interactions of multiple entities, such as the employee, a firm's information system, and capabilities (Ng 2011; Snowden and Boone 2007). Because complex problems are non-linear, the problem-solving process is also non-linear and unique to the situation (i.e., given the same inputs, a different output occurs; Allen 2013; Conklin 2005). Complex problems describe situations where the problem can only be fully understood by attempting to develop solutions to the problem (Conklin 2005). In essence, the problem solver performs many mini-experiments to try and develop a solution to the problem (Conklin 2005; Snowden and Boone 2007). A decision-maker facing a complex problem may begin by defining the problem, then define a response, return to defining the problem, followed by gathering and analyzing data before defining a second response. The bottom left pane of Table 1 depicts a complex problem, where the actual decision pathway takes a serpentine shape instead of the linear pathway seen in simple and complicated problems. For example, a customer getting authorization to return a product and attempting to return a different product represents a complex problem, with multiple possible causes (e.g., error in packaging the return, an attempt to deceive the firm), and requires the interaction of multiple entities (e.g., customer service, return employees, the customer).

The fourth type of problem- a wicked problem- describes a discrepancy where the decision necessary to move the system from the current state to a desired state is unknown, because the problem has no agreed upon outcome, and the only way to define an outcome is by implementing ideas to better understand the problem (Conklin 2005; Peterson 2009). Each decision-maker has different opinions on the nature of the problem, and follow different decision

pathways to attempt to handle the problem (Peterson 2009). Wicked problems depend heavily upon the environment and context of the specific situation, so responses to wicked problems are highly tailored and unique, and cannot be compared (Conklin 2005). Looking at the bottom right pane of Table 1, the problem-solving process is non-linear, with multiple decision-makers following different, separate sequences when trying to handle the wicked problem (Peterson 2009). The most notable difference in the depiction of wicked problems is the presence of only two steps in the problem-solving process: defining the problem and implementing a response. For wicked problems, the only way to better define the problem is by implementing a response, thus, the problem-solving process occurs through iterations of defining the problem and implementing responses (Hooker, Espinosa, and Davis 2015). Although the current research defines the problem-solving process as the series of steps the decision-maker follows to handle a problem, wicked problems often only reach a temporary solution because of their dynamic nature. Optimal solutions cannot be reached because of the lack of clarity on the nature of the problem, so that the time and resources a firm would need to commit to gain clarity on the nature of the problem would be cost prohibitive because by the time the firm gains clarity on the nature of the problem, the problem will have already changed. For example, a company upgrading to a new returns management software system represents a wicked problem, because the problem lacks consensus on the outcome or stopping point (e.g., is a five-screen return interface optimal? Is a one-screen interface optimal?). Even if decision-makers decide on a one-screen return interface outcome, decision-makers hold varying opinions on how to reach such an outcome. Tailoring a returns management information system to the needs of a firm or supply chain requires significant resources, and decision-makers will hold different opinions on the best way to optimize the information system due to different knowledge bases and problem definitions.

Additionally, once implemented, the returns management information system will require continued upgrades and improvements to handle new products and customers, making a goal of improving the return management software a moving target.

In summary, a comparison of the four types of problems- simple, complicated, complex, and wicked- reveals some key characteristics that distinguish complex problems. Namely, complex problems involve many entities, which interact to produce non-linear outcomes. The interaction of multiple entities leads to the decentralization of control, a key difference between complicated and complex problems (Ng 2011). Complex problems represent an unclear problem, where decision makers interact to identify the best response, which differs from wicked problems, where the problem is ambiguous and unknown, and solutions must be implemented in order to better understand the problem. While many wicked problems (e.g., implementing a zero-carbon footprint, upgrading information systems) impact business, the current research focuses on understanding the complexity of a product returns system. Although returns management likely includes wicked problems, an understanding of the inherent complexity is a necessary first step before moving on to wicked returns management problems. The current research will focus exclusively on complex problems due to the lack of clarity of how to handle complex returns management problems. Simple and complicated returns management problems still occur, however most firms know ways to handle simple and complicated problems.

### **Complex Problems**

Although firms still contend with simple and complicated problems, complex problems rank amongst the top concerns of chief executive officers because the best responses to complex problems usually do not come from a single individual, department, or firm, but require the

cooperation and collaboration of multiple individuals, departments, and firms (Kerle 2010; Reiter-Palmon, Wigert, and de Vreede 2011). In addition, responding to complex problems requires more than knowledge and expertise- instead complex problems require creative thinking capabilities and experimentation skills, which many firms may have limited experience with (Ng 2011). For example, in order for Apple to deliver a new product to customers, Apple relies upon the interaction of many intra-organizational departments and inter-organizational firms (e.g., in-house designers, Foxconn, shipping carriers), and Apple is involved with the operations of suppliers and manufacturers to improve materials, production processes, inventory management, and product margins (Satariano and Burrows 2011).

Complexity research originated from the study of biological systems (e.g., human cells), originally studying how the various components of a biological system interact to perform vital life functions and keep the organism healthy (Holland 1995). For example, within the human cell, various components, such as the nucleus, mitochondria, vacuoles, and ribosomes, interact to move, store, and consume nutrients within the cell. These interactions permit the cell to produce energy, store waste, and replicate. Similar to studying the components and interactions of a human cell, in general, complexity research seeks to understand the components of a complex system and how those components interact and function within the system to produce outcomes (Holland 1995; Marion 2011; Surana et al. 2005). In the context of the current research, a complexity approach will examine the components of a product returns system, and how the components interact to process returns. Complexity research adopts a more holistic perspective on a complex system than a systems perspective, because the goal of complexity research is not full control of the system, but how the system produces outcomes (Surana et al. 2005).

Controlling the entire system actually inhibits the vitality of the system by blocking the ability of the system's components to adapt as necessary when interacting.

Moving beyond the cellular level, complex systems correlate with the presence of humans (Stacey 1996). Human bodies contain many complex systems, but humans themselves participate in many complex systems (e.g., living in a city, employment). Just as the various components of a human cell interact to perform cell functions, human beings act as agents within numerous complex systems to perform functions for firms, families, and associations, to name a few. Complex systems with human agents may in fact include more complexity than cellular systems, because human agents interact with each other based on their unique knowledge and past experiences, yielding novel outcomes (Nilsson and Gammelgaard 2012; Snowden 2002). Human agents have the independence to interact with the complex system according to their own volition. Recalling that human limitations to decision-making can reduce the quality of decisions, complex systems including human actors must contend with human errors in decision-making (Rahman and De Feis 2009; Sargut and McGrath 2011; Schroder, Driver, and Streufert 1967; Simon 1959).

Although still a relatively young stream of literature within the supply chain domain, the application of a complexity perspective to supply chain management and returns management problems has had some initial success because supply chains form a dynamic and complex system of significant size, with decentralized control (Choi, Dooley, and Rungtusanatham 2001; Li et al. 2010; Nilsson and Gammelgaard 2012; Pathak, Dilts, and Mahadevan 2009; Surana et al. 2005; Wysick, McKelvey, and Hulsmann 2008). Supply chains self-organize through localized interactions of agents (e.g., employees in different firms; Carter, Rogers, and Choi 2015; Surana et al. 2005), and display the ability to adapt to various changes in the environment



(Choi, Dooley, and Rungtusanatham 2001; Pathak, Dilts, and Mahadevan 2009; Stevenson and Spring 2009). Studying supply chains and returns management problems from a complexity perspective is not an endeavor aimed at gaining control of the whole system (Choi, Dooley, and Rungtusanatham 2001). Instead the goals of a complexity perspective applied to supply chain and returns management problems are to understand the various components involved in the problem, how those components interact to produce outcomes, and the resulting outcomes. Understanding the interactivity of a product returns system has important implications for managers, because the nature of the system alters how changes and investments should be made to improve the system. In a non-interactive system, a single component can easily be replaced or upgraded without impacting the other system components. In an interactive system, changes to a single component impact all other system components, which magnifies the magnitude of changes or investments. For managers, this means small changes need to be made to improve the overall system.

Within the complexity literature, two major theoretical explanations of complexity exist—complexity theory and complex adaptive systems (CAS) theory. Many researchers consider CAS theory to be an extension of systems theory (Nilsson and Gammelgaard 2012), so the discussion will first turn to a discussion of general systems theory, followed by CAS theory and complexity theory.

### **Systems Theory**

Systems theory represents a generalized multi-disciplinary approach to understanding a whole entity (or system), and aims to provide a framework of a system based upon similarities in the system from different theoretical perspectives (Boulding 1956; von

Bertalanffy 1969). Systems theory integrates different perspectives to avoid fragmented knowledge due to differences in language, terminology, or communication between different scientific disciplines (e.g., biology, physics; Boulding 1956; von Bertalanffy 1972).

von Bertalanffy (1969) describes a system, or “a *model* of general nature, that is, a conceptual analog of certain rather universal traits of observed entities” (von Bertalanffy 1972, p. 416), as consisting of agents (the components within the system), attributes (the properties of the system), relationships (connections between objects) and the environment (the surrounding atmosphere). Agents within the system form relationships to transform inputs into new outputs, and boundaries exist between the system and environment. Depending upon the nature of the system, additional resources from the surrounding environment may enter the system and influence agents and agent relationships (von Bertalanffy 1969). Focusing solely on isolated agents within a system provides limited information, since an understanding of how those agents function in relation to one another and the environment is critical to understanding the agent, as the overall value of the system, where the value of the system may be greater than the value attributed to each agent (von Bertalanffy 1972). This is especially true for systems with a large number of agents, where agents are likely to have multiple inter-relationships, which cannot be easily understood by isolating agents within the system (Phelan 1999).

Systems theory assumes a static, observable system and complexity arises as the number of agents within the system increases (Nilsson and Gammelgaard 2012; Phelan 1999). Systems theory views systems as the result of specific decisions, and does not account for social interactions, assuming self-organization, evolution and bounded

rationality can be designed out of the system (Nilsson and Gammelgaard 2012). Finally, systems theory relies on feedback loops to predict how a decision influences the system (Nilsson and Gammelgaard 2012; Phelan 1999).

Systems theory has important implications for logistics research, emphasizing the fact that agents within a system should not be studied in isolation, but within the network of relationships found in the supply chain (Stock and Lambert 2001). Within supply chain management and returns management research, some applications of systems theory include how to manage the distribution of resources and complexity within a supply chain (Caddy and Helou 2007), the sources and drivers of vulnerability within a supply chain (Peck 2005), and the development of continuity plans to mitigate supply chain risks (Zsidisin, Melnyk, and Ragatz 2005). Despite these useful applications of systems theory, systems theory has some shortcomings when trying to explain product returns management, including a focus on optimizing a static system, and not accounting for the complications associated with people such as conflicts, creativity, and collaboration (Nilsson and Gammelgaard 2012; Phelan 1999).

### **Complex Adaptive Systems Theory**

Considered an extension of systems theory, CAS theory retains an emphasis on understanding the agents and relationships within a system found in systems theory, but extends systems theory by also capturing the role interactions play in creating outcomes (Nilsson and Gammelgaard 2012).

According to Holland (1992; 1995), CAS consists of numerous agents with unique abilities and characteristics. Agents have internal mental models (also commonly

referred to as mental schema), or mental networks of knowledge, which direct information processing and actions. These mental models permit the agent to draw upon past experiences and knowledge to anticipate appropriate responses to new problems, and lead to the development of a response hierarchy. During interactions, agents decompose the interaction into useful chunks of information and store that information in their mental model. Similar information is aggregated and stored together, while dissimilar chunks of information are stored separately. When the agent encounters a novel situation, the agent tries to assemble them into an appropriate response to the problem by first turning to an established response hierarchy and relevant mental models. With repeated testing of new responses composed of different information chunks learned in prior interactions, the agent adapts and develops new responses to problems, making better use of the surrounding environment.

Within the system, numerous agents interact. Agents within the system constantly adapt based upon information learned from interactions with other agents or the external environment (e.g., deregulation of an industry), making agent interactions non-linear. Due to the large number of interactions occurring within a CAS, the system will react to change in a non-linear way, meaning the outcomes of interactions may have a very small or large impact on the system (Anderson 1999; Choi, Dooley, and Rungtusanatham 2001). Due to this unpredictability of the system's response, the future state of a CAS can only be predicted generally (Choi, Dooley, and Rungtusanatham 2001). Precise forecasts cannot be made because the CAS constantly changes with each interaction, but even general predictions about system behavior can provide managers with useful insights on adjustments to make to the CAS (Holland 1995).

As agents interact, some learn a sub-set of useful information chunks, while others learn a different sub-set of useful information chunks, which leads to diversity in the mental models of agents. Over time, the interactions of diverse agents enable a system to create unique outcomes and alter the flow of resources within the system. During interactions, agents share resources (e.g., information, time, money). Useful interactions result in enhanced sharing, while less useful interactions result in decreased sharing, leading to differential flows of resources throughout the system. The combination of agent diversity and resource flows contributes to the complexity of the system. Numerous interactions occur between diverse agents, which also alter the flows of resources between agents. Changes to the CAS must be done in small, incremental steps because each agent interaction magnifies the change, making universal interventions impractical (Allen 2013).

CAS theory assumes a dynamic, changing system built on the interactions of agents (Nilsson and Gammelgaard 2012). Within a CAS, agents learn from each other, leading to self-organization, novelty, creativity and innovation (Nilsson and Gammelgaard 2012). CAS theory also assumes bounded rationality of agents, meaning agents are not perfectly rational, and social complexities occur (e.g., conflict; Nilsson and Gammelgaard 2012). Under bounded rationality, agents can only optimize decisions based upon the available information, their mental processing abilities and the time available to make a choice (Simon 1991). Finally, CAS theory assumes that future developments within the system result from agent interactions, so the future is not perfectly predictable because agents can be irrational, although general patterns of behavior likely reoccur and can be predicted (Nilsson and Gammelgaard 2012).

CAS theory has important implications for logistics research, highlighting the composition of the system from numerous interactions of semi-rational agents, who learn and

adapt to novel situations. Within supply chain management and returns management research, some applications of CAS theory include the introduction of new ordering systems for original equipment manufacturers (Holweg and Pil 2008), the evaluation of different value recovery options for original equipment manufacturers (Lehr, Thun, and Milling 2013), and the role of complexity in green supply chain management (Sarkis, Zhu, and Lai 2010). CAS theory is not without limitations, but strives to strike a balance between a narrow and holistic viewpoint. One limitation of CAS theory is the adoption of an objective stance on a system, which does not consider the subjective, emotional experiences of agents within the system, and how those experiences might alter interactions (Nilsson and Gammelgaard 2012). Additionally, CAS theory only permits predictions of the system state for the near future based upon repetitive general patterns, limiting the ability of managers to optimize and have control of the system (Nilsson and Gammelgaard 2012).

### **Complexity Theory**

In the literature, complexity theory and CAS theory terms are frequently used interchangeably, but in this dissertation, CAS references the theoretical perspective presented by Holland (1995) originating from biology, and complexity theory references the collection of works by Stacey (1996, 2001), Richardson, Cilliers, and Lissack (2001), Snowden (2002), and Snowden and Stanbridge (2002) originating from knowledge management.

While still studying the interactions of agents within a complex system, complexity theory approaches complex systems differently than CAS theory. Complexity theory adopts a modernistic/post-modernistic perspective on complexity, but focuses more on the social complexities created by human interactions. According to complexity theory, employees

participate in multiple formal (e.g., a firm's published policies) and informal (e.g., unpublished norms) organizational systems within a firm (Stacey 1996). Employees rely upon mental schemas to decide on appropriate behaviors and responses while working, and employees often switch between multiple mental schemas throughout the course of a workday. Conflicts can arise between the behaviors suggested by different mental models, and some informal mental models likely contradict the formal policies of the firm. For example, when deciding on how to process a return that does not match the returns authorization, the employee can choose to follow a formal or informal mental schema. The formal mental schema directs the employee to send the problematic return to a specialized employee to handle the issue. However, the informal mental schema directs the employee to handle the problematic return, because the employee knows what to do. Typically, when deciding which mental model to follow, the employee will compare the formal and informal mental models, and decide on a behavior to resolve the problem the employee perceives to be the most beneficial. In some situations, the employee's behavior will be more beneficial for the employee than the firm (e.g., purposely processing returns slower than normal because the employee is tired), but typically the employee will decide on a behavior to resolve the problem consistent with the firm's goals. Additionally, the behaviors of one employee can alter the behaviors of other employees. If one employee purposely processes returns slower due to fatigue, other employees who observe this behavior can add this behavior to their own informal mental models as acceptable (the firm would likely find such behavior unacceptable, so a slow processing behavior would not be added to the formal mental model representing the policies and expectations of the firm).

Complexity theory takes a holistic perspective on a system, and does not permit reductionism or predictions about the future of any kind, instead, emphasizing that each

system is unique (Nilsson and Gammelgaard 2012; Richardson, Cilliers, and Lissack 2001). Each system containing humans is unique, because people can alter cause and effect within a system and introduce uncertainty (Snowden 2002). The goal of complexity theory research is an explanation or description of the system to provide an awareness of the uniqueness of the system (Richardson, Cilliers, and Lissack 2001; Snowden 2002). The explanation of a system cannot be less complex than the system itself, and any attempt to reduce complexity of the explanation by creating boundaries is subjective and due to the limitations to human processing abilities (Richardson, Cilliers, and Lissack 2001).

Complexity theory assumes a unique, interactive system (Nilsson and Gammelgaard 2012). Within a complex system, complexity theory assumes bounded rationality of agents and emphasizes the importance of subjective experiences in forming competition, collaboration, and creativity (Nilsson and Gammelgaard 2012). Due to the bounded rationality of agents and disorder present in interactions, reductionism is not emphasized in complexity theory, limiting the usefulness of the theory to managers who need to make predictions (Nilsson and Gammelgaard 2012).

### **Comparison of CAS and Complexity Theory**

While both CAS theory and complexity theory have the potential to offer new and interesting insights into returns management problems, the current research adopts the CAS theoretical lens for several reasons.

First, both CAS theory and complexity theory examine complexity through the interactions of multiple agents, and those interactions are governed by mental schema.



Under CAS theory, agents follow a single, internal mental schema built upon prior knowledge and experience. Under complexity theory, agents have the choice between multiple schemas. A subtle, yet important, distinction needs to be made between how information is stored in these schemas. Information is stored as building blocks, or useful information chunks, with the usefulness of each building block repeatedly tested, retested, and monitored under CAS theory (Holland 2006). Conversely, information stored in the mental schema(s) under complexity theory is overwritten (Stacey 1996). Overwriting information is a significant disadvantage of complexity theory as the agent does not retain information about the success of past behaviors, and instead writes a new behavior over the old, increasing the likelihood of repeating past mistakes because past experience is erased. The building block approach permits the agent to draw upon a variety of past experiences, keeping the frequency of success of each experience in mind, to respond to a new situation. This ability to construct a response to a problem from a variety of past experiences enhances the flexibility of the agent and the likelihood the agent responds successfully (Holland 2006).

The goals of the theoretical approaches represent a second critical difference between CAS theory and complexity theory. While CAS theory acknowledges the importance of the whole system, CAS theory also permits some broad predictions to be made based upon general repeated patterns in the system. Broad patterns emerge because agents rely upon tried and true building blocks, and so some agent interactions will follow a similar trajectory within the system (e.g., weather patterns; Holland 1995). However, due to the flexibility afforded to agents in interactions, precise predictions are not possible because not all interactions follow tried and true building blocks or a known

trajectory. Complexity theory, on the other hand, represents a holistic, post-modern perspective on a system and does not permit any reductionism. Instead the unique nature of each interaction is emphasized, which makes an interest in providing some generalizations based upon a complexity theory approach difficult. Despite the lack of ability to make precise predictions, the CAS perspective is meaningful because it more accurately captures reality, and embraces uncertainty instead of assuming a state of equilibrium (Lansing 2003; Lichtenstein et al. 2006). Within a CAS, knowing the specifics of every interaction is untenable, but studying the system more broadly, to observe general patterns of behavior and interaction can provide insight into the nature of the CAS (Lansing 2003).

For example, New York City's John F. Kennedy (JFK) Airport represents an important CAS for air cargo traffic. Under the CAS theory perspective, managers of air cargo companies monitor the general traffic patterns of JFK airport to optimize the movement of air cargo, as much as possible. However, JFK airport is also a dynamic system, so air cargo companies cannot predict precisely how efficiently the airport runs on a particular day (e.g., due to the weather or air traffic control issues), but the companies can plan strategically to avoid known problematic times or days of the week. Applying CT to the same problem would require managers to manage air cargo logistics in the moment, because forecasting is not possible. While situations certainly occur where logistics need to be managed in the moment (e.g., disaster recovery), the CAS perspective is more consistent with the study of returns management because CAS theory takes a more objective view of the system, seeking to understand how the components of the system interact to create general, repeated patterns. Thus, studying CAS is important

because it permits researchers to study how order emerges from interactions, instead of ignoring those interactions (Nan 2011). Complexity theory, on the other hand, takes a nuanced view of a system, seeking to understand an agent's subjective experiences in interactions within the system. While complexity theory should not be discarded as a useful theoretical perspective for returns management problems, agent interactions within returns management are more common with the information system, returned product, and capabilities of the firm, which limits the usefulness of applying complexity theory.

Additionally, the assumptions underlying CAS theory and complexity theory provide different perspectives on problems. CAS theory studies the outcomes of a complex system, with an experimental bent of understanding how outcomes strengthen or weaken the system (Nilsson and Gammelgaard 2012). Complexity theory instead studies the complex system as a whole, and seeks to understand the subjective meaning created by the uniqueness of the system (Nilsson and Gammelgaard 2012). The aims of the current research are more in line with the CAS theory perspective, since the influence of complexity and creativity are examined to understand the impact on the system. For example, does a firm's climate for creativity influence the product returns system, and subsequently, firm relationships?

In summary, the current research adopts the CAS theoretical perspective because the assumptions and goals of CAS are more in line with the aims of this research. Specifically, CAS theory is superior to complexity theory for the current research because CAS theory describes the ability of agents to learn and adapt through building blocks and mental schema. Since an important part of this dissertation focuses on employee decision-making related to product returns, understanding how agents learn and adapt through building blocks and mental schema is more useful than overwriting mental schemas common to complexity theory. Additionally,

managers of product return departments desire some ability to forecast, so CAS theory is a better fit than complexity theory. Although CAS theory permits less precise forecasts than a traditional reductionist approach, complexity theory does not permit any forecasts due to the unique, subjective nature of social interactions. Finally, the goal of CAS research aligns more closely with the goal of this dissertation- to understand the components within a product returns system, and how those components interact. From this, managers will be better able to understand the complex nature of a returns management program and make small changes to improve returns management. The goal of complexity theory is to understand how the subjective interactions of agents influence a system, and appears to be more aligned with research studying human resource issues in product returns management.

### **Creatively Adapting to Complex Problems**

The adaptability of agents within a CAS arises from interactions, which build agent experience and knowledge through continual testing of mental models. Adaptability occurs when agents are able to fall back on and recombine successful building blocks from past experiences in new ways to respond to novel complex problems. Adaptability often comes in cycles. A system gathers resources and organizes them, but over time this organization creates rigidity in the system and reduces adaptability (Holling 2001). When adaptability declines, inevitably an unexpected event occurs that forces the system to change how it organizes itself, and in that reorganization, agents play an important role in creating adaptations by recombining their knowledge and experience (Holling 2001). Cumulatively, the ability of each agent to adapt enhances the adaptability of the overall system.

Inherent within the idea of adaptable agents or systems, is the ability of the agent or system to take known elements and recombine them in a new way, a key characteristic of creativity. Creativity, which can be defined as “the generation or production of ideas that are both novel and useful,” describes this underlying ability that enables an agent and the system to be adaptive (George 2007, p. 441). Generating creative solutions to problems requires recombining information through conceptual combination, or the “process whereby previously separate ideas, concepts, or other forms are mentally merged” (Ward and Kolomyts 2010, p. 101). Looking at the definition of creativity, it is important to stress that creative outcomes are both *new* and *useful* (Hirst, Van Knippenberg, and Zhou 2009; Kazanjian and Drazin 2011). Without the *new* requirement, creativity would be no different than mere problem solving, where the same solution procedures can be applied repeatedly (George 2007). Additionally, the useful requirement excludes the generation of purely outlandish, impractical ideas (George 2007). Complex problems fuel creativity, because multiple solutions could solve the problem and the usefulness of new solutions can be tested out (Mumford, Hester, and Robledo 2011a).

Previous research in the supply chain management literature finds that creativity helps a system retain stability when environmental turbulences happen or when taking advantage of new market opportunities (Mumford, Hester, and Robledo 2011b). Creativity can enhance the competitiveness of the supply chain by making the system difficult to imitate (Menguc and Auh 2006; Mumford, Hester, and Robledo 2011b; Soriano de Alencar 2011; Styhre and Sundgren 2005). Within the system, creativity also has the ability to reduce agent resistance to change (Kolb 1977; Torrance 1986), improve

organizational/channel planning processes (Mumford, Hester, and Robledo 2011b), build employee satisfaction levels (Amabile et al. 2004; Mumford, Hester, and Robledo 2011b), increase collaboration and information sharing (Ayers, Dahstrom, and Skinner 1997; McGourty, Tarshis, and Dominick 1996; Mumford, Hester, and Robledo 2011b), increase financial profitability (Eisenhardt and Tabrizi 1995; Geroski, Machin, and Van Reenen 1993; Mumford, Hester, and Robledo 2011b), increase cost saving opportunities (Clapham 1997; Runco 2014; Thackray 1995), and improve outcomes of negotiations (Goldenberg, Nir, and Maoz 2006).

### **Organizational Creativity**

With the growth of complex problems firms face, an organizational ability to be creative will help firms overcome challenges and remain stable despite volatile environments. Organizational creativity, or the ability to leverage the creative abilities of employees to produce new and useful outcomes, relies upon the interactions of employees within the complex social system of the firm, through which employees combine knowledge and produce ideas that create value for the firm (Rasulzada 2014; Styhre and Sundgren 2005; Woodman, Sawyer, and Griffin 1993).

Organizational creativity supports the adaptability of a firm and contributes to knowledge creation (Gilson 2007; Nonaka 1991). Organizational level creativity can occur in three ways: 1) through leveraging existing knowledge to develop something new (e.g., line extension), 2) through recombining and extending knowledge to develop a new platform (e.g., brand extension), or 3) through obtaining new knowledge to develop a new business (e.g., new brand; Kazanjian and Drazin 2011).

A firm's organizational-level creativity depends upon the interactions of employees with other employees individually and within teams, in addition to the organization's motivation, resources, practices and policies (Amabile 1996; Sternberg, O'Hara, and Lubart 1997). Therefore, in order to fully understand a firm's organizational-level creativity, it is important to first summarize the underlying cognitive processes of creativity, as well as employee-level and team-level creativity, and the importance of the organizational climate. Organizational-level creativity occurs at multiple levels, and across levels within an organization (George 2007; Gilson 2007), so a summary of key research insights at each level will be presented.

*The Creative Process.* Creating a new and useful solution to a problem occurs through a series of six steps, with the first three steps describing creativity processes and the last three steps describing innovation processes (see Table 2 for a summary; Reiter-Palmon, Herman, and Yammarino 2008). The series of six steps described by Reiter-Palmon and associates has many similarities to the five-step problem-solving process described in the *Types of Problems* section of this chapter (see Table 2 for a summary; Conklin 2005; Hooker, Espinosa, and Davis 2015).

Table 2. The Creativity and Innovation Process

	Creativity-Innovation Process*	Problem-Solving Process**
Creativity Steps	1. Problem Identification 2. Information Search 3. Idea Generation	1. Define Problem 2. Gather Data 3. Analyze Data 4. Design Response
Innovation Steps	4. Evaluation and Selection of Idea(s) 5. Idea Implementation 6. Monitoring	5. Implement Response

\*Based on Reiter-Palmon, Herman & Yammarino 2008

\*\*Based on Conklin 2005 and Hooker, Espinosa, and Davis 2015

Both sets of processes address, problem definition, gathering information, and developing a response. Reiter-Palmon and associates have one general step for gathering information, while

the problem-solving process includes both a gather and analyze data step. Taken together, gathering and analyzing data describes an information search. Reiter-Palmon and associates steps break the innovation processes into more steps (*Evaluation and Selection of Ideas, Idea Implementation, and Monitoring*) than the problem-solving process (*Implement Response*). The discussion will summarize the six steps from the work of Reiter-Palmon, Herman and Yammarino (2008).

The first three steps to produce a creative outcome consist of the *problem identification, information search, and idea generation* processes. During the *problem identification* step, the creative agent focuses on identifying, understanding and defining the focal problem, which will influence the remainder of the creativity and innovation processes and the creativity of the outcome because the agent will set a course here for how to successfully solve the problem (Reiter-Palmon, Herman, and Yammarino 2008). To define the problem, the creative agent decomposes the problem into basic elements, and attempts to combine, abstract upon, or compare with other information to create a new and useful solution (Ward and Kolomyts 2010).

Following the completion of the *problem identification*, the creative agent begins to search for relevant information to solve the problem in the *information search* step (Reiter-Palmon, Herman, and Yammarino 2008). Information search provides the creative agent with information, which can be combined with other knowledge to produce a new and useful solution. The amount of time spent searching for information shapes the creativity of the outcome- both too little and too much time spent searching for information reduces the creativity of the outcome by placing too few or too many information-processing demands upon the creative agent (Reiter-Palmon, Herman, and Yammarino 2008).



Following the *information search* step, the creative agent begins to generate solution ideas in the *idea generation* step of the creativity process. During *idea generation*, the creative agent takes the basic elements of the problem and attempts to combine them with new information to yield possible solutions to the problem (Reiter-Palmon, Herman, and Yammarino 2008). The creative agent attempts to recognize patterns within the information obtained in step two and known knowledge that can be repeated or recombined and relies upon his/her own intuition on how and when to combine those patterns and chunks of information (Eckert and Stacey 1998). The ability to form new connections depends upon divergent and convergent thinking. Divergent thinking, or the ability to “think about original options,” focuses on producing a variety of creative ideas (Runco 2004, p. 14). The variety of creative ideas produced during divergent thinking can be original based upon the fluency (the number of ideas thought up), originality (the degree of novelty of the ideas), and/or the flexibility of the ideas (the number of different categories or kinds of ideas; Agars, Kaufman, and Locke 2008; Paulus 2007). Once an individual has thought up a variety of creative ideas, those ideas are then integrated and assessed for relevance and meaningfulness under convergent thinking (George 2007). Repeated application of this creative process promotes mental flexibility, or the ability to develop alternate ideas, since the individual practices being creative and is more familiar and comfortable with the creative process (Azadaegan and Dooley 2010). At the outcome of this stage, the creative agent should discover insight based upon the new connections and associations (Hoff 2014). Some creative solutions may even exhibit emergent properties, where the value of the overall solution exceeds the sum of the parts and leads to a competitive advantage (Ward and Kolomyts 2010).

The remaining steps within the creativity-innovation process consist of the *evaluation and selection of ideas*, *idea implementation* and *monitoring* stages (Reiter-Palmon, Herman, and

Yammarino 2008). While the creativity steps focus on creating new and relevant ideas, the innovation steps actually assess that novelty and relevance (Puccio and Cabra 2010). Although the creativity-innovation processes has been presented sequentially, the innovation processes can interact with the creativity processes during idea generation, by providing additional feedback and insight, which can potentially fuel additional ideas (Puccio and Cabra 2010).

This overview of the creativity-innovation process describes the steps an employee, team, or firm follow to generate creative outcomes. The next sections describe some of the key research findings on individual and team creativity. Individual employees and teams of employees play an important role in a firm's organizational-level creativity. Typically, the most creative outcomes are attributed to individuals working in isolation (e.g., painters) or teams of individuals working together (e.g., bands), however, the key to creative outcomes is not the level per say, but that the creative agent has time to think about creative ideas in isolation and in interactions with other agents (Perry-Smith 2007).

*Individual-Level Creativity.* Much of the individual-level creativity literature adopts an entity-based perspective, or a focus on identifying the factors or conditions that make a person more creative, not how those factors or conditions make a person more creative (Marion 2011; Shalley, Zhou, and Oldham 2004). Essentially, the entity-based perspective places creativity within a black box, and focuses on identifying conditions or factors that enhance creativity (Marion 2011; Shalley, Zhou, and Oldham 2004). Some motivational creativity research has begun to look beyond an entity-based perspective by considering interactions between individuals and the organizational environment (e.g., Woodman et al.'s (1993) interactionist theory of creativity). The motivational perspective suggests that a firm's work environment

influences employees' willingness to express creative ideas, and will be described in more detail in a later section.

Employees vary in creative potential (the capacity and resources an individual has to produce new and useful ideas) due to variations in the ability to make new connections and associations with basic thoughts (DiLiello and Houghton 2008; Styhre and Sundgren 2005; Ward and Kolomyts 2010). While all employees have the potential to be creative, societal norms for behavior can suppress creative expression, leaving most adults with weak creativity skills (Dauw 1966). Creativity skills describe the ability of an individual to build new and useful solutions to a problem (Soriano de Alencar 2011, p. 93). Many factors can influence the creative expression beyond societal norms, including an individual's personality and motivation (Feist 2010). "Highly creative people are generally self-confident, attracted to complexity, tolerant of ambiguity, and intuitive" (Cummings and Oldham 1997, p. 26). In addition, other personality characteristics such as aggression, independence, flexibility, assertiveness and sensitivity correlate with creativity skills (Feist 2010; Shalley and Zhou 2007).

Motivation, more specifically intrinsic motivation (or the excitement a person feels from working on the task itself, e.g., feeling challenged) and extrinsic motivation (or an incentive to work on a task unrelated to the task, e.g., winning a gift card), influence an employee's creative expression (Amabile 1997; Sternberg, O'Hara, and Lubart 1997). Intrinsic motivation usually increases an employee's willingness to share creative ideas, because the employee experiences some satisfaction or happiness with solving the problem. Intrinsic motivation depends on the individual's personality and the organizational environment, and has the potential to compensate for an individual's deficiencies in expertise or creativity skills (Amabile 1997). Within the organizational environment, job complexity, supportiveness of leaders and developmental

feedback fuel intrinsic motivation and creativity (Shalley, Zhou, and Oldham 2004). Extrinsic motivation often decreases creativity because the employee shares creative ideas only to obtain the reward, not for the excitement or satisfaction of solving the problem, however, some types of extrinsic motivation can complement intrinsic motivation and enhance creativity, such as recognition or feedback (Amabile 1997; George 2007).

In addition to motivation, many other personality qualities shape creativity, including positive affect, demographics, diversity, culture, language and fit (Shalley, Zhou, and Oldham 2004). Together, these factors and others (see Mumford 2011 for a review), lead to the development of an employee's creative self-efficacy, or "the belief one has the ability to produce creative outcomes" (Tierney and Farmer 2002, p. 1138). Positive affect, or the ability of an employee to consciously access long-lasting positive feelings, contributes to creative self-efficacy by encouraging a broaden-and-build mindset (Fredrickson 2001), which promotes mental flexibility and divergent thinking (George 2007; Rego et al. 2014; Schwarz and Clore 1988). This broader mind-set and flexible perspective "empowers the self to override standard, habitual and other uncreative modes of thought" (Tice et al. 2007, p. 379).

In addition to positive affect, demographic qualities have been thought to influence creativity. Traditional demographic factors, such as age, sex, and race, have shown little consistent influence on creativity (Dauw 1966; Hulsheger, Anderson, and Salgado 2009; O'Reilly, Williams, and Barsade 1998). Instead, functional diversity, which describes diversity in functional demographic backgrounds such as education, job experience, knowledge and skills, increases creativity (Fay et al. 2006; Hulsheger, Anderson, and Salgado 2009; Keller 2001). Functional diversity develops when employees have different education, experience and knowledge. Functional diversity influences whether employees maintain creative skills through

their formative and working years. In addition to functional diversity, the culture and language of an employee also influence creativity primarily through mental categorization and information processing (Ward and Kolomyts 2010). The failure of demographic factors like age, sex, and race as predictors of creativity supports the perspective that knowledge and learned skills have a greater impact on an employee's creativity than how the person was born (Dauw 1966).

Further, the level of fit between the employee's creativity skills and the demands of the problem influence the likelihood of producing a new and useful solution. Better fit between the creativity skills of the employee and the problem leads to a higher likelihood of success, which increases satisfaction and well-being of the employee (Gilson 2007). Alternatively, poorer fit suggests a lower likelihood of success, which increases dissatisfaction and strain (Gilson 2007). When fit occurs between the skills of the employee and the problem, the employee enters a state of creative engagement, where the individual "behaviorally, cognitively and emotionally *attempts to produce creative outcomes*" (italics in the original text; Kazanjian and Drazin 2011, p. 549). Creative engagement requires the employee to be open to new perspectives on the problem (Oldham and Baer 2011; Rasulzada 2014). "Creativity facilitates and enhances problem solving, adaptability, self-expression, and health" (Runco 2004, p. 677).

*Team Creativity.* With some understanding of the important factors and characteristics influencing individual employee level creativity, this section summarizes some key team-level research on creativity. While the individual's motivations, personality, and fit primarily shape individual employee level creativity, team composition primarily shapes team level creativity (Choi and Thompson 2006; George 2007). Team creativity represents a collective construct based upon the social interactions

of team members, where multiple individual employees share similar ideas (Belussi 2011; Marion 2011; Sacramento, Dawson, and West 2008).

Team composition, which can be defined as “ the representation and balance of people in a group,” shapes how teams learn, discuss and solve problems (Choi and Thompson 2006, p. 89). Unlike individual employee level influencers of creativity, managers can alter team composition to alter team creativity (Hirst, Van Knippenberg, and Zhou 2009). Typical composition issues include the diversity of a team and membership change within the team (George 2007). While functional diversity was found to be beneficial for an individual employee’s creativity, diversity has more of a mixed influence in teams- at times team diversity stimulates creativity; at other times team diversity thwarts creativity by creating conflict and reducing productivity (Choi and Thompson 2006).

Team membership change, or “changes in a group’s membership structure,” also has mixed impacts on team creativity and includes adding new employees to the team, removing employees from the team, reorganizing the power dynamics of the team or changing the function of the team also has mixed influences on creativity (Choi and Thompson 2006, p. 90). Membership change in groups can be disruptive (e.g., breaking up a long-standing team) or stimulating (e.g., providing fresh perspectives), but on average it tends to stimulate creativity (Choi and Thompson 2006; Nemeth 1997).

Interactions between team members shape team cognition and creativity. The diversity of knowledge and expertise composed within the team influences team cognition, or the thoughts of the team (Shalley 2008). Cognitive team processes, such as brainstorming, idea generation, information gathering, and reflection, contribute to creativity (Reiter-Palmon, Wigert, and de

Vreede 2011). Interactions permit team members to ask other team members for help, share information about a problem, or offer guidance to other team members (Zhou and Shalley 2011). These interactions increase the breadth of knowledge available to team members by disseminating new information (Paulus 2007). Interaction promotes team collaboration by encouraging the communication and exchange of information (Burke et al. 2006). “Open internal communication, trust, and psychological safety seem to be critical processes that influence team creativity and innovation” (Reiter-Palmon, Wigert, and de Vreede 2011, p. 311). For example, the behaviors of supervisors influence team creativity. Supervisors practicing interactional justice (or fairness in working with and interacting with employees) and trust can enhance subordinate feelings of safety by promoting a safe working environment, providing an atmosphere where the team feels comfortable developing new ideas (George 2007; Rego et al. 2014). The creativity potential of a team depends upon the resources a firm provides to the team, team motivation, team collaboration and team decision-making (Nijstad, Rietzschel, and Stroebe 2006; Paulus and Nijstad 2003).

Team-level creativity research is not as advanced as individual employee level creativity research (Reiter-Palmon, Wigert, and de Vreede 2011), and much of the existing team-level research relies on studying creativity in teams of students (Paulus 2007). While many students work during college, the lack of research with teams of full-time employees remains a significant limitation of team-level creativity research. More research is needed to study the relationships between team-level creativity and affective outcomes, team cognitive processes (excluding brainstorming), and different models of team-level creativity beyond the input-processes-output model (Gilson 2007; James and Drown 2011; Sacramento, Dawson, and West 2008).

*Role of the Internal Environment.* While individual employees and teams play critical roles in a firm's creativity by generating new and useful solutions, the organizational environment surrounding employees and teams has the potential to enhance or reduce organizational creativity. Generally, in order for employees or teams to feel comfortable generating creative ideas, those employees or teams need to operate in a safe, supportive environment (West and Sacramento 2011). The nature of the supporting environment determines "the level and frequency of creative behavior" performed by individual employees or teams (Amabile et al. 1996, p. 1155). Organizational environments support creativity by encouraging challenging creativity goals, providing sufficient resources, flexibility, and enhancing intrinsic motivation (Hoff 2014; Mathisen and Einarsen 2004; Shalley, Zhou, and Oldham 2004). Creative organizations are "generally those adept at maintaining internal environments where information acquisition, distribution, and collective interpretation are commonly occurring process" (Huber 1998, p. 4). Creative solutions depend upon the nature of the focal problem, and a supportive organizational environment encourages employees and teams to take calculated risks when generating creative ideas to solve the problem (Sacramento, Dawson, and West 2008; Sternberg, O'Hara, and Lubart 1997). A threatening organizational environment (e.g., the employee or team faces discipline or repercussions for poor performance) stifles creativity by reducing the frequency of creative behavior due to increased stress, fear, etc. (Rasulzada 2014).

The nature of the internal organizational environment surrounding organizational creativity describes a specific organizational climate. While an organization's climate (or the environment surrounding a specific part of the organization) is a surface-level manifestation of the organization culture (the foundational values and beliefs of the organization), the two concepts are not well distinguished from each other in the literature (Carr et al. 2003; Denison



1996; Schein 1990). In the context of the current discussion, the internal organizational environment surrounding individual employee and team creativity represents the organization's climate for creativity. While the organization certainly has deep-rooted beliefs on the importance of creativity to the organization, the level of supportiveness for creativity is a surface-level expression of the organization's deep-rooted beliefs on the importance of creativity. The organization's climate for creativity determines the freedom available to employees and teams to perform job tasks, the availability of resources, the level of challenge associated with work assignments, the knowledge of coworkers and the support of leaders (Amabile and Grysiewicz 1989; Hitt 1975; Locke and Kirkpatrick 1995).

The organization's climate for creativity often is more influential on organization creativity than characteristics of individual employees or the composition of teams (Paulus 2007; Shalley and Zhou 2007). For example, in a study of Egyptian organizations, a supportive climate for creativity was found to better predict individual employee creative behavior than individual factors such as self-direction, achievement, curiosity and conformity (Rice 2006). While a supportive environment typically enhances creativity through building work standards, too much support can also encourage groupthink, a state where the ideas of employees are too similar, and healthy task conflict stops occurring (Gilson 2007).

Within the marketing literature, firm innovativeness describes an aspect of a firm's climate and is related conceptually to the climate for creativity described in the organizational psychology literature (Azadaegan and Dooley 2010; Busse and Wallenburg 2011; Menguc and Auh 2006). Firm innovativeness describes an organization's "openness and capacity to introduce innovation in the organization" (Golgeci and Ponomarov 2013, p. 605). The firm innovativeness construct focuses more on the ability of an organization to turn a creative idea into an innovation

(the later steps in the creativity-innovation process) than creating new and useful ideas within an organization (Hurley and Hult 1998, p. 44). Overall, innovativeness has been found to have positive impacts on business performance regardless of the level of environmental turbulence, making a climate open to innovation more resilient during volatile times (Hult, Hurley, and Knight 2004).

*Summary.* Organizational-level creativity is a multi-level construct, with the creativity of individual level employees and teams as the organization's source of new and useful ideas. At the individual employee level, creativity research devotes a significant amount of attention to identifying characteristics of the individual that increase or decrease creativity. At the team level, creativity research primarily studies the influence of team composition and change on creativity. Organizational creativity can be enhanced by exposing employees to new information (Oldham and Baer 2011), supporting employee's creativity skills (Mauzy 2010), matching employee creativity skills to work assignments, providing employees with flexibility in completing work assignments, encouraging diversity within teams (Amabile 1998), increasing the difficulty of assigned jobs, training supervisors to be supportive (Cummings and Oldham 1997), and removing organizational impediments to creativity (Amabile 1997). Organizational structure, culture, leadership, firm size, age, and business experience can moderate organizational creativity (Cummings and Oldham 1997; Ryhammar and Smith 1999; Talbot 1993; Tesluk, Farr, and Klein 1997). Organizations with rigid organizational structures, hierarchical structures, risk-averse cultures, threatening or unsupportive leaders, and few interactions between employees or teams due to a small organization size or low organization age/experience reduce organizational

creativity (Alencar 1996; Alencar and Bruno-Faria 1997; Bruno-Faria and Alencar 1996; Paulus 2007).

### **Summary**

This chapter brings together insights from the returns management, human decision-making, complexity and creativity literatures to set the stage for essays I and II. From this chapter, the reader has learned that product returns management involves different kinds of problems (simple, complicated, complex or wicked), which require employees to draw upon their internal mental models to solve. Many common returns management problems occur due to the presence of human actors. Human actors often make errors or poor decisions due to decision-making resource limitations and fatigue, which requires employees to inspect, verify, and disposition returned items correctly when processing product returns.

In addition, the reader has also learned that reverse supply chains represent complex adaptive systems, characterized by numerous, diverse employees who interact to produce non-linear outcomes. Employees have their own mental models to guide responses to problems, which can be combined in new ways to create adaptive outcomes. Employee creativity appears to be an important skill for employee adaptability, and essentially describes the process an employee follows to create adaptive outcomes. While employee creativity has the ability to enhance employee and organizational adaptability, the organization's climate for creativity can mitigate or enhance employee creativity.

## CHAPTER III: COMPLEXITY OF RETURNS MANAGEMENT

### Introduction

Reverse logistics activities manage the flow of returned products and materials within a supply chain (Rogers and Tibben-Lembke 2001). Returns management, a subset of reverse logistics focused on the handling of returned products within a supply chain, remains a significant pain point for numerous firms with the growth of multi-channel and omni-channel retailing (Napolitano 2013; Penske 2014; Rogers et al. 2002). In addition, customer deviance in returning products has outpaced firms' ability to identify and process fraudulent customer returns (Lipka 2010). Product returns cost retailers upwards of \$200 billion a year, and numerous firms do not know how to implement appropriate systems and processes to manage product returns (Penske 2014). Too often, firms view investing in product returns as investing in a 'failure,' and neglect allocating a sufficient amount of resources to improving the systems and processes needed to manage product returns (Griffis et al. 2012; Rogers and Tibben-Lembke 2001). Neglecting returns management investments hurts a firm's ability to efficiently process product returns (Daugherty et al. 2005; Huscroft et al. 2013).

Despite the significant financial impacts the mishandling of product returns can have on a firm's bottom line, the complex nature of returns management overwhelms those firms looking to implement a product returns system. The existing reverse logistics and returns management literature offer useful insights related to designing a returns management system to prevent product obsolescence (Turrisi, Bruccoleri, and Cannella 2013); different end of life options for

returned products (Hazen, Hall, and Hanna 2012; Stock and Mulki 2009); and the steps necessary to process product returns, to name a few (Stock, Speh, and Shear 2006). However, the literature remains silent on the complexity of product returns management. What are the important components of a product returns system? How does complexity arise in product returns systems?

The purpose of this study is to identify the important components of a product returns system and understand how the identified components contribute to the complexity of the product returns system. The research applies a grounded theory analysis to primary data collected from site visits with US companies. Findings reveal the complex nature of product returns management comes from the interactions of five main components: capabilities, employees, the information system, the organizational climate and the customer service boundary. This chapter begins with a description of the grounded theory research method. Next, the substantive theory of returns management is presented followed by a discussion of the limitations and implications of this research for returns management.

## **Method**

### **Grounded Theory**

Grounded theory is an exploratory, inductive qualitative research method where the researcher builds a substantive theory of a phenomenon or problem based upon the analysis of systematic, rich data (Charmaz 2014; Glaser and Strauss 1999; Golicic and Davis 2012). A substantive theory is “a theoretical interpretation or explanation of a delimited problem in a particular area” (Charmaz 2014, p. 344). The substantive theory describes the dynamics and the relationships between the key variables of the phenomenon (Golicic and Davis 2012). The resulting

substantive theory should be able to describe a majority of the dynamics and relationships of the focal phenomenon, but given the exploratory nature of grounded theory work, the resulting substantive theory will not perfectly describe every aspect of the phenomenon. In the context of this research, the researcher conducted grounded theory analysis to build a substantive theory of product returns management. The substantive theory focuses on describing the complex nature of product returns management, and the structure of the substantive theory is similar to the structure of CAS theory.

Grounded theory research is an inductive research method, where insights about the phenomenon are built from the descriptive data. Data for grounded theory can come from a variety of sources, including in-depth interviews, researcher observations, and company records. Grounded theory analysis follows a constant comparison procedure, where the researcher collects, codes, and analyzes the data concurrently. As the researcher codes and analyzes the data, conceptual categories (the central components of a theory) and conceptual properties (qualities of conceptual categories) begin to emerge (Charmaz 2014; Glaser and Strauss 1999). The researcher compares these emerging conceptual categories and properties to each other, as well as tacking back to established insights in published research on the topic. The constant comparison procedure affords grounded theory a certain level of flexibility, so that the researcher can follow up on emerging questions, categories, and properties by collecting more data (Charmaz 2014). The constant comparison of categories and properties reveals important similarities, differences, and relationships amongst the categories and properties, permitting the researcher to develop interrelationships amongst the elements, which marks the beginnings of theory integration (Charmaz 2014; Glaser and Strauss 1999).

## Sample

Site interviews with key informants were conducted to gather their knowledge about the current management of product returns. Six companies responsible for handling a variety of product returns were selected for interviews in this research. Companies were chosen based upon their position in the supply chain (e.g., retailer, distributor, manufacturer) and on the type of product sold, to create variation in supply chain position and products. This kind of variation provides a stronger foundation for the substantive theory of returns management. The principal investigator conducted site visits with all six companies to collect interview and observational data from logistics managers. In addition, one company permitted the principal investigator to shadow return employees and observe return processing first hand.

Unlike deductive, confirmatory research that requires a specific sample size to enhance the generalizability of the research findings, grounded theory relies upon theoretical sampling, where the emerging substantive theory guides data collection (Charmaz 2014; Glaser and Strauss 1999). A grounded theory researcher initially begins sampling according to the conceptual categories present in the research questions (Original research questions for this research include: 1) What is the role of complexity in reverse logistics? And 2) What reverse logistics processes are complex problems?). Once some qualitative-based data collection has occurred, the researcher begins to compare the data, at which point the data comparisons begin to suggest additional, more-specific questions related to the categories, properties, and relationships of the focal phenomenon that remain unanswered and suggest who to sample next (Glaser and Strauss 1999). Over time, the researcher begins to ask new, additional questions to sampled informants. Theoretical sampling places more importance on maximizing variation than statistical sampling (where variation can reduce effect sizes), because maximizing variation provides the most

extreme test of emerging conceptual categories, properties and relationships, and therefore strengthens the analysis (Charmaz 2014).

For example, if a hypothesized relationship between two conceptual categories is found to hold for a highly diverse group of subjects, the researcher feels more confident that the relationship between those two conceptual categories is robust. Therefore, the combination of theoretical sampling and the constant comparison procedure requires the researcher to triangulate the reliability of the data and refine the analysis, if unreliable (Charmaz 2014). Diverse subjects continue to be sampled under grounded theory until a point of theoretical saturation emerges- or a point where the inclusion of additional subjects yields no new information about a conceptual category or property (Charmaz 2014; Glaser and Strauss 1999). In this research, after nine interviews theoretical saturation occurred, because no new conceptual categories emerged. Thus, the goal of grounded theory research is not to make statistical inferences about a defined target population, but to understand the relationship(s) between identified constructs through the construction of a theory consistent with the collected descriptive data, which yields propositions that may serve as inspiration for future deductive, confirmatory research (Charmaz 2014). Grounded theory propositions result from the combination of insights from the collected data (e.g., in-depth interviews, research observations, published company information) and published literature.

The substantive theory of the complexity of returns management presented in this essay relies upon descriptive data collected from in-depth, semi-structured interviews with key informants, researcher observations of reverse logistics activities at the warehouses of key informants, and published information about the key informants. Perceptions of returns management activities were collected in in-depth interviews with nine key informants, including



managers of distribution and employees involved in product returns. Informants were influential decision makers involved with product returns, and employees make decisions about product returns. To identify key informants, the researcher first made a list of companies that fit the context of the current research (e.g., companies that receive returned products). The researcher then called and emailed contacts at the identified companies. From those initial contacts, the researcher made contact with the managers responsible for product returns and recruited them to join the study. Table 3 details the profile of each participant, including their pseudonyms, titles, and background information. In total, this grounded theory analysis relies upon 56 pages of

Table 3. Profile of Informants

Name	Informant Details
Cole	Executive Vice President, Chief System Officer, Fast Food, Approximately 40 years in industry, 30 years with company, responsible for overseeing distribution, overseeing purchasing, and developing systems and systems support
Belle	Senior Logistics Manager of Reverse Logistics, Technology Products, 8 years in industry, 8 years with company, 1 year in current position, responsible for administrative duties and overseeing reverse logistics teams
Dave	Logistics Director, Technology Products, 12 years in industry, 12 years with company, 5 years in current position, responsible for all facets of logistics
Bob	Returns Employee, Technology Products, 16 years with company, responsible for processing returns with issues
Rachel	Returns Employee, Technology Products, 10 years with company, responsible for initial processing of returns
John	Director of Distribution, Apparel, 13 years in logistics, 5 years with company, 1.5 years in current position, responsible for the financial and service aspects of all in-bound and out-bound shipments
Nick	Operations Manager, Laboratory Equipment, 9 years in logistics, 2 years with company and in current position, responsible for out-bound shipping, returns, and facility management
Mike	Out-bound Operations Manager, Automotive Parts, 4 years in industry and with company, 1.5 years in current position, responsible for selection, replenishment, and shipping
Elliot	Regional Manager of Distribution, Furniture, 25 years in industry, 9 years with company, 3 in current position, responsible for overseeing the distribution of three facilities and outlet stores

Notes: Names are pseudonyms to protect the anonymity of informants.

single-spaced text transcriptions of the in-depth interviews, an additional 21 pages of recorded researcher observations, and published information gathered from websites, all of which were systematically coded and analyzed.

### **Data Collection**

To collect the information from the in-depth interviews, a semi-structured interview protocol was developed (See Appendix B). Following a thorough literature review, the researcher constructs the semi-structured interview protocol by writing open-ended questions to capture detailed information on the focal topic. The researcher writes, and re-writes the questions on the interview protocol until s/he feels comfortable with the flow of questions, and breadth of topics covered. The interview protocol contains open-ended questions to encourage the informant to elaborate on the focal topics, and minimize the influence of the researcher, all the while ensuring the interview covers the topics the researcher has included in the protocol. During the interview, the informant directs the conversation, and the researcher acts as a navigator to ensure the informant stays on the right track, and discusses the focal topics (Charmaz 2014). Most interviews were one-on-one with the principal investigator, although one interview was conducted in a small group setting because the interviewee was in another state. Interviews ranged from 20 minutes to over two hours in length. All interviews were digitally recorded, and later transcribed. Over time, the researcher added new interview questions consistent with the emerging categories to the interview protocol to gather information on more specific topics (Charmaz 2014). While some questions were asked of all research informants, other questions were only asked to a sub-set of research informants. This describes the flexibility of the grounded theory method: some questions must be asked of all research informants so the results

can be compared, however, other questions are only asked of a sub-set of research informants once the conceptual categories and properties begin to emerge from earlier interviews.

The principal investigator conducted all of the interviews on-site. Research informants were located in two states- Florida and Texas. Prior to arriving on-site, the researcher examined the company's website, publicly available documents (found utilizing an online search engine) regarding reverse logistics, product returns management, and sustainability for the focal company to understand the current actions of the firm, and to be familiar with the language of the firm (Charmaz 2014). Site visits permitted the researcher to directly interact with research informants in their natural setting, providing rich information through interactions, discussions and observation.

### **Data Analysis**

To facilitate the comparison of collected data, the interview transcripts, researcher observations, and published company information were imported into NVivo 10 for analysis. NVivo has many functionalities, including the systematic coding and analysis of qualitative data (QSR International 2012). In NVivo, the researcher is able to identify, name, and compare themes emerging in the descriptive data.

Systematic coding of descriptive data occurs in two ways- open and axial coding. Together, open and axial coding reveal the important categories and themes in descriptive data, and permit the researcher to build a theoretical framework based on similarities and differences observed in the data. Once the researcher has collected some descriptive data, open coding begins to identify and name important categories in the data. The researcher begins by reading through the entire interview transcript, and then breaks the interview transcript down into major sections. During open coding, the researcher tries to identify what the informant specifically

discusses. In each major section, the researcher identifies the main categories and themes being discussed, and then labels those categories and themes. The assigned labels are assigned *in vivo*, or closely matched to the informant's actual words whenever possible (Glaser and Strauss 1999). In this research, open coding resulted in the identification of 69 concepts. During open coding, related concepts may be identified, where multiple named concepts describe aspects of the same overall phenomenon. When this occurs, the researcher can group the similar concepts together, and form higher order categories. For example, open coding led to the identification of two concepts (customization and speed), which both describe aspects of the higher-order category of the returns management information system. Higher-order categories move beyond identifying what an informant describes, and begin to reveal what is going on. Open coding will identify numerous categories, some central to the focal phenomenon, and some less relevant to the phenomenon. Grounded theory requires the researcher to take a parsimonious approach to constructing the substantive theory, and focus on the core categories related to the focal phenomenon, setting aside irrelevant categories (Glaser and Strauss 1999). Of the 69 categories identified in open coding, 37 of those categories were retained (see Table 4 for the name and definition of retained categories). Retained categories, such as processing returns or allocating resources, were retained because of their relevance to the complexity of product returns management. Examples of some excluded categories include transportation, destroying returns, and distributing to stores, which were not central categories to product returns management. These categories related to product returns management, but ultimately were more peripherally related, and therefore, excluded.

In addition to open coding, the researcher also axially codes emerging categories. The purpose of axial coding is to better understand the depth and type of interrelationships amongst

identified, important categories (Strauss and Corbin 1998). This differs from open coding, where the main purpose is to identify categories appearing in the data. Once the researcher begins to notice patterns in the emerging categories, axial coding begins. Axial coding reveals the connections between categories and sub-categories, which ultimately serve as the skeleton of the emerging substantive theory and corresponding theoretical framework. In the current research, 10 subcategories formed 5 major categories in a substantive theory of the complexity of returns management (see Figure 1).

Table 4. Name and Definition of Core Categories

Component	Category name	Definition <sup>a</sup>
Capabilities	Budgeting for returns	Descriptions of financial planning for product returns.
	Communicating exceptions	Descriptions of communication related to product return problems.
	Communication	Descriptions of general communication.
	Forecasting	Descriptions of labor planning for product returns.
	Inspecting returns	Descriptions of employees initially inspecting the condition of a product return.
	Managing vendors	Descriptions of interactions with vendors.
	Matching returns authorization	Descriptions of employees checking the returned product against the product customers said they would return.
	Processing returns	Descriptions of how employees process returns.
	Returning to vendors	Descriptions of interactions with vendors regarding returning items to the vendor.
	Verifying returns	Descriptions of employees confirming all aspects of the product return match the information in the information system.
Employees	Allocating resources	Descriptions of allocating labor to different departments.
	Increasing complexity	Descriptions of complex issues employees face.
	Relying on agent knowledge	Descriptions of employee knowledge.
	Risks	Descriptions of risks associated with processing product returns.
	Weird returns	Descriptions of uncommon returns seen by employees.
Information System	Allocating credit	Descriptions of issuing credit to customers for returned products.
	Customizing the system	Descriptions of how to change the information system.
	Importance of system speed	Descriptions of why information system speed is important to informants.
	Monitoring performance	Descriptions of how the information system is used to track and improve performance.

Table 4. (continued)

Category	Category name	Definition <sup>a</sup>
Information System (cont.)	Special handling	Descriptions of special situations arising from errors inputting information into the information system.
	System	General descriptions of the nature and functions of the information system.
Organizational Climate	Corporate attitude	Descriptions of the company's overall attitude towards product returns.
	Encouraging creativity	Descriptions of how informants encourage creative ideas.
	Experimenting with solutions	Descriptions of how informants generate ideas to problems.
	Experimenting locally	Descriptions of how informants test out new creative ideas.
	Getting innovation ideas	Descriptions of how informants encourage employees to develop creative ideas.
	Innovating company wide	Descriptions of new ideas implemented throughout the company.
	Innovating to solve problems	Descriptions of how informants work together to be creative.
	Investing in returns	Descriptions of the willingness of the company to invest in product returns management.
	Organizational structure	Descriptions of the structure of informant's companies.
	Reusing Pallets	Descriptions of experiments related to reusable pallets.
	Rewarding creativity	Descriptions of how informants reward creativity.
Understanding local culture	Descriptions of the uniqueness of each location.	
Customer Service Boundary	Building reciprocal relationships	Descriptions of how informants strive to nurture understanding, forgiving relationships with customers.
	Eating some costs	Descriptions of a willingness to absorb some costs of an unsuccessful interaction with the customer to preserve the relationship.
	Maintaining customer focus	Descriptions of the attention informants pay to keeping customers as the firm's first priority.
	Offering leeway to vendors	Descriptions of flexibility offered to vendors to maintain vendor relationships.

<sup>a</sup> The researcher constructed a working definition for each category *in vivo*, or based upon the words spoken by informants (Glaser and Strauss 1999).

### Trustworthiness of Findings

The rigor, or the trustworthiness of the results of qualitative research is assessed differently than quantitative research. Quantitative research rigor depends upon the internal validity, external validity, and objectivity of the results, and often relies on simplifying assumptions or restrictions in the definition of the target population (Lincoln and Guba 1985). Qualitative research rigor depends upon the credibility, transferability, dependability, and conformability of the results, and

relies upon the researcher capturing multiple, different accounts of a phenomenon (Lincoln and Guba 1985). Essentially, a rigorous substantive theory reflects the perceptions and opinions of people working in the focal area (e.g., employees and managers of returns), and can be applied in more than one context (Glaser and Strauss 1999).

The trustworthiness of qualitative research is evaluated on the credibility (the findings represent multiple, different accounts), transferability (the findings are described in enough detail that a second researcher could attempt to compare the findings to other contexts), dependability (the findings capture change in the phenomenon), and confirmability (the research rests on reliable information; Lincoln and Guba 1985). In the current research, the credibility of the findings was confirmed through the use of member checks, where research informants checked the researcher's interpretation of the interview, observation, and published data. The researcher composed a summary of the key information discussed in the interviews, and emailed the summary to research participants to review and correct for any mistakes or misinterpretations. Only minor corrections were necessary (e.g., the spelling of one firm's returns management information system). The transferability of this research occurs in the detailed description of the research settings and results. The use of written interview protocols, which provide enough structure to the in-depth interviews for the researcher to capture the focal phenomenon of returns management, but also provide enough flexibility to capture dynamic aspects of returns management (through the use of probing questions), supports the dependability of this research. The current research ensured the conformability of the findings by having two academic colleagues familiar with the grounded theory method and product returns audit the research.

## Results

For five of the six firms in the current research, the site visits began with a tour of the company's warehouse and return facilities. Following a tour of the facilities, the principal investigator conducted the in-depth interviews with key informants. Interviews with executives, directors, and managers occurred in conference rooms, while interviews with employees responsible for processing product returns occurred in the warehouse, at their normal workstation. The principal investigator was unable to tour one informant's facilities due to the company's transition to a new warehouse (this did not cause any difficulties in evaluating the interviews because the informant elaborated in a sufficient level of detail on the firm's facilities and processes).

The next sections present the results of the grounded theory analysis. First, the general similarities and differences between informants are outlined (see Table 5). Second, the substantive theory of the complexity of product returns management is presented (See Figure 1).

### Company Similarities

Despite differences in products and markets, some similarities emerged amongst the included companies. First, five of the six companies have high tenure rates for employees, including employees processing returns, ranging between 10 to 15 years. Second, the majority of the companies have some formal, structured processes to manage product returns. Typically, in these formal processes, the customer service function authorizes and initiates product returns. Once the returned product is received, employees are responsible for inspecting the condition of the product, verifying the identity of the product, and making a decision on what to do with the product. Common decision options include reselling, refurbishing, re-boxing, recycling, or destroying the product.



Third, the majority of the companies handle some type of complexity when processing product returns; however, the nature of the complexity is unique to each company. For example, informants in the technology products company described the complexity of receiving unauthorized product returns. These returns usually occur due to human error in packing up returns, but some customers attempt to deceive the company. To further illustrate this point, the furniture company faces a different kind of complexity- complexity originating from the sheer number of possibilities employees must consider when deciding on what to do with a product return (products returning to the furniture company's distribution center are usually damaged or flawed). At the furniture company, employees must know the types of materials the products are made out of, how the specific materials can be fixed, and then determine if refurbishing the product would result in a saleable product.

Table 5. Similarities and Differences of Informant Companies

Company Similarities
<ul style="list-style-type: none"> <li>• Most firms had high employee tenure rates.</li> <li>• Most firms followed a similar process for processing product returns, beginning with a returns authorization from customer service, followed by inspection by employees.</li> <li>• Most firms handle complex problems associated with product returns.</li> <li>• Most firms attempt to reduce returns before they happen.</li> </ul>
Company Differences
<ul style="list-style-type: none"> <li>• Return volumes varied between companies. Correspondingly the number of employees processing returns varied according to return volume.</li> <li>• Two general attitudes towards product returns: <i>unavoidable headache</i> or <i>potential competitive advantage</i></li> <li>• Firms use a variety of information systems to manage product returns.</li> <li>• Firms issue credit to customers for a returned product at different points in the return process.</li> </ul>

Finally, the majority of companies try to reduce returns before they happen, also known as controllable returns (Rogers and Tibben-Lembke 2001). For example, the technology products

company attempts to reduce returns by refusing in-bound shipments of damaged or improperly transported products to avoid customer refusals on delivered products that appear damaged. The automotive parts company also attempts to reduce returns by refusing shipments of products that have been damaged in transportation. The furniture company works to reduce returns through collaboration with vendors and manufacturers. When the furniture company notices a high return rate on specific furniture pieces, employees at the furniture company will troubleshoot the issue(s), and offer the vendor or manufacturer suggestions on how to eliminate the issue(s).

### **Company Differences**

To achieve theoretical saturation, the current research interviewed informants in a variety of companies, selling different products in different markets, leading to some noticeable differences. First, the return volume varied between companies. For example, the technology products company has a 7% overall return rate, while the apparel company has a 0.5% overall return rate. Variations in return volumes create variations in the number of dedicated employees each company has. For example, the technology products company keeps a staff of 15 employees, while the automotive parts company keeps a staff of 70 employees. Second, two general attitudes towards returns exist amongst the informants. Some companies view returns as an unavoidable headache that accompanies selling products, and only invest the minimal amount of resources necessary to keep the product returns system functioning. These companies do not invest extra resources to make improvements to the return management information system. Other companies see returns as a potential competitive advantage and a critical component of their business. Handling returns is critical to the automotive parts company's business, as having parts in stock builds customer loyalty and satisfaction. Minimizing returns is also critical to the

furniture company's business, because each time a piece of furniture is moved, the likelihood of the piece being damaged increases. Thus, the furniture company invests time and resources to communicate clearly with customers and avoid returns.

Third, a variety of information systems are used to manage returns amongst informants. Some companies rely on old legacy systems, and are experiencing growing pains as the companies take on new business. Other companies rely upon off-the-shelf-programmable systems (e.g., Sage ACCPAC, IBM AS400) to manage returns. These companies did not report growing pains, aside from waiting for programmers to get around to customizing the system.

Finally, the companies also differ in when the customer receives credit for a returned product. Some companies issue the credit to the customer as soon as the customer contacts customer service about the return. When the returned item is received at the warehouse, the initiated credit is completed. Other companies do not issue credit to the customer until after the returned product has been received and processed.

### **Complexity of Product Returns Management**

By definition, complexity deals with something intricate, usually a system containing many parts that interact together (Campbell 1988). For example, eukaryotic cells represent a complex system, containing many parts (e.g., nucleus, mitochondria, ribosomes), which interact together to keep the cell alive and healthy. In the context of the current research, the product returns system of an organization represents a complex system, consisting of many interacting parts including employees, or the agents who process product returns; information systems and capabilities responsible for structuring and empowering the employee's actions, a customer service boundary responsible for specifying which products can be returned; and an overall

organizational climate that surrounds the functions of employees (see Figure 1). Figure 1 portrays one return associate cell and the numerous interactions between the five main components. The employee interacts with the firm's capabilities and information system, and those interactions permit the employee to process returned products that have entered the cell through the customer service boundary. These interactions occur within the organization's climate, which also has the potential to influence product returns processing. Product returns systems contain multiple return associate cells.

Interactions amongst the components of the product returns system make product returns management a complex activity, but also permit employees to perform processes vital to the functioning of the product returns system. Interactions between the employees, information system, capabilities, organizational climate, and customer service boundary of the product returns system permit the system to adapt and remain responsive. According to CAS theory, the ability of a system to adapt depends upon the interaction of numerous, unique components (Holland 1992; 1995). For example, in the returns management context, employees develop unique mental models of information relevant to processing product returns, which inform the product returns system's analysis capabilities. When new problems arise, employees draw upon their unique mental models of information to adapt and make appropriate decisions. Cumulatively, the ability of employees to make adjustments based on their knowledge permits the product returns system to be responsive, or quick to adjust to sudden changes, and maintain a stable level of performance (Richey et al. 2004).

To better understand the complexity of product returns management within a product returns system, this research seeks to identify the interactions amongst the components of the product returns system. Data analysis identified five main components of the complexity of

returns management: (1) capabilities; (2) the employee; (3) the returns management information system; (4) the organizational climate; and (5) the customer service boundary (see Figure 1).

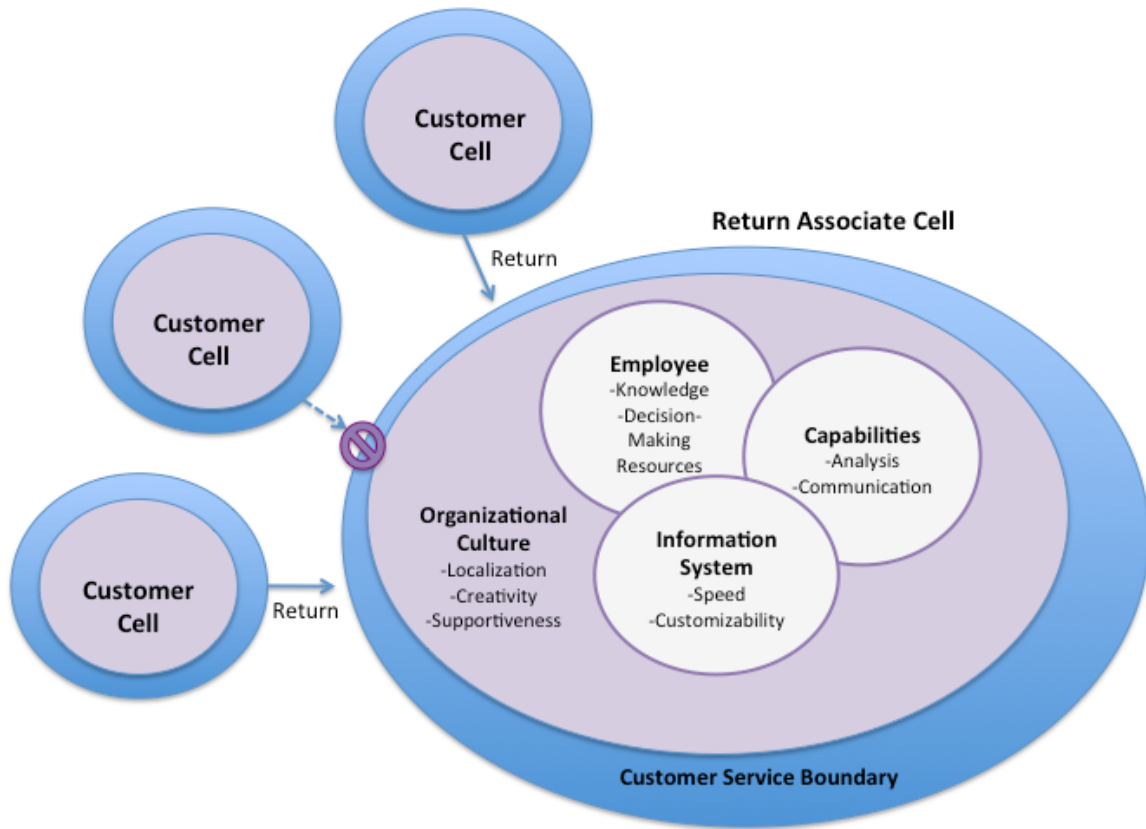


Figure 1. Conceptual Map of the Complexity of Returns Management

### Capabilities

Informants described formal *capabilities*, or the “internal processes that the firm uses to effectively implement its reverse logistics activities” (Jack, Powers, and Skinner 2010, p. 233), as a key component of the complexity of product returns management. Capabilities help make employees aware of the firm’s expectations, and therefore, guide employees’ decisions and behaviors (Ho et al. 2012; Huscroft et al. 2013). Belle (see Table 3) equated processing product

returns to buying a used car, because of the inherent information asymmetry. Information asymmetry occurs when one party to a transaction has more information than the other party (Douma and Schreuder 2008). For product returns, information asymmetry occurs because the customer has more information about the product return than the company. While some customers share information about the reason(s) for the product return transparently, not all customers fully communicate the reasons for a product return. Therefore, employees, in part, may take on the role of a detective when processing product returns, and look for clues to support the statements of the customer, or reveal additional information about the motivations for the product return. Formal firm capabilities give structure to employee 'detective work,' and guide what information the employee looks for. Formal capabilities help to keep in the words of one informant- the "madness [of product returns] in check." Data analysis revealed two main types of capabilities important to the complexity of product returns management: (1) analysis; and (2) communication capabilities.

*Analysis Capabilities.* Informants describe the firm's formal analysis capabilities as consisting of a series of steps including receiving, inspecting, identifying, verifying, and dispositioning the product (defined as the final destination for a returned product- stock, scrap, etc.). For most informants, analysis capabilities begin when the employee obtains the return from a local pallet or workstation. The employee inspects the product, assessing all aspects of the return, including the external box, the packing tape, and the condition of the product itself. Bob (see Table 3) said he could usually spot a problematic return just by looking at the condition of the packing tape on the outer box. During the inspection, the employee identifies the product, and compares the identified product to the returns authorization to confirm the customer returned

the correct product. As Mike (see Table 3) described, if the identity of the product matches the returns authorization, the employee makes a disposition decision based upon the inspection and sends the return to the appropriate warehouse location:

*There's an authorization to return [ATR] that is there; they will scan that. The system will cross-reference that ATR number with what type of SKU the store said they were going to send back. And then the team member scans that tag, then scans the SKU, and (...) if everything matches up, the system will then say 'okay, it's received, put it in a container that is set up [to be put away]'.*

As Dave (see Table 3) described, if the identity of the product does not match the returns authorization, the employee communicates the issue to customer service, which goes back to the customer to find out more information about the product being returned:

*And that communication [about the product's identity] is essentially a back and forth communication between us at our site- because we are hands on and we can visually see what we have- versus the decision makers at [customer service], who have to determine whether or not we issue the credit to the customer.*

The analysis capabilities described by informants largely mirror the typical returns process described in the returns management literature (Rogers et al. 2002; Stock and Mulki 2009; Stock, Speh, and Shear 2006; Tibben-Lembke 2002). Researchers in returns management describe the typical returns process as beginning with the company receiving the return. Following reception of the return, returns are sorted, organized, and processed by employees. Employees next analyze the return and make a disposition decision. While some informants showed slight variation in the order of the steps (i.e., some informants perform the processing step before the sorting step), the descriptions of informants are overall consistent with the literature.

The firm's established analysis capabilities help mitigate the risk associated with product returns by establishing a standardized decision-making procedure to follow. As Belle stated, even though employees may know how to process a return that does not match the return authorization, the established analysis capabilities prevent that:

*So the decision-making is kind of limited, even though [the employees] know what to do with [the return]. We have kind of restrained [the decision-making process] because of the risks involved.*

The technology company restricts the analysis capabilities of employees to protect all parties involved. In the past, customers returning a cheaper version of a product, and claiming to return a more expensive model have burned the technology company. If an employee rushes to a quick decision on a mismatched product return, the employee could cost the firm hundreds or thousands of dollars. Instead, the firm prefers to have customer service further research mismatched returns and have a specialized employee process mismatched returns in close collaboration with customer service.

In summary, analysis capabilities represent an essential component of the product returns system, providing employees with a series of steps to process product returns.

*Communication Capabilities.* In addition to analysis capabilities, employees also need communication capabilities. Communication can occur between employees, management, customers, and vendors. Although managers share information with employees about the firm's estimated return volume based on historical information, known product releases, and seasonal events; the main types of communication relevant to the complexity of product returns management are requests for lost items and communication with the vendor.

All informants rely on their information system to track the location of products in the warehouse, however, mistakes happen and items get lost. For product returns, items often get lost when received from the shipping carrier, or when incorrectly entered into the system. For example, quite frequently Bob must go find lost returns because there has been a delay in crediting the customer for the return, despite the parcel being delivered by the shipping carrier.



When this happens, customers complain to customer service about their ‘lost’ return, and employees have to go locate the box in the pallets of returned products typically by the shipping label or delivery date. Returns can also go missing if the employee re-enters the wrong product into inventory. Errors in re-entering returns into inventory cause the return to be put away in the wrong location, and once put away in the wrong location, the employee has no way to track down the item aside from going to personally look for it.

Other informants rely on communication capabilities for incorrectly processed product returns. Mike at the automotive parts company finds communication to be key to maintaining reciprocal relationships with stores when returns are processed incorrectly, and the store receives the wrong credit for a returned item:

*What happens a lot is the store doesn't designate [the return] correctly, then the store does not get the right credit. (...) And that's why we get a lot of communication from the stores that says 'hey, this should have been this, this should have been that.' And we bend over backwards to help them out with that. As you've seen, if a store called you and said, 'hey, this one piece needs to be this,' you can see it's pretty hard to find. But we still try to do it for them.*

In addition to locating lost items, employees also utilize communication capabilities to maintain relationships with vendors. The technology products and automotive parts companies monitor the number of accumulated parts returning to the vendors. During some times of the year, the automotive parts company's capacity to ship parts back to the vendor is reduced, so Mike described how employees communicate with vendors to make alternate arrangements:

*But we do run reports just to see if anything weird has happened.... Like we're running low on trailers, or something like that. We will communicate with [the vendor], something like 'We're 1,000 pounds off [of your normal load], but we're going to send you a load anyways,' or 'We need an extra load, can we send it?'*

Therefore, communication capabilities represent an essential component of the product returns system, that help employees better manage the complexity of product returns management.

## The Employee

Informants described the employee as a second critical component of the product returns system. Employees play a central role in making critical decisions about product returns. The *employee* represents the agent responsible for inspecting, verifying, and dispositioning returned products. When observing Rachel (see Table 3) at the technology products company, her role as an employee appeared to be part detective. As Rachel was processing returned items, she would look for hidden clues (e.g., the box the product was returned in does not match the product) to better understand the customer's motive for the return and ensure the correct item was returned. Just as detectives adapt to the case at hand, so to do employees adapt to the return at hand. Given appropriate resources, detectives solve different, unique cases by relying on an established set of skills and techniques, and so too, employees process different, unique returns by relying on their established knowledge.

*Knowledge.* Informants described the specialized *knowledge*, or the mental models of information related to processing returns, return employees possess as a critical differentiator from other employees. With each return processed, employees build a mental network of information about the types of products returned, common issues with returned products, and the feasible options for returned products. Observations at the apparel, automotive, furniture, and technology products companies suggest employees build highly specialized knowledge while processing returns, which limits the ability of the firm to allocate pickers and packers to processing product returns. As Mike described, the knowledge and intuition of employees is critical to the accurate analysis and processing of product returns:

*Our team members have to be smart enough, that when they are receiving back an engine... for some reason... it happens a lot with engines. Just maybe because of how long*

*a sales life of an engine lasts... but if you're receiving in an engine, you don't want to give store credit for a hose.*

*But when you have issues like that, then you really need a human there to say 'hey it's an engine, not a hose.'*

The mental network of specialized knowledge of employees is consistent with the literature and shows many similarities to the internal mental models described by Holland (1995; 2002; 2006). According to Holland, agents begin to build internal mental models or mental networks by decomposing an interaction into basic elements. The agent evaluates the basic elements, grouping similar elements together, and forming mental boundaries between different elements. The groupings are then integrated into the agents existing network of knowledge for storage until needed for future interactions. As the agent engages in numerous interactions, some building blocks are used more frequently than others. Elliot (see Table 3) at the furniture company describes how employees rely upon their existing knowledge to inspect product returns:

*Just because the customer said that one [problem], we have to make sure that every inch of that piece is still good. So [the employee] will go and inspect it, and based on that inspection and the years [the employee] has been here, and knowing what can and can't be fixed, it will go to the shop and [the employee] will decide whether [the shop] can fix it 100% so it can be sold as new, or what the next step would be, on down the line to either clearance or salvage.*

Building blocks used frequently lead to the development of information processing rules, which essentially act as heuristic mechanisms to aid the employee in processing future interactions (Tversky and Kahneman 1974). For example, several informants described an 'if unopened, return to stock' heuristic, meaning that if a returned product has not been opened and is in perfect condition, the product returns to saleable stock.

Describing employee knowledge as an internal mental model also echoes research in marketing, where information is stored in mental schemas made up of nodes and linkages (Hawkins and Mothersbaugh 2010). Within mental schemas, the individual stores information about a phenomenon within nodes, or a central position within a network, and constructs linkages, or associations, between nodes (Alba and Hasher 1983). The interviews with companies revealed that in the product returns management context, employees have nodes of specific products returned to the firm (e.g., circuit boards, engines) and build associations between nodes based upon experience processing returns (e.g., circuit board node links with the ‘circuit’ node and the ‘chip’ node because the employee needs to check the circuits and chips within the returned circuit board to verify the correct product was returned).

*Employee Knowledge and Analysis Capabilities Interactions.* While informants discussed the importance of employee knowledge, the majority of the discussion related to employee knowledge addressed the connection between knowledge and a firm’s analysis capabilities. Established analysis capabilities provide employees with a prescribed set of steps for receiving, inspecting, identifying, and verifying a returned product to avoid making decision errors when processing the return. Informants connect a firm’s ability to efficiently and effectively process returns with the level of employee knowledge.

At the furniture company, employee knowledge plays a critical role in the processing of product returns, particularly the disposition decision. Employees must know the type of material the returned product is made out of, the possible ways to fix that material, and the probability that attempting to fix the product return will result in a piece of furniture that can be sold as new

or in a discount store. As Elliot described, employees are constantly tested about their knowledge:

*The jobs that are most technical are shop and quality control; just in terms of the knowledge you need to have in terms of how to fix things properly, so [the furniture piece] wears correctly. So those are promotional positions, most people do not come in in a shop position; they grow into it based on learning the rest of the business. So in order to get that job, you have to pass a test in terms of knowing how to repair things and how to do things. But then you're continually taught and given tests to make sure that you haven't lost the ability to do certain things because you say you're fixing something, but you're not fixing something properly.*

The importance of employee knowledge to the analysis of product returns was observed at other firms, as well. For example, researcher observations at the technology products company showed that the technology products company sells many similar circuit boards. Employees need to have the knowledge to correctly identify the type of circuit board being returned, since many look very similar. With experience, employees at the technology products company build a strong foundation in identifying the returned product correctly. For new products, employees at the technology products company add onto their existing mental network of information by consulting the company's sales catalog, manufacturer websites, or even Google to ensure the correct product is identified. Also, researcher observations at the apparel company revealed that the apparel company sells many types of shirts, which all look very similar, and may have customized designs on them. Employees must sort through returned apparel items and identify the returned item by sight. The employees use catalogs for visual reference, but must rely on their knowledge to correctly identify the returned product.

**P<sub>1</sub>:** The employee's knowledge reduces decision errors in the analysis of product returns.

*Decision-Making.* Employees process unique, different returns and rely upon their established knowledge to do so. Bob described returns processing as “*managed chaos*,” because returns can range from a simple return due to an incorrect shipment, to unusual returns that include crime scene evidence or fabricated products. For example, Bob at the technology company recalls seeing women’s lingerie, kid’s clothes, X-box games, and a used blood testing kit in product return boxes. While unusual returns are not common, employees process a broad variety of returns, which require different amounts of decision-making resources. Decision-making resources describe the level of attention and mental processing capacity the employee allocates to a decision (Patten et al. 2006). Each employee has a reservoir of a finite amount of decision-making resources, which fuels decision-making (Baumeister and Tierney 2011; Vohs 2006; Vohs et al. 2008; Vohs et al. 2005). Decision-making resources facilitate decision-making by permitting the employee to rule out non-viable decision options and weigh the benefits of viable options to ultimately make an optimal decision. When decision-making resources are consumed, employees have a more difficult time weighing and eliminating decision options to make a decision (Tierney 2011; Vohs 2006).

Applying the preceding insights to the product returns context, the number of decisions an employee must make to process a return, in addition to the number of decision options the employee must weigh and evaluate, will determine how much of an employee’s available decision-making resources are consumed. Although most informants see a sizable number of simple returns, which require a fewer number of decisions, and have fewer decision options to weigh and evaluate (e.g., a returned product is unopened, and only needs to be re-entered into inventory and put away); complicated returns also occur. Complicated returns require numerous interactions between the employee and the returns management information system, capabilities,

and the customer service boundary to be resolved, and thus require the employee to make a higher number of decisions, as well as weigh and evaluate more decision options. Nick (see Table 3) described out of box failures at the laboratory equipment company, which represent one example of a complicated return:

*So the process then is that [the salespeople] try to do an onsite fix if they can. If they can't, then they go back through their chain of command to get permission to get the out of box failure authorized. So then customer service gets contacted, they do a no charge order, which generates a movement for me to ship out a replacement item and for [them] to return the broken one.*

In this example, multiple interactions occur between the salesperson and the customer, the salesperson and customer service, and the product return department and customer service. Researcher observations at the technology products company revealed that the company also handles complicated returns, when processing customized products and mismatched returns. Customized products consist of many components sold by the technology products company, and each component has to be processed for a return, because the company does not generate a new SKU for the finished customized product. Mismatched product returns occur due to customer error or deception, and describe product returns where the item received by the company does not match the item listed on the returns authorization. Although some mismatched returns reflect unscrupulous motives of the customer, the majority of the time, mismatched returns occur due to customer error in packaging up the returns.

These examples from the laboratory equipment and technology products companies suggest that complicated returns require more employee decision-making resources than simpler returns. With the increased number of decisions required for complicated returns, as well as the higher number of decision options to weigh and evaluate, the employee consumes more decision-making resources. For example, a mismatched product return requires the employee to first

follow the firm's analysis capabilities, starting with identifying and attempting to verify the identify of the returned product. When the employee determines that the returned product does not match the returns authorization, the employee stops following the analysis capabilities and turns to communication capabilities. The employee communicates the issue to customer service, who will then re-contact the customer to determine the reason for the mismatched return. Once customer service decides how the return should be processed, the employee follows the firm's analysis capabilities anew.

These examples are consistent with the task difficulty literature. With each decision an employee faces, the task difficulty, or the ease with which an employee can complete a task, influences the amount of decision-making resources the employee must allocate to the problem (Helton et al. 2010; Iani, Gopher, and Lavie 2004; Muller-Gass and Schroger 2007; Robinson 2001). Task difficulty is a higher-order construct composed of task variety (how frequently do special tasks occur?; e.g., mismatched returns) and task analyzability (how well routinized is the process to solve a task?) dimensions (Withey, Daft, and Cooper 1983). High task variety means special tasks occur frequently, and high task variety limits the ability of a firm to plan ahead since special tasks keep occurring (Withey, Daft, and Cooper 1983). High task analyzability means the firm has a well-established routine for solving tasks. Low task analyzability requires the employee to study the characteristics of the problem, to devote more time to solving the problem; to process more information related to the problem; and to switch between tasks more frequently (Neerincx 2003; Robinson 2001). The duration of time the employee must spend on processing a return increases task difficulty. The level of information processing, which can range from basic skill processing (information that is well known, so processing information is automatic), to rule processing (processing information occurs according to if-then statements), to



knowledge processing (processing information requires analysis of the problem to generate new solutions), increases task difficulty as the level of information processing required increases (Neerinx 2003). Also, as the number of times the employee must switch between sub-tasks requiring different types of knowledge (i.e., inspecting the return requires different knowledge than inputting the return into the returns management information system) increases, task difficulty increases (Neerinx 2003). This occurs because humans have trouble switching attention between tasks (Boehne and Paese 2000).

In addition, the characteristics of the employee contribute to task difficulty (Robinson 2001). The employee's available attention, memory, and information-processing resources in combination with the employee's motivation and emotions, determine how easily the employee can complete the task (Robinson 2001). The employee's decision-making resources are intertwined with the employee's knowledge in such a way that employees who have established mental networks of information are able to more easily complete a product return than an employee without an established mental network of information (Patten et al. 2006). Essentially, employees with a high level of knowledge consume a lower amount of decision-making resources to process a return than employees with a lower level of knowledge.

As task difficulty increases, the employee must dedicate additional decision-making resources to the focal problem (Goldberg et al. 1998; Muller-Gass and Schroger 2007). Higher difficulty has been linked to reductions in cognitive performance, leading to reduced performance on decisions because employees must draw upon additional decision-making resources to make a decision (Goldberg et al. 1998). In addition to reduced performance created by task difficulty, complicated tasks also increase the likelihood of mistakes, because a series of sub-tasks must occur, and with each sub-task mistakes can take place (Dellaert, Donkers, and

Van Soest 2012). Common employee mistakes include misremembering information and over/underestimating information (Rahman and De Feis 2009; Sargut and McGrath 2011). Employees, therefore, have more opportunity to make mistakes on complicated decisions because complicated decisions require the employee to know and weigh multiple decision outcomes (Campbell 1988). Complicated returns require more decisions to be made, and more options to be weighed, increasing the likelihood of employee mistakes. Incorrect decisions influence subsequent decisions, so if an employee makes an error when deciding on how to disposition a product, the product may be dispositioned incorrectly, potentially reducing the value recovered for the product.

**P<sub>2</sub>:** Common product returns are lower in task difficulty than uncommon product returns.

**P<sub>3</sub>:** The number of decisions necessary to process a product return is negatively related to the employee's decision-making resources.

**P<sub>4</sub>:** As employee knowledge increases, the decision-making resources needed to process a product return decreases.

### **The Returns Management Information System**

Beyond capabilities and employees, informants described the *returns management information system*, or the software system used to manage product returns, as a third component of the complexity of product returns management. In the current research, three companies utilize customized information systems, two of which are old legacy systems. Another company utilizes a DOS-based AS 400 information system. One other company utilizes a returns management routine within the SAGE ACCPAC ERP system. Regardless of the type of information system,

informants described several key functions of the information system. First, the information system acts as the interface between customer service and the employees. The majority of the companies interviewed do not permit employees to communicate directly with customers about returns. Belle described the reasoning behind preventing employees from communicating directly with customers:

*We don't know what sales decisions are, so if we tell our customer something else, which is different from the sales organization, we will have a different viewpoint. So we try to have one clear person talking to customers.*

The information system also facilitates performance measurement and performance improvements by tracking a variety of metrics, including the return rate. Elliot at the furniture company actively monitors the return rates of products to prevent problems:

*Everything we get is inputted into the computer system, so the buyers will check the products coming back, and if they see a chair has a high return rate, then they will call [the distribution facility] up and say 'hey, what are the problems with [the chair]? Let's check it out. Let's open a couple of new ones and see if we are seeing problems from the vendor, or where the problems are coming from.'*

Finally, the information system tracks the location of returned products within the warehouse. Nick emphasized the importance of tracking the location of a return, because the location of the return within the warehouse determines when the customer receives credit for a returned product:

*So the way the customer gets refunded back is that once I receive it in, we're going to choose which location it goes in to- is it going to go into services, or is it going to into new, or is it going to go into scrap. So inside of the system, we have a warehouse location that is defined, and once we change that and submit it, it generates the return authorization, which goes to accounting so they can credit the customer that did the return.*

Data analysis revealed several types of interactions involving the information system that occur within the product returns system.

*Information System & Analysis Capabilities Interactions.* In addition to reducing the risk associated with return employees communicating with customers and monitoring performance, the information system serves as the primary source of information for return employees by documenting the pertinent information regarding a customer's product return. Researcher observations with informants revealed the typical information stored in the information system will include the customer's order history, invoices, and the returns authorization issued by customer service specifying the reason for the return. This information aids the employee's inspection of a return, and will initially guide how the employee processes the return. Employees will inspect the product return, seeking to confirm the information provided by the customer. Interactions between the information system and analysis capabilities of the firm protect the firm from unscrupulous customer motivations by providing employees with information regarding the return. To illustrate the importance of this interaction, consider a purchase made by a customer at the technology products company. The customer purchased two nearly physically identical routers, one valued at \$800 and the other at \$2500. Unhappy with one of the routers, the customer contacted customer service to return the \$2500 router. When the employee inspected the returned router, the serial number of the router did not match serial number of the \$2500 router on the return authorization, although the vendor parts number did match. Customer service went back to the customer to gather more information and decided to make an exception for the return, and credited the customer \$2500. Later, when the vendor took back the router, the vendor notified the company that they only had the \$800 router, and the technology products company had to eat the \$1700 difference.

Thus, the information stored in the information system helps employees better process product returns, by housing information about the customer's return. Without this information,

processing product returns would be more difficult because employees would first need to determine why the customer wants to return the product.

**P<sub>5</sub>:** The quality of information in the information system about a product return is positively related to the firm's analysis capabilities.

*Information System Speed.* Several informants described the importance of the information *system speed*, or the quickness of the system in processing product returns, when discussing product returns. For the apparel company, the timeliness of processing returns can mean the difference between selling a returned item and destroying it. Many apparel items have very short saleable seasons, so if a returned shirt is not processed quickly and returned to saleable stock in season, the shirt will not sell.

Some informants are constrained by old legacy information systems, which require numerous steps to process a returned product. One company processing returns with a legacy information system faces increasing difficulty in enhancing the information system speed as the company adds new clients. In contrast, other informants reported satisfaction with the speed of their information system. For example, Mike attributed the speed of the information system to the associated overhead of the system:

*Yeah, it is actually one of the fastest systems you could use because the overhead is so small on a DOS-based system. You don't have graphics, you don't have all of that stuff, so it is pretty much instantaneous in that aspect. You know, if you are a cost making facility like we are- we are basically a money sink, this building- that's what it is. Speed is the key.*

Informants' emphasis on the importance of the information system speed echoes findings from the returns management literature. In order for employees to process product returns

quickly, coordinated information is required from all parties (e.g., customer, customer service; Blumberg 1999; Daugherty, Myers, and Richey 2002). The speed of the information system influences the firm's ability to deliver good service to customers and limit the cost of product returns by supporting employee decision-making (Closs and Savitskie 2003; Daugherty, Myers, and Richey 2002).

*Information System Speed & Analysis Capabilities Interactions.* The speed of the information system plays a part in how quickly employees can process returns, primarily through the number of screens employees must go through to complete a return. For example, at the technology products company, employees must go through numerous screens when processing a return because the product returns system operates on an old legacy system, and the rest of the warehouse runs on a newer ERP system. Even to process a simple return, the employee must look the returns authorization up in the legacy system, and return the item to stock in the ERP system. If the employee needs to access product information, the employee will switch between the old legacy system, the ERP system, and additional references to verify the identity of the product.

System speed influences analysis capabilities through the number of screens and steps employees must follow to process a return. Quicker system speeds enhance the analysis capabilities of the firm, while slower system speeds constrain the analysis capabilities of the firm because employees must go through additional steps to complete a product return. Formally:

**P<sub>6</sub>:** System speed enhances analysis capabilities.

*Information System Speed & Employee Decision-Making Resources Interactions.* While entering information on multiple screens to process a product return takes more time than a simple product return routine, the speed of the information system also impacts employee decision-making resources. Each time an employee has to switch attention during a return, decision-making resources are consumed by increasing cognitive task load (Neerincx 2003). Over time, employees enter a state of decision fatigue (or ego depletion), where decision-making resources have become temporarily depleted (Baumeister et al. 2006; Vohs 2006; Vohs et al. 2005). Decisions made in a state of decision fatigue tend to be conservative choices, because the employee does not have the mental resources available to weigh multiple possible outcomes, and will revert to the least demanding decision (Tierney 2011). For example, customized products at the technology products company require the employee to make numerous decisions to fully process the return, because each component within the customized product must be processed individually. Processing a customized product will be more difficult for an employee in a state of decision fatigue, because the employee will have a small amount of decision-making resources to draw upon for the customized product return.

Thus, the speed of the information system interacts with employee decision-making abilities, with the potential to increase the cognitive task load of processing returns and decrease the employee's available decision-making resources.

**P<sub>7</sub>:** Legacy systems constrain employee decision-making resources by increasing cognitive task load.

*Information System Customization.* While information system speed facilitates employee processing of returns, *information system customization*, or the ability to change the setup of screens in the information system, influences the speed of the information system. When informants discussed information system customization, two groups emerged. The first group operates legacy systems, and expressed dissatisfaction with the customizability of their information systems. For this first group, the information system requires employees to complete many steps and computer screens to process a return. John (see Table 3) stated that the company's legacy information system could be customized, but that the company's resources did not permit much customization:

*Right now we have a list of 300 things we want to change about the system, but you only have two people to do the work. So you have to prioritize what changes are the most important to get us the biggest bang for our buck, and (...) make sure that we're not investing too much money into those legacy systems.*

Dave described his company as struggling to customize their information system sufficiently, and felt that the lack of customizability of the information system was actually impeding the company's ability to adapt:

*As we are taking on new types of business that is a little bit outside of our norm, we're finding that we are trying to have to manipulate this archaic system to a tremendous amount, and it is increasing a lot of steps- extra steps and things like that- that we're not accustomed to doing with our normal business, that has made it very difficult to adapt to new business opportunities.*

The second group of informants expressed satisfaction with the customizability of their information systems. While these informants use different information systems to manage returns, all of them stated they were able to process customizations fairly quickly, when necessary. Amongst these informants, the most common customization process occurs with designated programmers. Several informants indicated their company has a few in-house programmers, who are responsible for maintaining and customizing the information system.



Even one company utilizing a legacy information system relied on in-house programmers, but the main difference between the dissatisfied and satisfied companies appears to be how easy the information system is to customize. With some of the off-the-shelf returns management information systems, customizations are more straightforward, and only require knowledge of the programming language. Since the legacy information systems were built specifically for a single company, they appear to be harder to customize because they lack a common, universal language.

The reluctance of firms to invest the appropriate resources in customizing the returns management information system is a problem that has been highlighted in the literature since the early 2000's, but remains an issue for firms today (Douthit, Flach, and Agarwal 2011; Moore 2005; Penske 2014; Rogers and Tibben-Lembke 2001). Those firms desiring to customize a returns management information system face a situation similar to John's, where customizations to the information system take on a lower priority than other information system customizations. Many firms view product returns as a cost of doing business or a 'failure,' and therefore, are wary of investing additional resources into a 'failing' department (Douthit, Flach, and Agarwal 2011; Moore 2005; Rogers and Tibben-Lembke 2001). Although product returns in one way represent a failure of the product to satisfy the needs of the customer, product returns also present an opportunity because most retain a portion of their original value, and firms who invest in customizing their returns management information system are better equipped to reclaim that value (Moore 2005; Rogers and Tibben-Lembke 2001). Therefore, firms that invest in customizing their returns management information system enhance their analysis capabilities.

*Information System Customization & Analysis Capabilities Interactions.* While many informants linked the willingness of the firm to invest in information system customization to the corporate attitude towards product returns, investing in information system customization enhances analysis capabilities. Elliot described how critical the furniture company's customized information system is:

*The company has a computer system we built ourselves. It is not an off-the-rack. And basically, it's the same system that is used in all of our DC's and all of our stores. It is a phenomenal system. The building is 2 million square feet, if we didn't have great systems in here, we wouldn't be able to do what we do.*

Firms need to be able to adapt the information screens to the meet the requirements of the firm's formal analysis capabilities. Not being able to make changes slows down the processing of product returns, and as Dave described, limits the ability of the firm to process returns for new clients. The inability to customize the information system can act as a handicap, leaving a firm less responsive to, and effective in, processing returns than competitors (Daugherty, Myers, and Richey 2002; Manuj and Sahin 2011). The inability to customize the information system reduces the effectiveness of returns processing by constraining the analysis capabilities of a firm.

**P<sub>8</sub>:** Information system customization enhances the analysis capabilities of the firm.

### **The Organizational Climate**

Beyond the capabilities, employees, and returns management information system, informants described aspects of the *organizational climate*, or the surrounding environment, which represents a firm's values. Informants' descriptions of climate hint at the underlying organizational culture, or the foundational values and beliefs of the organization (Denison 1996; Deshpande and Webster 1989). The organizational climate is the surface-level manifestation of

the values and beliefs important to organization members, and shapes the way employees interact and behave within the organization (Denison 1996; Schein 1990). The underlying values within the organization are physically represented at the climate level by employee's perceptions of the firm's policies, practices, and procedures (Carr et al. 2003; Deshpande and Webster 1989).

Each organization's climate uniquely reflects the values of the organization, and helps maintain the cohesiveness and functioning of all employees by rewarding behaviors consistent with the culture (Jex and Britt 2008). The policies and procedures of the climate restrict interactions employees should not undertake, by restricting access to resources. For instance, at the technology products company, when the serial number of a returned product does not match the returns authorization, an 'exception' process begins. The policies and procedures require that the return pass to a specialized employee specifically trained in processing exceptions, instead of permitting all employees to make decisions related to the mismatched return. Acceptable interactions result in the sharing of resources amongst employees, while restricting the flow of resources to unacceptable interactions will deter those interactions (Holland 1995). Informants discussed different aspects of the organizational climate, including the (1) creativity, (2) localization, and (3) supportiveness of the climate.

*Climate for Creativity.* The *climate for creativity* can be defined as a firm's expression of creative values within the organization, which includes how employees express creative ideas, as well as how the firm handles receiving and implementing creative ideas. A climate strong in creativity encourages employees to express creative ideas, knowing that the firm values creative ideas, and will implement feasible creative ideas.

All informants expressed an interest in nurturing a climate high in creativity, although in different ways. For example, Cole (see Table 3) at the fast food company expressed the importance of nurturing creativity amongst executive managers and hired experts to create new systems.

*Well, [the process for developing creative ideas is] a combination of using some experts, so [the company] has experts in every field. It's a combination of through this office, and particularly through me, to set up the programs, and then to communicate that down to the restaurants, and people in the restaurants.*

In contrast, John at the apparel company asks for creative ideas from all levels of employees:

*The two previous directors have been [running the distribution center] for a long time and had a certain style. The director before me had a different style, and I've got a different style. So we're trying to move towards the more creative ownership, where I want our Leads to be able to see an issue- not just solve it- but figure out why it's happening, and what is a solution that can dig down to the root cause. In the past, they haven't been given that authority and ability, so a lot of it's asking the 'well, what should we do?' 'I don't know, I'm waiting for you to tell me what to do' So we're working on trying to break down those barriers of 'I've never had to think of something that way, you tell me how to solve it, and I'll solve it.' Now I want them to come up with ideas on how to solve it, so we don't always have to manage down, they can manage up.*

Similarly, Elliot at the furniture company asks for creative ideas from each one of his employees, recognizing the fact that the idea is more important than the credentials of the employee:

*You want anybody who sees something to bring it to your attention. I always tell people if I'm the receiving manager, and I happen to see a piece of furniture on fire in the racks, I'm not going to say 'phew, I'm glad I'm not the load manager cause I'd have to deal with that.' We are all responsible for the benefit of the company and for our success. So I want people to do good. I mean I've been in this business for 25 years, I tell people 'I'm not a rocket scientist. I don't claim to know everything.' I've learned as much from the housekeeper, from my bosses, and I listen to them because everybody has good ideas.*

In order to nurture a climate strong in creativity, employees need to believe in and support the implemented creative ideas. Without employee buy-in, as John describes, a new creative idea faces improbable odds of success:

*It's a matter of the easiest way to do it is just you spend a lot of time with them. You educate them on what you're trying to do, you get their input on how to make it better. You do a lot of training, you do a lot of follow-up. If they don't buy into the new idea, it's not going to work. So one of the things I always talk about with my team is there may be a 100% solution on improving something- it's the optimal solution- but only 10% of your people are going to buy into it. You're going to get a 10% return. You could have a 50% solution that's only 50% optimal, but if 100% of the people buy into it, you're going to get a 50% return on your investment. So it's a matter of really working with the employees.*

Data analysis revealed two interactions between the climate for creativity.

*Climate for Creativity & Employee Interactions.* While the firm shapes the climate for creativity, this climate interacts with the employee, either encouraging or discouraging employee's expression of creative ideas. In strong creative climates, employees regularly present creative ideas to management, and management shows appreciation for, and implements some of the creative ideas. A climate strong in creativity essentially acts as a reinforcing mechanism, encouraging employees to come up with creative ideas because the firm recognizes and rewards creative ideas, even when the idea cannot be implemented. If employees suggest creative ideas that cannot be implemented due to resource constraints (i.e., the creative idea costs too much money to implement), management must still thank the employee, who suggested the creative idea, and explain why the creative idea cannot be implemented. Otherwise, as Elliot emphasized, the employee may refrain from suggesting creative ideas in the future, which can ultimately stifle the climate for creativity:

*You don't want someone to be stifled and again if they don't think you care and you're just waving them off, then they are not going to bring you the ideas. And maybe the two that they brought you weren't that great, but you still want to thank them for it, you still want to say 'hey, I appreciate it.' Make them feel that it was still the most important thing you did that day, so that they will bring you more. Because it could be that one [idea] that they brought you out of 100 that could save hundreds of thousands of dollars over the lifetime of the company being in business. So it is important that people bring you ideas and again, even with processes, I always tell people, if I say no to a process, I'll*

*always explain to them from a business standpoint why we can't do that. I'm not going to say no because it wasn't my idea.*

Informant descriptions are consistent with insights from the creativity and marketing literatures, which suggest the creativity of a firm depends upon the nature of the organizational environment (Amabile et al. 1996; Busse and Wallenburg 2011; Hoff 2014; Hurley and Hult 1998). Organizational environments, which encourage creativity, have been associated with a higher number of creative ideas suggested by employees (Rice 2006).

**P<sub>9</sub>**: Creative ideas result from the interaction of the climate for creativity and employee knowledge.

*Climate for Creativity & Capabilities Interactions.* The climate for creativity also interacts with a firm's capabilities, enabling the firm to test out improvements and changes to its capabilities. Creative ideas that can be implemented are usually done in a local, experimental form. For example, Mike describes how the automotive parts company has tested out potential solutions to improve the flow of returned products:

*But one of the things that we did [at another distribution center] that you don't actually get to see here, because they don't do it here is a module or a conveyor for reclamation. As you can see there is a lot of sorting that needs to be done. To me, it's no different than selecting for a store. Like we have selectors out there that select in these modules, and we have a sorter that sorts out every tote that goes to every store. I don't see why we can't have a conveyor that will sort out each product by the zones in which it goes in the building, and then for us to put it away, instead of it being such a manual process.*

The technology products company is testing out a new recycling initiative at one of the firm's distribution centers. The firm realized that a substantial amount of used cardboard and plastic from in-bound or product return shipments was being trashed, and has recently begun collecting cardboard and plastic for reuse or recycling. Some of the materials can be reused as packing

supplies in outbound shipments, while the rest can be recycled. When describing the recycling initiative, Belle emphasized the localized nature of this experiment:

*The whole building is doing it, but we are the only ones doing it at this point. So we have 6 facilities, and we haven't actually spread the word yet. We want to see how it actually works, because you never know how things can get to. So, it's just local at this point.*

In addition, other informants described experimenting with creative ideas related to distribution center services, managing low volume SKU's, developing workarounds for legacy systems, tracking small shipments to larger retailers, and developing more sustainable raw materials.

The main benefit of local, small-scale experiments, as Elliot described, is that if the creative idea does not work out, the firm can always go back to its original way of doing things:

*But it's always easy to try something, and if it doesn't work, you just go back. But if you don't try it, you'll never know.*

In fact, the apparel company described one experiment that did not work out. The apparel company receives some returns that cannot be resold, and must be destroyed to protect the integrity of the brand. In an effort to make these returns more sustainable, the apparel company tried to cut the brand off of the returned merchandise, and use the left over fabric as rags in the firm's manufacturing facilities. While the rags reduced the amount of material the apparel company destroyed, the rags ended up costing too much in labor, and the creative idea was ultimately scraped.

The experimental nature of implementing creative ideas is consistent with the creative process described in the creativity literature, and solving wicked problems. The second half of the creative process describes the selection, implementation, and evaluation of creative ideas (Reiter-Palmon, Herman, and Yammarino 2008). Once a firm implements a creative idea, the change will be monitored to determine if the new idea will become permanent. If a creative idea that has been implemented does not work, monitoring will provide some feedback on what

aspects of the creative idea were unsuccessful, which will provide additional information to developing alternative creative ideas to solve the problem (Puccio and Cabra 2010). Similarly, when managing wicked problems, managers implement ‘mini-experimental’ solutions to attempt to manage and better understand the wicked problem (Conklin 2005; Snowden and Boone 2007).

**P<sub>10</sub>**: The climate for creativity enhances the firm’s capabilities.

*The Localization of the Climate.* In addition to the climate for creativity, informants also described the importance of the *localization of the climate*, or the expression of values and attributes unique to a specific location (e.g., a single warehouse or distribution center). Elliot, who works for a company with multiple distribution centers, emphasized the importance of understanding the people at each distribution center. Understanding the people requires appreciating the motivations and abilities of employees. At the furniture company, job security is a significant motivator of employees. The distribution center for the warehouse is in a rural area, and the employees place importance on job security since many do not have the education to move jobs quickly and easily.

The localization of the climate also shapes how employees prefer to be rewarded. Some informants reward high performing employees through public recognition, writing up articles to appear in the company newsletter, or posting a story about the employee on a centralized bulletin board. Other informants reward employees with small gifts like gas cards or movie tickets. As Mike described, employees at the automotive company earn reward points for creative ideas, and safe working behaviors, just to name a few:



*Well, here we try to reward them through... We have what we call 'RPM points.' And basically, they're points that can be converted into stuff they could buy or if you have enough points you could convert it into a paid day off.*

*Points are given out in increments of 2, 5, 10, 20 and 50. And 100 points earns you a free day off. So of course for everybody's birthday, they get 50 points. You know, if I walk through the building, cleanliness is a big thing for me. If I walk through the building and I see someone going out of their way to clean something up, then I will give them like a 2-point RPM card. Or, it's really up to the discretion of the manager. Or if... like shipping... they went 500 days without an accident... so they will get a 50-point RPM card. And if they play their cards right, they get a 50 RPM card for their birthday and a 50 RPM card for going 500 days without an accident, so they get a free day off.*

The points employees earn at the automotive company can be used to purchase company merchandise (e.g., t-shirts, water bottles), or saved up for a free day off. The key point Mike emphasized is to reward employees according to what they like:

*The culture here, [the employees] love t-shirts. I don't know why, but people love t-shirts. (...) Every time I look at the [employee attitude survey], someone brings up the fact that in this building years and years ago – like 18 to 25 years ago- we used to give out t-shirts. And I came from another company building to this building, and at that company building, team members could care less about t-shirts. But here, everyone wants a t-shirt.*

Elliot at the furniture company echoed that point, stating that employees can be rewarded:

*We will give [employees] everything from a gas card, to movie tickets... We put their names and pictures in the newsletter, with what they accomplished and what they did for us. So lots of different things that, we will do. Sometimes we will send them to the other distribution centers to teach the other DC's what they did. So little things like that, and hopefully they respect and appreciate them.*

The localization of the climate recognizes the importance of employee motivators, or internal forces that drive employee behavior (Hawkins and Mothersbaugh 2010). When employees perceive a gap between their current and desired states, motivation encourages employees to close that gap (Hawkins and Mothersbaugh 2010). Employees' motivation has a direct influence on decision-making resources by influencing the task difficulty (Robinson 2001). An employee who has recognized a gap and is motivated, increases his/her focus for the task, making the task

easier to complete (in this research, task difficulty is defined as the ease of completing a task, see page 82-83). Employees motivated to work will be better focused to complete a task and experience a lower task difficulty, which will reduce the amount of decision-making resources needed to make a decision.

**P<sub>11</sub>**: The localization of the climate influences employees' decision-making resources.

*Supportiveness of the Climate.* Third, informants described the *supportiveness of the climate*, or the organization's willingness to provide employees with the resources they need to process returns. Dave described how the limited supportiveness of the climate towards product returns influences investments in the return information system:

*It's kind of like that necessary evil, and [returns] don't really get the attention that they might deserve at the corporate level. (...) Because [returns] are not really generating revenue, right? So [the return information system] is not really receiving the attention that it really deserves.*

John described a more supportive climate, but even with more support, investments in the product returns system by the organization are limited:

*We have corporate licenses for some of the high-end systems, like the Manhattan Employees, which a lot of the Fortune 500 companies use. They either use Red Prairie or Manhattan Employees for their distribution centers. The problem is the price tag to implement; it is close to \$2 million. It's really, really expensive. The cost justification becomes really hard. So as painful as our legacy systems are, it's hard to justify. How are you going to pay \$2 million for just putting in a new system?*

Other informants described a more supportive climate, where return initiatives are given serious consideration by management, and investments are made in return processes. Mike at the automotive parts company described the firm's desire to invest in reusable pallets for returns processing:

*That is a way we see that, 'hey, we could spend \$60 million, but constantly get this pay back.' Because we could then go back to the pallet company and say, 'hey, we're going to start sending you not just bad pallets, but also good pallets.'*

While these illustrations describe the supportiveness of the climate, informants intimately link the supportiveness of the climate to the firm's ability to customize the information system.

*Supportiveness of the Climate & Information System Customization Interactions.* The above illustrations indicate that supportive climates place value on investing in customizing the information system. Informants describing limited supportiveness of the organizational climate operate legacy information systems. Legacy information systems are information systems a firm has used for years, and tend to be customized uniquely to a single firm. The supportiveness of the climate correlates with the reliance on legacy information systems. Consistent with insights in the literature, the willingness and ability of the organization to provide financial, technical, and managerial resources to employees directly shapes employees' ability to efficiently and effectively process returns (Daugherty et al. 2005; Ho et al. 2012; Huscroft et al. 2013; Jack, Powers, and Skinner 2010). Resource investments lead to the development of competitive advantages (Srivastava and Srivastava 2006). In returns management, resource investments lead to a customized, functional product returns system, which is difficult for competitors to imitate.

**P<sub>12</sub>:** The supportiveness of the organizational climate has an effect on the customizability of the information system.

### **Flexible Customer Service Boundary**

The *customer service boundary*, or the gateway between the customer and the product returns system, is the final component of the complexity of returns management described by

informants. The customer service boundary acts as a gatekeeper, screening customer returns and limiting the access of returns to the product returns system so that only those returns acceptable to the firm are permitted to enter (Rogers et al. 2002). “Gatekeeping assures that only product that should be returned to a specific point in the returns network is allowed to enter the return flow” (Rogers et al. 2002, p. 10).

For most informants, the customer service boundary also represents the primary communication barrier between the employees of the product returns system and the customer, to ensure the customer has a pleasant, and consistent experience. The customer service boundary supports the maintenance of relationships between the customer and the company, keeping the customer happy despite having to return a product, and keeping the company happy by eliminating unnecessary costs (Rogers et al. 2002).

While the customer service barrier acts as a boundary, it also maintains a certain level of *flexibility*, or a willingness of the firm to alter the firm’s response to a customer when necessary. Informants recognize the critical role customers play in sustaining the financial health of the firm by purchasing products, and most informants expressed a willingness to assume some costs, when necessary, to maintain positive relationships with customers. Two companies expressed a strong customer focus, and a willingness to be flexible and take a hit in accepting a return, in order to keep the customer coming back to the store to purchase more products. Nick (see Table 3) described flexibility as a way to “soothe the customer’s needs,” but the amount of soothing depends upon the situation:

*[If we make an error], we will take care of the customer and make sure their needs are taken care of. Versus, you know if the customer made a mistake and they need a shipment back, I believe it is up to a 20% restocking fee to correct the error and ship back out what they need.*

Being flexible, Mike hopes, encourages customers to be flexible with the company when it makes a mistake:

*But we understand that we ship things to [customers], and if we ship things to them incorrectly, then there is the whole 'we billed you for this, but you did not get what you asked for' [mentality]. There is a whole financial side to that. So we understand that. So just because of that relationship, we look at the store as our customer. So if they need something, we will try to do it for them just in the happenstance that if we did something wrong, we would like them to help us out too.*

Additionally, some companies interviewed issue credit to the customer before receiving and inspecting the return, in an effort to keep customers happy. Mike at the automotive parts company describes how credit is issued to the customer:

*They receive the credit right there, and once we receive [the product], it kind of completes the transaction. So basically, a \$25 credit opens up, and then when we receive it, the \$25 credit closes, so everything is good.*

Thus, while the flexibility of the customer service boundary requires the company to absorb some unnecessary costs, such absorption is assumed to strengthen the reciprocal relationship between the customer and company.

*Customer Service Boundary & Analysis Capabilities Interactions.* Since the customer service boundary acts as a gatekeeper, it interacts with the analysis capabilities of the firm. The analysis capabilities represent the firm's formal procedure for processing product returns. Without the customer service boundary, customers could send in anything to a firm to be returned, including products not sold to the customer by the firm. Return fraud, or returns for deceptive reasons account for upwards of 10% of all product returns (Lipka 2010; Reynolds and Harris 2006; Speights 2005). Multi-channel retailing, where customers can purchase a product from a single store in multiple ways (e.g., online, in-store), and omni-channel retailing, where the customer can purchase a product from any store in any way, contribute to growth in product

returns (Napolitano 2013; Penske 2014). Return fraud becomes a significant concern with the growth of omni-channel retailing, as customers can return products bought in/on one platform (e.g., online) to a completely different part of the firm (e.g., in-store). This freedom to return products to a different part of the firm increases the likelihood customers may try to return products bought at another firm, since customer service representatives are less strict in accepting returns. Therefore, the customer service boundary plays a critical role in reducing the volume of returned products to the firm and preventing the firm's analysis capabilities from being stressed.

**P<sub>13</sub>:** The customer service boundary enhances the efficiency of the firm's analysis capabilities by screening product returns.

*Customer Service Boundary & Employee Decision-Making Resources Interactions.* In addition to the customer service boundary enhancing a firm's analysis capabilities, the customer service boundary also plays a critical role in shielding employees from an excessive volume of product returns. Without the gatekeeping role of the customer service boundary, employees would also be overburdened with excess returns, placing more stress upon employees to process a higher number of returns. This additional stress negatively impacts employee decision-making resources by increasing task difficulty. Task difficulty describes how easily an employee can complete a return, and depends upon the employee's available attention, memory, and motivation (Robinson 2001). Therefore, without the customer service boundary, customers would overload employees with excess unauthorized returns, particularly fraudulent returns

(Reynolds and Harris 2006), leading to a higher incidence of employee mistakes while processing returns due to stress and fatigue.

**P<sub>14</sub>:** An effective customer service boundary decreases the task difficulty of processing product returns.

## CONCLUSIONS & IMPLICATIONS

The current research set out to address a gap in returns management knowledge regarding the complexity of product returns management. Results from this study find that the complexity of returns management can be conceptualized as a CAS, comprised of interactions between a firm's capabilities, employees, information system, organizational climate, and customer service boundary. Within the product returns management CAS, the employee's knowledge and decision-making abilities play important roles in the processing of product returns, with the potential to enhance a firm's capabilities. The speed of the information system supports employee decision-making, while the ability to customize the information system increases a firm's analysis capabilities. Further, aspects of the organizational climate influence the employee's willingness to present creative ideas, the employee's decision-making, and the firm's analysis capabilities. Finally, the customer service boundary enhances the analysis capabilities and decision-making resources of employees by filtering the in-coming flow of returned products.

The current research is not without limitations, which provide opportunities for future research. The main limitation revolves around the context of the research. Six companies, representing a variety of positions within the supply chain and selling a variety of products, were interviewed to build this substantive theory of returns management (see Figure 1), however the

findings may not be generalizable to other companies selling different products (e.g., pet supplies, books, hardware) or holding different positions in the supply chain (i.e., supplier) who were not included in the current research. Based upon the descriptions provided in the current research, it would be informative to test the robustness of this theory by replicating the study with additional companies selling different products or holding different positions in the supply chain.

Second, the current research puts forth a set of propositions, which provide a foundation for a quantitative test of the proposed relationships amongst the constructs. However, the proposed relationships are not tested in this essay. Testing the propositions requires a confirmatory research design, and could test the robustness of the main premise of this study—that the identified components of product returns management interact in a CAS. In addition, future studies could examine and model the relative importance of each interaction proposed here, and reveal the relative importance of an employee’s interactions with the information system versus formal firm capabilities, for instance. Finally, quantitative analyses can determine the ability of the proposed components of returns management to explain complexity of product returns management.

Despite these limitations, the current research makes important contributions. First, the current research contributes to the supply chain management, reverse logistics, and returns management literature by developing a substantive theory of the complexity of returns management (see Figure 1). This study lays the groundwork for future examinations of the complexity of product returns. The role of the employee in processing and analyzing product returns is under researched, and the results of this study suggest the employee plays a pivotal role in returns management. Employees interact with the firm’s capabilities and information system



to process returns. The current research highlighted the importance of considering human limitations in processing returns. Future research can investigate the abilities, limitations, and motivations of employees more deeply. Further, understanding how employees adapt within the product returns system also has implications for managing the risks associated with product returns.

Second, this research contributes to the returns management and complexity literatures by examining the components of a product returns system that make the system complex. The results indicate that most interviewed companies combat return complexity, and try to manage the complexity through the development of capabilities, employees, and an information system. Complexity within returns management remains an understudied area, as most of the research attention has focused on optimizing return policies to reduce returns (Davis, Hagerty, and Gerstner 1998; Janakiraman and Ordonez 2012; Madzlan 2008; Piron and Young 2001; Powers and Jack 2013) and developing profiles of frequent returners (Daunt and Harris 2012; Harris 2008). Future work identifying the best practices for improving information system speed, information system customization, analysis capabilities, and communication capabilities could reveal ways for managers to improve value recovery from returned products.

The theoretical propositions that describe the components and component interactions of the substantive theory suggest a number of directions and research questions for future research. Some research questions that require further research and empirical testing include: How do the qualities of individual employees and returns management information system impact the efficiency of product returns processing? How do employees and the returns management information system enhance a firm's analysis and communication capabilities? How do different facets of a firm's organizational climate impact product returns processing?

Overall, the substantive theory developed in this essay identifies five key components of the product returns system. Managers seeking to improve value recovery, agent adaptability, or the efficiency of returns, first need to understand the complex nature of product returns management. An effective product returns system contains numerous interactions between the firm's capabilities, employees, information system, organizational climate, and customer service boundary to process product returns. Changes made to improve the efficiency and effectiveness of the product returns system need to be carefully considered, as any changes made will be magnified throughout all the interactions within the product returns system.

## **CHAPTER IV: THE IMPACT OF THE PRODUCT RETURNS MANAGEMENT SYSTEM ON FIRM FLEXIBILITY, FIRM ADAPTABILITY, PERFORMANCE AND RELATIONSHIP QUALITY**

### **Introduction**

Product returns, or items that customers send back to a retailer, manufacturer, or third-party provider, cost retailers alone upwards of \$200 billion a year (Penske 2014). Although receiving a refund is the customer's main goal after returning a product, firms aim to maximize the value recovered from a returned product through reselling, repairing, or recycling the product. In order for a firm to recover value from a returned product, the product goes through a complex product returns system. Once a firm receives a returned product from a customer, the returned item is sorted and prepared for analysis (Stock, Speh, and Shear 2006).

As described in chapter III, analyzing the product return requires the interaction of employees, the returns management information system, the firm's capabilities, the customer service boundary and the organizational climate. Employees rely upon their existing knowledge and available decision-making resources to gather information from the returned product and information system to make a disposition decision. The speed of the information system supports employee decision-making by making information easier to access and reducing the amount of steps the employee must go through to record a disposition decision. Throughout product returns processing, employees follow the established analysis capabilities of the firm and utilize communication capabilities when issues occur (e.g., a returned product gets misplaced). The customer service boundary of the firm is responsible for communication with customers, and acts as a first line of defense against unwarranted product returns (e.g., bought a product at a different

company). The organizational climate permeates the entire analysis process, and has the ability to enhance employee processing by providing access to important resources (e.g., improving the customizability of the returns management information system).

While chapter III developed a substantive theory on the complexity of product returns management grounded in information provided by managers knowledgeable of product returns activities, the purpose of this chapter is to empirically evaluate how some components of the developed substantive theory (to keep the size of the study manageable, the researcher chose to focus on the three most commonly mentioned problematic components) impact the flexibility, adaptability, and health of the firm. This chapter investigates how three components of the product returns system- *employees*, the *returns management information system*, and the *climate for creativity*- contribute to the firm's relational and monetary health. Specifically, the current research investigates how employee knowledge, employee decision-making resources, information system speed, and information system customizability influence firm flexibility and adaptability. Studying these components will reveal insights into how the components of a product returns system produce positive outcomes (e.g., higher performance, better relationships) for the firm. These insights reveal the importance of the adaptability of the firm in maintaining strong relationships with customers. To study and test these relationships, the current research relies on survey data collected from managers of product returns systems in the US. This chapter begins with hypotheses development, followed by a discussion of the methodology, analysis, and results.

### **Theory and Hypotheses Development**

Complex Adaptive Systems (CAS) theory, which suggests that a system is composed of the interactions of multiple parts, guides the hypothesis development in conjunction with insights

from the substantive theory of product returns management presented in chapter III. According to CAS theory (Holland 1995), four important characteristics of complex adaptive systems include the ability for entities within the system to group similar things together (aggregation), the uniqueness of entities within the system (diversity), the production of super additive outcomes because entities constantly adapt (non-linear interactions), and the exchange of resources (e.g., expertise, materials) through interactions (flow of resources). In addition to these four characteristics, complex adaptive systems also include three mechanisms: mental networks of information (internal mental models), basic chunks of information about an interaction (building blocks), and grouping similar things together to form a boundary (termed tagging). Together these characteristics and mechanisms permit a system to self-organize and adapt. The ability to adapt permits complex adaptive systems to remain relatively stable despite unexpected events or turbulent environments, because each agent within the system is free to adapt according to his/her knowledge and experience. The cumulative effect of numerous agents adapting to unforeseen events permits the CAS to make small changes to continue functioning at a relatively stable level. CAS theory provides a relevant perspective on product returns management because of its ability to describe how the interactions of many components within a system yield a consistent outcome.

The overall theoretical framework shown in Figure 2, illustrates the network of relationships between two components of a product returns management and the ability of the firm to be flexible and adapt. In Figure 2, the interactions of *employees* and the *returns management information system* shape the *firm's flexibility*, defined as the ability of a firm to make changes quickly (Liu et al. 2013; Stevenson and Spring 2007), and the *firm's adaptability*, defined as the ability of a firm to proactively make changes to its structure or organization to

remain competitive (Carmeli, Jones, and Binyamin 2015; Stevenson and Spring 2007). The definitions for firm flexibility and adaptability are literature-based, since the interviews of Essay I looked primarily at the components of a product returns system, not the outcomes. The *firm's adaptability* influences the *relationship quality*, or the strength of the relationship the firm forms with vendors and customers (Fynes, de Burca, and Voss 2005; Su et al. 2008). In addition, the firm's *climate for creativity*, or the firm's policies and procedures related to creativity (Carr et al. 2003), moderates the relationship between *firm flexibility* and *firm adaptability*. Figure 2 relates to Essay I by studying how the employee, returns management information system and climate for creativity components contribute to a firm's flexibility and adaptability. Essentially, Essay I identified the important components of a product returns management system, and Essay II examines how some of those components contribute to the overall health of the firm.

### **The Employee Component**

Within the product returns system, employees inspect returned items to verify the identity of the return, and make a disposition decision (Rogers et al. 2002; Stock, Speh, and Shear 2006).

Depending upon the type and condition of the return, employees may decide to resell, remanufacture, repair, recycle, or destroy the returned product to disposition it (Hazen, Hall, and Hanna 2012; Tibben-Lembke 2002). At most firms, employees will make a disposition decision aimed at recovering the most value from the returned item, however, some firms have different goals for product returns and aim to protect the integrity of the brand instead of recouping value (Dwyer 2010).

How does an employee make an optimal disposition decision? Making an optimal disposition decision requires employees to gather information about the current state of the

returned product, and determine the approximate value the firm can recover for the product for each disposition option and the costs the firm will accrue to carry out the disposition decision made by the employee (Stock, Speh, and Shear 2006; Tibben-Lembke 2002). While the employee can determine the current state of the returned product by inspecting the return, referencing the returns authorization, and information provided by the customer to customer

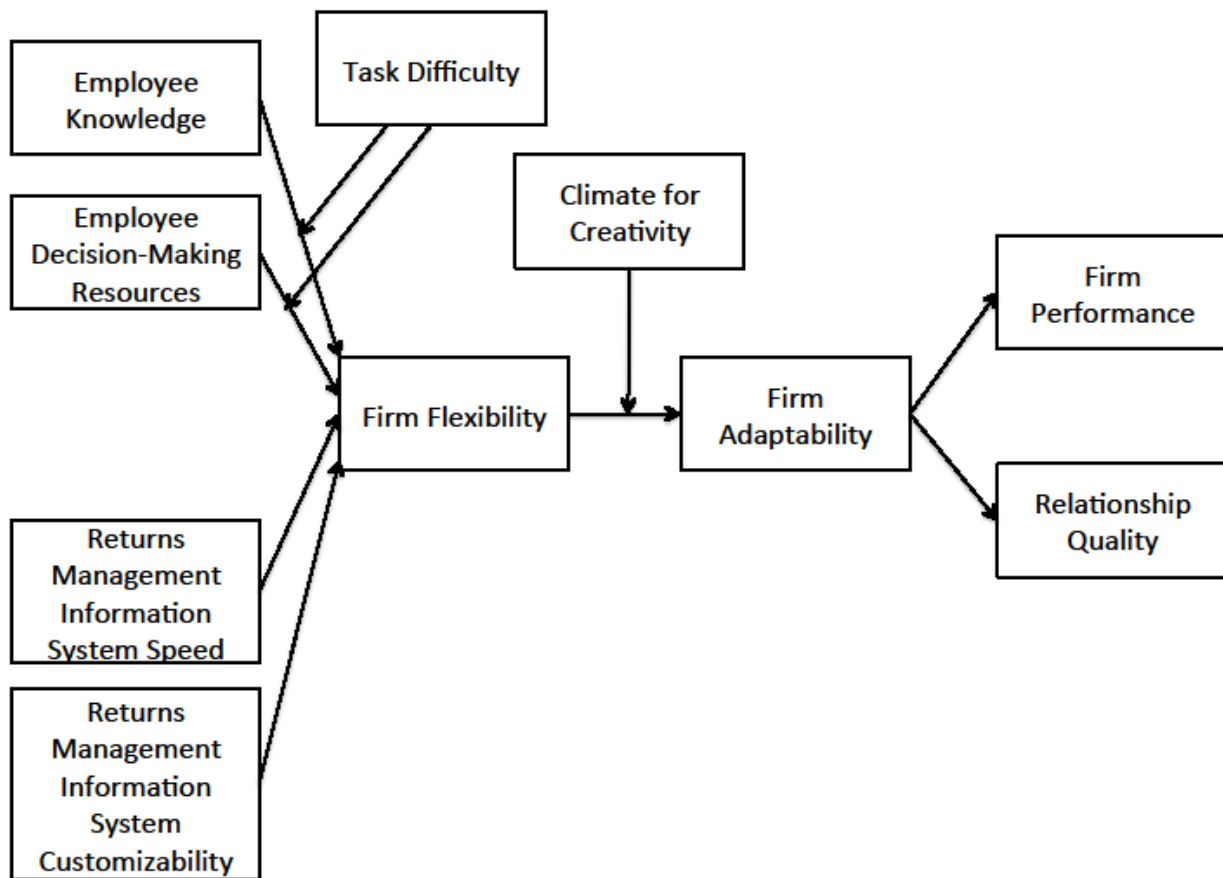


Figure 2. Conceptual Framework of Essay II.

service, the employee also relies on an internal mental model, or network of learned information stored in nodes and linkages (Hawkins and Mothersbaugh 2010; Holland 1995) to make the disposition decision.

Internal mental models are one of the defining mechanisms of a CAS. To build internal mental models, employees rely on two other CAS mechanisms- building blocks and tagging (Holland 1995). Each time an employee interacts with a product return, the employee breaks the interaction down into basic components (e.g., type of product returned, viable disposition options), or building blocks, and evaluates the usefulness of each building block in the interaction. The employee will tag similar building blocks with a common name (e.g., MacBook Air and MacBook Pro are both tagged ‘Apple computers’) and form an aggregated building block, or a node that jointly stores information about multiple building blocks. In addition to nodes within the employee’s internal mental model, the employee also builds linkages between nodes describing the usefulness of nodes. In the next interaction, the employee will call on the most useful nodes first. If the information stored in that node helps the interaction, the employee mentally reinforces the importance of that node. If the information stored in that node does not help the interaction, the employee will look for information in other mental nodes to facilitate the interaction. Over time, linkages between nodes are formed, with the strongest linkages connecting the most useful nodes (Alba and Hasher 1983). Connections between nodes lead to the formation of information processing rules (Holland 1995), which with enough experience, the employee can utilize as heuristic information processing mechanisms (Tversky and Kahneman 1974). In heuristic decision-making, employees do not rely on all available information, but rely on their past experience to suggest ‘short-cuts’ for making a decision. Thus, when making a disposition decision, employees rely on information about the condition of the return the customer supplied to customer service when the returns authorization was issued, and on internal mental models to determine the value that different disposition options will recover.



Interviews with firms in chapter III point to the integral role employee knowledge plays in processing product returns. Employee knowledge is required throughout the screening, inspection, verification, and disposition decision stages of processing a returned product. At the initial screening, customer service employees need to know how to distinguish returns the firm should accept due to defect or customer dissatisfaction from returns the firm should not accept (e.g., a product a customer actually purchased from a different company). At the inspection, employees need to know how to inspect a returned product to confirm the identity of the product and uncover any hidden damage to the product. Depending upon the type of product, looking for damage may be straightforward (e.g., looking for tears or scratches in a piece of furniture) or require more effort (e.g., inspecting the chips within a circuit board). Further, once the employee inspects and verifies the identity of the returned product, the employee also must determine the likelihood the product can be resold, and what repairs need to take place for the product to be resold. Some firms even require employees to pass knowledge tests to obtain a job processing product returns.

While previous research suggests a firm's ability to share knowledge internally and externally contributes to the firm's flexibility (Blome, Schoenherr, and Eckstein 2014; Gupta and Nehra 2002; Santos-Vijande, Lopez-Sanchez, and Trespalacios 2012), the current research investigates something different. Instead of studying how well a firm shares knowledge, the current research studies how the amount of employee knowledge influences the firm's flexibility. CAS theory suggests that a more extensive knowledge base enhances flexibility by providing the employee with more building blocks of information to consult in an interaction. For product returns, this means that employees with more experience processing and dispositioning products should have larger internal mental models. Employees will still use some mental nodes more

frequently than others, but the overall breadth and scope of the mental model will be larger and deeper with more experience. This breadth and scope supports a firm's flexibility by enabling the employee to be able to adapt to new or problematic returns quickly. When encountering a new type of product return, employees with higher levels of knowledge have more nodes to examine for information related to processing the new type of product return.

**H<sub>1</sub>:** Employee knowledge is positively related to firm flexibility.

In addition to employee knowledge, employee decision-making resources influence the firm's flexibility. Flexibility requires employees to have the mental capacity to consider multiple options, and calculate the pros and cons of each option in comparison to all the other options (Neerinx 2003; Tierney 2011). Interviews in chapter III suggested that employees must process a variety of simple, complicated, and complex product returns, which vary in the number of interactions the employee must make with the returned product, customer service, and other departments within the firm.

Simple returns have an obvious disposition decision (e.g., the product is in pristine, unopened condition, so return it to saleable stock). To process a simple return, the employee only needs to consult his/her preferred building blocks to process the return. Employees can do this quickly. Complicated and complex returns require more processing resources, because the employee will often need to consider multiple types of information and disposition options, including multiple nodes of building blocks within his/her internal model. Complicated and complex returns will typically require more time to process than simple returns.

When processing product returns, employees make numerous decisions. To make these decisions, employees must focus their attention on the product return at hand, filter out

unimportant information, and process the relevant information to make a disposition decision. Performing these actions requires decision-making resources, or the amount of attention and mental processing capacity available for a decision (Patten et al. 2006). Individuals have a finite amount of decision-making resources, and once consumed, the individual must wait for the pool of decision-making resources to regenerate (usually through rest or nutrition; Baumeister et al. 1998; Converse and DeShon 2009). When decision-making resources become depleted, the individual enters a state of *decision fatigue*, characterized by reduced ability to focus attention and process information systematically (Baumeister et al. 1998; Tierney 2011; Vohs 2006; Vohs et al. 2005). In a state of decision fatigue, the individual does not have the mental resources available to systematically process information, and instead relies upon heuristic shortcuts to process information (Hagger et al. 2010; Tierney 2011; Tversky and Kahneman 1974). Quite frequently, the individual will opt to make no decision while fatigued.

Each decision an employee makes requires some decision-making resources, although the amount required will vary by the type of decision and the experience the employee has with making that decision in the past. In accordance with CAS theory, frequent decisions become automated through the development of heuristic information processing rules (Holland 1995). Essentially, the relationships between frequently used building blocks grow, and eventually with repeated success in interactions, develop into information processing rules that the employee will consult first as a heuristic mechanism to conserve mental resources (Holland 1995; Tierney 2011; Vohs et al. 2008). Infrequent or new decisions require a higher amount of decision-making resources because the employee must focus more attention on the problem, and systematically process more information.

In order for an employee to be flexible, he/she must be able to consider alternative nodes of information when making a decision quickly and then use some of those available resources to make a decision. Consideration and evaluation of alternatives requires systematic processing, and only employees with available decision-making resources will be able to consider and evaluate alternatives (Vohs et al. 2005). Thus, employee knowledge enables an employee to construct heuristic information processing rules to more efficiently make a disposition decision on common product returns. This helps the employee maintain a store of available decision-making resources to draw upon when systematic processing is required to process uncommon or problematic returns. Although firms will likely provide guidelines on how to structure information processing, ultimately it is up to the individual employee how he or she structures their internal mental models. Regardless of the structure, employees must use resources to enhance firm flexibility.

**H<sub>2</sub>:** Employee decision-making resources usage is positively related to firm flexibility.

While an employee's knowledge and available decision-making resources are predicted to contribute to the firm's flexibility, the ease with which an employee can process product returns has the potential to moderate these relationships. Task difficulty describes the ease with which an employee can solve a problem (Helton et al. 2010). Characteristics of the problem impact task difficulty, including the number of components of the problem the employee must reconcile, the amount of time the employee will need to process information related to the problem, and the number of times the employee will need to switch between different types of knowledge (Bai, Coronado, and Krishnan 2010; Neerincx 2003; Robinson 2001).

In his work, Perrow (1980) suggests two dimensions of task difficulty- task variety and task analyzability. The task variety dimension describes how often unexpected events occur (e.g., how often do unusual returns occur?), while the task analyzability dimension describes how difficult a process is to run (e.g., how difficult is it to process unusual returns?; Perrow 1980; Withey, Daft, and Cooper 1983). High task variety (unexpected events occur frequently) limits a firm's predictive power because tasks become unpredictable (Withey, Daft, and Cooper 1983). High task analyzability means a process can be routinized easily, and reduces the amount of time an employee must spend on determining how to solve the problem (Withey, Daft, and Cooper 1983). In the context of product returns, task difficulty in part determines the amount of knowledge the employee will consider and the amount of decision-making resources the employee will need available to process a product return. As task difficulty increases (due to high variety, low analyzability, or both), the employee considers more types of knowledge and requires a higher amount of available decision-making resources to process a return. High variety in product returns means unusual returns happen frequently, which require more specialized processing. Low analyzability increases task difficulty by requiring the employee to determine how to process a product return. Thus, low analyzability will require employees to consider more information to process a product return, and consume a larger amount of decision-making resources while doing so.

Therefore, task difficulty influences how employees contribute to the firm's flexibility. Task difficulty enhances the relationship between employee knowledge and firm flexibility, where difficult tasks requiring employees to consider multiple, different types of knowledge enhance firm flexibility (and there is a minimal effect for easy tasks). However, tasks high in difficulty require a large amount of employee decision-making resources due to the need to

systematically process and reconcile the elements of the problem. Therefore, while task difficulty enhances the relationship between employee decision-making resources and firm flexibility, difficult tasks consume employee decision-making resources more quickly (and there is a minimal effect for easy tasks), running the risk of exhaustion. Formally:

**H<sub>3</sub>:** Task difficulty exerts a positive moderating effect on the relationship between employee knowledge and firm flexibility.

**H<sub>4</sub>:** Task difficulty exerts a positive moderating effect on the relationship between employee decision-making resources usage and firm flexibility.

The preceding discussion does not distinguish between firms that have multiple employees involved in processing a product return from those firms who have a single employee processing a product return. The current research looks instead at the average knowledge and decision-making resources of all return employees at a firm to establish its impact on firm flexibility. The number of employees involved with processing a product return is an interesting extension to the current research, and future research could investigate the potential moderating effects of the number employees on employee knowledge and decision-making resources.

### **The Returns Management Information System Component**

Employees rely upon information from the returns management information system to process returns and make disposition decisions. The returns management information system describes the software platform used by a firm to store information about product returns. Interviews in chapter III revealed that informants utilize a variety of returns management information systems, including old legacy systems, DOS-based systems, and SAGE ERP systems. Informants described some of the key functions of the returns management information system as storing

information provided by customers, generating a returns authorization, describing the reason for the product return, monitoring return rates for specific products, and specifying the location of products within the warehouse. The information stored in the returns management information system aids employees in inspecting, verifying, and dispositioning returned products.

Management information systems can be studied from many levels, including the technical, semantic and influence levels (DeLone and McLean 1992). At the technical level, researchers study *system quality*, or the characteristics of the information system itself that houses information. At the semantic level, researchers study *information quality*, or the accuracy and meaningfulness of the information produced by the management information system. At the influence level, researchers study *user satisfaction*, or the happiness of users with the information, or *information impact*, or the influence of the information on management and organizational decisions. From the substantive theory presented in chapter III, the information system components of speed and customizability were found to contribute to the complexity of product returns management. Both speed and customizability are *system quality* characteristics, as they are both characteristics of the information system itself. System quality characteristics influence the quality of the information delivered to the employee (Gorla, Somers, and Wong 2010).

Information system speed can be defined as the quickness of the returns management information system in processing product returns. While the returns management information system stores important information about a product return (e.g., returns authorization, customer order history), employees go through a series of steps within the information system to complete a product return and make a disposition decision. Therefore, the information system speed refers not to the number of seconds it takes for the information system to respond to a user, but instead

describes the number of steps or screens an employee must go through to process a product return. Quick information systems minimize the number of steps and screens employees interact with, speeding up the processing of returned items. Some informants in chapter III rely upon legacy systems (old systems that are unique to a single firm), which typically require employees to go through numerous steps and screens to process product returns. Going through extra steps and screens slows down the processing of returned items, which has negative consequences. Slower information systems restrain the ability of firms to take on new market opportunities (see Dave's comments on page 90). In addition, slower information systems reduce the value recovered from returned items, by increasing the length of time it takes for returned items to re-enter inventory and increasing the risk of product obsolescence (Closs and Savitskie 2003; Daugherty, Myers, and Richey 2002). Thus, a quicker information system enhances employees' ease of use, which increases the management information system's quality (DeLone and McLean 1992; Gorla, Somers, and Wong 2010). In turn, the information system speed enhances the flexibility of the firm by providing employees with quick access to information when changes need to be made, allowing the firm to avoid product obsolescence or take advantage of new market opportunities, for instance.

**H<sub>5</sub>:** Returns management information system speed is positively related to firm flexibility.

Information system customizability can be defined as the ease of changing the screens of the returns management information system. Customization can be conceptualized as a continuum, ranging from low customizability where only basic changes can be made to high customizability where every part of the system can be changed (Bouwens and Abernethy 2000). While customization is often discussed in the context of customized products or website use



(Bouwens and Abernethy 2000; Palmer 2002), customization also has implications for product returns management. Many firms rely on off-the-shelf ERP systems to manage product returns, which require customization to make the ERP system functional for the firm's needs (Wu and Wang 2006). The ability to customize the returns management information system enhances the value of the information system by better meeting the firms needs (Gorla, Somers, and Wong 2010). The ability of a firm to customize the information system also enhances the firm's flexibility, by making it easy for the firm to change the information system when necessary.

**H<sub>6</sub>:** Returns management information system customizability is positively related to firm flexibility.

### **Flexibility, Adaptability, and Performance**

According to CAS theory, CAS remain functional despite changes due to the ability of agents to behave in different ways, in accordance with internal mental models. For organizations, flexibility, or the ability of an organization to make changes quickly (Blome, Schoenherr, and Eckstein 2014; Cheng et al. 2014; Johnson et al. 2003; Schilling and Steensma 2001), is an essential capability amidst the pressures of global competition. Within the global market, numerous firms adopt imitation strategies (developing new products or services similar to the offerings of competitors; Ofek and Turut 2008), so firm flexibility is critical to protecting and maintaining competitive advantages (Schilling and Steensma 2001). Flexibility has shown positive links with firm agility (the ability of a firm to sense the needs and wants of customers and respond with such offerings; Braunscheidel and Suresh 2009; Mason et al. 2002) and firm performance (Swink, Narasimhan, and Kim 2005).

Flexibility permits firms to survive change by reducing uncertainty through the exploration of different strategic actions (Braunscheidel and Suresh 2009; Hatum and Pettigrew

2006). Some firms remain flexible by adopting a modular organizational structure, which permits work units to be rearranged as needed when an event happens (Hatum and Pettigrew 2006; Schilling and Steensma 2001). Other firms rely upon the skills of managers to be flexible and respond to change (Hatum and Pettigrew 2006). The current research argues firms can also remain flexible through the knowledge of front-line employees and the quality of the returns management information system. When these employees have the freedom to process and respond to returns according to their internal mental models, they too help the firm adapt to change.

When discussing firm adaptability, some researchers suggest firm flexibility as an antecedent. “Flexible supply chains are able to adapt effectively to disruptions in supply and changes in demand whilst maintaining customer service levels” (Stevenson and Spring 2007, p. 686). Flexibility describes the ability of a firm or supply chain to take make changes quickly, while adaptability describes the ability of a firm or supply chain to redesign or reconfigure itself (Stevenson and Spring 2007). While multiple researchers declare firm flexibility is important to firm adaptability, these researchers do not empirically test the relationship between firm flexibility and adaptability (Blome, Schoenherr, and Eckstein 2014; Stevenson and Spring 2007) or only examine a component of adaptability (e.g., predictive ability; Takii 2007). The current research empirically tests the relationship between firm flexibility and adaptability in the product returns context.

**H<sub>7</sub>:** Firm flexibility is positively related to firm adaptability.

Early work on firm adaptability began with an examination of the levels of adaptability exhibited by different firms. Miles et al. (1978) typified firms into four categories of adaptability:

reactor, defender, analyzer, and prospector. A reactor firm adapts the least, instead maintaining the status quo and only taking reactive adaptive actions when necessary. A defender firm serves a narrow niche market, and focuses on efficiency and cost savings within that niche to avoid adapting and protecting the niche. An analyzer firm serves a stable market, and balances efficiency with taking proactive actions to protect and grow the market. A prospector firm adapts the most, and constantly looks for new market opportunities. Adaptability has been linked to higher firm performance and sustainable competitive advantages (Oktemgil and Greenley 1997). Both objective firm performance (e.g., employee turnover, firm revenues) and subjective firm performance (e.g., amount of time to process returns) measures will be studied, as some debate exists about the best way to capture firm performance data (Heffernan et al. 2009; Nyaga and Whipple 2011).

**H<sub>8a</sub>:** Firm adaptability is positively related to objective firm performance.

**H<sub>8b</sub>:** Firm adaptability is positively related to subjective firm performance.

Adaptation occurs in cycles, and the amount of adaptation that occurs depends on the resources a system has to adapt, the flexibility, and the resilience of the system (Holling 2001). The adaption cycle begins with a firm accumulating resources and rigidity over time, which begins to expose a firm's vulnerabilities and highlight where changes need to be made (Holling 2001). Recognition of vulnerabilities sparks adaptation, and the firm begins to make changes (Holling 2001). In order for a firm to adapt, slack in organizational and employee resources is necessary (McKee, Varadarajan, and Pride 1989; Oktemgil and Greenley 1997). In order for a process or system to be changed, there must be excess resources and down time for the change to occur while the system or process continues to run (Oktemgil and Greenley 1997). If a process or

system completely consumes all available resources, adaptation is unlikely to occur because the process or system would need to be stopped for any changes to be made. Firm flexibility intuitively supports firm adaptability by permitting the arrangement of resources to be shifted, so that the firm can continue to perform important actions, while also making changes necessary to adapt. Flexibility also permits decision-makers to consider multiple, different solution arrangements and decide upon the best solution arrangement.

### **Relationship Quality**

Just as the quality of relationships within a family require both stable routines and a willingness to make changes (Olson 2000), so to do firm relationships with vendors and customers require established routines and an ability to make changes when stress or unexpected events occur.

Adaptable firms have the capacity (e.g., slack in resources) to make changes to maintain and improve the quality of relationships. Non-adaptable firms lack the capacity to make changes, so even if a non-adaptable firm desired to make changes to support a relationship, the firm would lack the slack and necessary resources to make the desired changes. Firms adapt to build sustainable competitive advantages (Oktemgil and Greenley 1997), and often building a sustainable competitive advantage involves developing integrated relationships with other firms (Nyaga and Whipple 2011). According to CAS theory, CAS consist of agents that adapt to different interactions, and thus create super-additive (the value of the outcome(s) exceed the value of the input(s)) outcomes for the system. Integrated relationships require extensive interaction between agents of each party, and provide the opportunity for super-additive results. Each party's adaptability influences these interactions, and more adaptable firms (firms able to redesign themselves) will be better suited to form higher quality relationships, because each

party will be able to adapt to the needs of the other (to a reasonable extent). Therefore, the current research predicts that firm adaptability will enhance the quality of relationships.

Relationship quality can be defined as the strength of the ability of a relationship to meet the needs of the involved parties (Su et al. 2008). In practice, firms cannot develop deep, collaborative relationships with every customer or vendor, so arms-length relationships can be considered 'good quality' relationships if they meet the needs of the parties involved (Naude and Buttle 2000). However, the measurement of relationship quality inherently assigns collaborative relationships a higher 'quality' because of the dimensions used to measure relationship quality. The extant literature conceptualizes the relationship quality construct as a second-order construct composed of first-order relationship behaviors. Relationship quality is a reflective construct, with different researchers studying different relationship dimensions. Common dimensions of relationship quality include atmosphere (Su et al. 2008), commitment (Nyaga and Whipple 2011; Ulaga and Eggert 2006), communication (Fynes, de Burca, and Voss 2005; Su et al. 2008), cooperation (Fynes, de Burca, and Voss 2005; Su et al. 2008), relationship adaptation (Fynes, de Burca, and Voss 2005; Su et al. 2008), satisfaction (Nyaga and Whipple 2011; Ulaga and Eggert 2006), and trust (Fynes, de Burca, and Voss 2005; Nyaga and Whipple 2011; Su et al. 2008; Ulaga and Eggert 2006).

Similar to Nyaga and Whipple's (2011) conceptualization of relationship quality, the current research includes commitment, trust, satisfaction, and relationship-specific investments as the first-order determinants of relationship quality. The commitment dimension of relationship quality measures the effort parties to a relationship will continue to invest in maintaining and improving the relationship. In high quality relationships, the parties are highly committed to each other. The trust dimension of relationship quality measures the belief that partners to a

relationship are truthful and honest. Trust helps to reduce uncertainty and opportunism by encouraging collaboration on goals and actions. In high quality relationships, the parties have high trust in each other. The satisfaction dimension of relationship quality measures the positive feelings parties feel about the other's ability to meet their needs and desires. Satisfaction encourages collaboration on goals and actions, and reduces the likelihood of a partner exiting the relationship. In high quality relationships, the parties are highly satisfied with each other. The relationship-specific investment dimension measures the amount of investments parties make in the relationship. Relationship-specific investments enhance the efficiency of and demonstrate commitment to the relationship by building interdependence between partners. In high quality relationships, the parties make relationship-specific investments.

**H<sub>9</sub>:** Firm adaptability is positively related to relationship quality.

### **Climate for Creativity**

Firm flexibility and adaptability describe the ability of a firm to take action and make changes necessary to remain competitive, respectively. In order for a firm to adapt, flexibility and slack resources are required (McKee, Varadarajan, and Pride 1989; Oktemgil and Greenley 1997). Slack resources offer managers an opportunity to try out different actions, and once committed to a course of action, change the organizational climate (the policies, practices, and procedures guiding employee behavior; Carr et al. 2003; Deshpande and Webster 1989) to adapt. While firm flexibility is predicted to enhance firm adaptability, the firm's climate for creativity may act as moderator of this relationship.

Climate for creativity, or a firm's expression of creative values within the organization, influences employees' expression of creativity. Climate for creativity represents the surface level

manifestation of a firm's creative culture (the firm's deep-rooted beliefs and values regarding creativity; Carr et al. 2003; Denison 1996). Interviews in chapter III indicated that all informants desire to nurture creativity within their organization (see pages 94 and 95). An organization with a climate strong in creativity supports and encourages employees to express creative ideas, even if the expressed ideas cannot be implemented in the organization. With appropriate rewards and support from management, employees will continue to share and express creative ideas even if their ideas cannot always be implemented. Creative ideas from employees can result in improvements to analysis processes, recycling, and information system management, to name a few.

The insights from the in-depth interviews in chapter III echo insights in the literature, that employees require a safe environment, which supports and rewards creative ideas, to feel confident expressing creative ideas (Amabile et al. 1996; West and Sacramento 2011). Supportive environments provide employees with resources (e.g., materials, time, information), rewards, and challenging work assignments to encourage creativity (Hoff 2014; Huber 1998; Mathisen and Einarsen 2004; Shalley, Zhou, and Oldham 2004). Supportive environments encourage creativity by providing employees with some freedom to collaborate on ideas, assume risks by combining knowledge in new ways and try out new ideas (Hill et al. 2015; Sacramento, Dawson, and West 2008; Sternberg, O'Hara, and Lubart 1997), and do not threaten employees with discipline or repercussions if a new idea fails (Rasulzada 2014). An organization's climate for creativity has the strongest impact on an individual employee's expression of creative behavior, more so than the employee's underlying characteristics such as curiosity or achievement (Rice 2006). Thus, organizational environments with a climate strong in creativity differentially enhance the adaptability of a firm by building firm flexibility through the creation

and testing of new ideas at various levels of the organization. Not all creative ideas will be successful, but experimenting with some provides a firm with practice on taking action, and adapting when necessary. Case study research with Japanese managers supports this argument, that a climate high in creativity enhances the flexibility of a firm, increasing the ability of the firm to adapt (Nonaka 1991).

**H<sub>10</sub>:** Climate for creativity exerts a positive moderating effect on the relationship between firm flexibility and firm adaptability.

A firm's climate for creativity describes how creativity is encouraged or discouraged through the use of policies and procedures. The firm's climate for creativity is predicted to moderate the relationship between firm adaptability and firm flexibility, but not the relationships between employee knowledge and decision-making. A firm's climate for creativity will not change the amount of knowledge or decision-making resources an employee has. Although employees would engage in the creative process within the climate for creativity, the two constructs describe different things. A better understanding of how participating in the creative process enhances employee knowledge is an extension of the current research left to future research.

## **Methodology**

### **Data Collection and Sample**

This essay utilizes a cross-sectional research design with data collected through online surveys completed by managers of product returns. The initial sampling frames consisted of Warehousing Education and Research Council (WERC) and Reverse Logistics Association (RLA) members. For the WERC group, a total of 4100 potential respondents were contacted. A



total of 34 responses were received, yielding a response rate of 0.8%. Respondents were offered a summary of the research results and a copy of a book for participating. For the RLA group, a total of 600 members were contacted. A total of 15 responses were received, yielding a response rate of 2.5%. Respondents were offered a summary of the research results and a chance to win an Amazon gift card for participating.

With these low response rates, the sampling frame was expanded to include members of the Reverse Logistics and Sustainability Council (RLSC) and a database of logistics and supply chain executives was purchased from the Council of Supply Chain Management Professionals (CSCMP). The RLSC agreed to post a link to the online survey on their website, and a total of 3 members responded (the actual response rate is unknown, since the number of members is unknown). The CSCMP database contained the names, email addresses, and company for 1653 potential respondents. A total of 49 responses were received, yielding a response rate of 3%. Respondents were offered a summary of the research results and a chance to win an Amazon gift card for participating.

For members of WERC, RLA and CSCMP, an initial email invitation was sent to members explaining the nature of the study. The email stated that the purpose of the study was to better understand the important components of managing product returns. The body of the email invitation contained a link to the survey. Respondents who chose to start the survey again saw information about the nature of the study and were provided with instructions for completing the survey. Follow-up reminder emails were sent approximately two and four weeks after the initial email to members of WERC and CSCMP. Reminder emails were not possible with RLA due to the size of the mailing. Members of RLSC were able to access the same invitation message on the association's website. The researcher took every effort to contact the person within each

organization responsible for product returns about the survey, however, some members indicated they had no experience with product returns. In some instances, members with no experience with product returns emailed the researcher and asked to forward the survey to the person within their organization with the correct experience.

### **Combining the Data Sets**

Data collected from CSCMP, RLA, RLSC and WERC were analyzed to ensure no significant differences existed between them. Responses from individuals from each group were compared. Mean differences of several scales were tested between the different groups. The results yielded no statistically significant differences ( $p > .05$ ). Therefore, all the data was combined and used as a single sample in further analysis.

### **Testing for Non-Response and Common Method Bias**

When collecting survey data, a potential bias can arise if differences exist between those people who did and did not respond to the survey. To evaluate the potential for non-response bias, a randomly selected subset of non-respondents received a shorter version of the main survey to answer. This shorter version of the survey contained questions relating to six constructs of interest and three demographic questions. The Mentzer and Flint (1997) procedure was used to test for non-response bias. Twenty-two people completed this shorter, non-response survey. Non-respondent data was compared to respondent data through multivariate analysis of variance and t-tests. These tests revealed no significant differences ( $p > .05$ ) on any of the construct or demographic questions. Based on these results, non-response bias appears to have little impact on the data.

When participants in a research study answer all study questions through a single medium, the potential for common method bias arises. The threat of common method bias was ruled out by running Harmon's one-factor t-test (Fuller et al. 2016; Podsakoff and Organ 1986). The unrotated principal components analysis yielded 11 factors with eigenvalues  $> 1$ , accounting for 81% of the variance. No single factor accounted for a majority of the variance (the highest one accounted for 31% of the variance). Alternatively, when the unrotated principal components analysis was constrained to only one factor, only 31% of the variance was explained by the single factor. The threat to validity associated with common method bias was minimized for survey respondents.

### **Measurement Scales**

The current research adapts existing scales to the product returns context to measure the focal constructs. All scales were adapted by reviewing the original scale and making adjustments to the wording of question and scale items, where necessary, to better fit the product returns context. Table 9 contains a summary of the measurement scales, scale items, and scale points used to measure the constructs in Essay II. 6-point scales were used for the majority of the studied variables to keep the number of scale points consistent.

*Pretest.* The modified scales for firm flexibility and firm adaptability were pre-tested to ensure reliable measurement. Due to the difficulty of recruiting participants for the main study, a MTurk pretest of these two scales was conducted with 50 respondents. MTurk respondents were screened to ensure they worked at least 20 hours a week. MTurk participants were not restricted to working only in product returns, since such a restriction was not necessary because the three scales tested ask questions about the firm in a broader context than product returns. Although it

would have been ideal to pretest these two scales on managers of product returns, the difficulty of recruiting such participants was prohibitive. Results of the pretests are discussed below, under the appropriate construct.

*Employee Knowledge.* Two measures of employee knowledge were collected. First, employee knowledge was measured in a way similar to Smith, Collins, and Clark (2005), by asking the respondent to rate the average time return employees have worked at the firm, in the industry, in product returns, and the average level of education return employees have completed. Second, respondents rated the average knowledge of return employees on four specific aspects of product returns management, such as knowledge of the information system. These ratings were captured on 6-point interval scales ranging from “No Knowledge” to “Complete Knowledge.”

*Employee Decision-Making Resources.* Employee decision-making resources was measured on a scale adapted from the 25-item self-ego depletion scale by Ciarocco et al. (2007). On the original scale, respondents rate the trueness of statements, such as ‘I feel mentally exhausted’ or ‘I feel sharp and focused,’ on seven-point scales ranging from “not true” to “very true.” The context of this scale was adapted to be consistent with processing product returns. The scale was also shortened to 9 items to prevent respondent fatigue on the main survey. Respondents rated items, such as ‘at the end of the workday, employees feel mentally exhausted,’ on 6-point Likert scales. A 6-point scale format was adopted to eliminate a neutral point instead of the original 7-point scale format.

*Task Difficulty.* Task difficulty was measured on a scale adapted from Withey, Daft, and Cooper (1983), which measures both the variety and the analyzability of a task. Respondents evaluated task variety by responding to statements, such as ‘employee work is repetitive,’ on 6-point frequency scales ranging from “Rarely: Less than 10% of the time” to “Most Always: More than 90% of the time.” Respondents evaluated task analyzability by responding to statements, such as ‘procedures to process product returns’ on 6-point interval scales ranging from “Not At All Developed” to “Completely Developed.”

*Returns Management Information System Speed and Customizability.* Respondents rated their firm’s returns management information system on two dimensions of the information system’s quality- speed and customizability. Information system speed and customizability were measured on scales adapted from Iivari’s (2005) service quality scale. Respondents evaluated the returns management information system speed by making assessments on descriptive items, such as ‘Please evaluate your employees’ ability to complete the required screens in your firm’s information system to disposition a product return,’ on 6-point semantic differential scales. The bipolar descriptors vary and are matched to each assessment. Respondents evaluated the returns management information system customizability by making assessments on descriptive items, such as ‘Please assess the ability of your firm to make modifications to the return’s management information system,’ on 6-point semantic differential scales. Again, the bipolar descriptors vary and are matched to each assessment.

*Firm Flexibility.* Firm flexibility was measured on a three-item scale adapted from Liu et al. (2013). Respondents rated statements, such as ‘employees can take action quickly when problems arise,’ on 6-point frequency scales ranging from “Rarely: Less than 10% of the time”

to “Most Always: More than 90% of the time.” Since employees are the agents of a firm’s flexibility, scale items focused on measuring the freedom employees have to be flexible.

*Pretest Results I.* For the pre-test, a factor analysis (principal components analysis with varimax rotation; Grawe, Daugherty, and Dant 2012; Zsidisin and Wagner 2010) was conducted on the items measuring employee freedom to respond quickly to problems as they arise. In the analysis, one eigenvalue greater than one was observed. Factor loadings ranged from .83 to .93 and the single factor extracted explains 79.9% of the variance in the firm flexibility construct. The results of the rotated factor matrix for firm flexibility are summarized in Table 6. The Cronbach alpha reliability estimate of .87 for firm flexibility exceeds the recommended .70 cutoff value, and provides satisfactory evidence of internal consistency of the scale (Hair et al. 2010; see Table 8 for the descriptive statistics about the scale).

Table 6. Factor Analysis for Firm Flexibility

Items	Flexibility
Employees can make adjustments to handle different problems.	.915
Employees are willing to make changes to respond to problems, if necessary.	.833
Employees can take action quickly when problems arise.	.931
	Cronbach $\alpha$ .870

*Firm Adaptability.* Firm adaptability was measured on a six-item scale adapted from Carmeli, Jones, and Binyamin (2015). Respondents rated agreement with statements, such as ‘my firm monitors the dynamics of our industry’ or ‘my organization is willing to make structural changes to remain competitive,’ on 6-point frequency scales ranging from “Rarely: Less than 10% of the time” to “Most Always: More than 90% of the time.”

*Pretest Results II.* A second factor analysis was conducted on the items measuring how well the firm can make structural changes to remain competitive. In the analysis, one eigenvalue greater than one was observed. Factor loadings ranged from .78 to .92 and the single factor explains 75.5% of the variance in the firm adaptability construct. The results of the rotated factor matrix for firm adaptability are summarized in Table 7. The Cronbach alpha reliability estimate of .93 for firm adaptability exceeds the recommended .70 cutoff value, and provides satisfactory evidence of the internal consistency of the scale (see Table 8 for the descriptive statistics about the scale). In this pretest, the means show that employees rated their firms higher on flexibility than adaptability. More spread was observed in the ratings of firm adaptability, than firm flexibility.

Table 7. Factor Analysis for Firm Adaptability

Items	Adaptability
My firm adapts to problems.	.914
My firm monitors the dynamics of our industry.	.802
My firm monitors environmental changes that may impact this firm.	.775
My firm is willing to make substantial changes to remain competitive.	.895
My firm is willing to make structural changes to remain competitive.	.919
My firm solves complex problems.	.895
	Cronbach $\alpha$ .931

Discriminant validity was evaluated by comparing the square root of the variance-extracted estimate to the correlations between the factors (Fornell and Larcker 1981; Hatcher 1994). The square root of the variance extracted was .89 for firm flexibility and .87 firm adaptability, which both exceed the .16 correlation between the two factors (see Table 8). Additionally, both firm flexibility and firm adaptability showed variance-extractions (AVE) exceeding the recommended .5 cut-off to show discriminant validity (Fornell and Larcker 1981).

*Firm Performance.* Firm performance was captured through both objective and subjective measures, since some debate exists on the best way to capture performance data (Heffernan et al. 2009; Nyaga and Whipple 2011). Objective performance was measured through the overall employee turnover rate, turnover rate for employees of product returns and firm

Table 8. Correlations and Descriptive Statistics

	Firm Flexibility	Firm Adaptability
Firm Flexibility	<b>.89</b>	
Firm Adaptability	.16	<b>.87</b>
Mean	4.59	3.54
Standard Deviation	1.09	1.20

<sup>a</sup> SQRT(AVE) bolded and shown on the diagonal.

revenues. Subjective performance was measured on a three-item performance rating scale adapted from Nyaga and Whipple’s (2011) subjective performance scale. For example, respondents evaluated firm performance on ‘the amount of time it takes to process a return’ on a 6-point scale ranging from “Terrible: F letter grade” to “Outstanding: A+ letter grade.”

*Relationship Quality.* When evaluating relationship quality, respondents were asked to think of their firm’s experience with a recent customer. Prior to completing the relationship quality scales, respondents were asked to evaluate the overall importance of the customer on a 6-point scale ranging from “Worst Customer” to “Best Customer.” Relationship quality was measured on a sixteen-item scale adapted from Nyaga and Whipple’s (2011) relationship quality scale. The relationship quality scale has four sub-dimensions: commitment (three items), trust (five items), satisfaction (four items), and relationship-specific investments (four items). Respondents rated commitment statements, such as ‘my firm is \_\_\_\_\_ to continuing this relationship for a long time,’ on 6-point interval scales ranging from “Not At All Committed” to “Completely Committed.” Respondents rated trust statements, such as ‘my firm \_\_\_\_\_ our



relationship with this customer,’ on 6-point interval scales ranging from “Never Trusts” to “Completely Trusts.” Respondents rated satisfaction statements, such as ‘my firm \_\_\_\_\_ with the coordination of activities in this relationship,’ on 6-point interval scales ranging from “Not At All Satisfied” to “Completely Satisfied.” Respondents rated relationship-specific investment statements, such as ‘my firm is \_\_\_\_\_ in personnel dedicated to this relationship,’ on 6-point interval scales ranging from “Not At All Invested” to “Completely Invested.”

*Climate for Creativity.* Climate for creativity was measured on a six-item scale adapted from Amabile et al. (1996) and Heffernan et al. (2009). Respondents rated agreement with scale items, such as ‘my firm encourages employees to solve problems creatively’ on 6-point frequency scales ranging from “Rarely: Less than 10% of the time” to “Most Always: More than 90% of the time.”

Table 9. Summary of Adapted Scale Measures

Construct
<p><b>Employee Knowledge</b></p> <p>Please select the response that best describes your employees’ level of knowledge of the following items: (1 = No Knowledge, 6= Complete Knowledge; 4 items)</p> <ol style="list-style-type: none"> <li>1-The information system your firm uses to process product returns.</li> <li>2-Your firm’s procedures to process product returns.</li> <li>3-How to process your firm’s common product returns.</li> <li>4-How to process your firm’s uncommon product returns.</li> </ol>
<p><b>Employee Decision-Making Resources<sup>a</sup></b></p> <p>For each of the following work characteristics, please select the response that best expresses how often that characteristic describes your employees: (1= Strongly Disagree, 6 = Strongly Agree; 9 items)</p> <ol style="list-style-type: none"> <li>1-At the end of the work day, employees feel mentally exhausted.</li> <li>2-Processing product returns takes a lot of concentration.</li> <li>3-At the end of the work day, employees feel energetic.</li> <li>4-At the end of the work day, employees would find it difficult to plan ahead.</li> <li>5-At the end of the work day, employees feel sharp and focused.</li> </ol>

Table 9. (continued)

Construct
<p>6-At the end of the work day, employees could make an important decision.            7-When employees finish work, they appear fatigued.            8-During the work day, employees are receptive to new information.            9-During the work day, employees are receptive to new challenges.</p>
<p><b>Task Difficulty<sup>b</sup></b></p> <p><i>Task Exceptions</i>            Please select the response that best describes your employees' work: (1= Rarely: Less than 10% of the time, 6 = Most Always: More than 91% of the time; 2 items)            1-The tasks employees perform are similar from day-to-day.            2-Employee work is repetitive.</p> <p><i>Task Analyzability</i>            Please select the response that best describes how developed your firm's procedures are: (1= Not at all developed, 6 = Completely developed; 2 items)            1-Procedures to process product returns.            2-Procedures to analyze product returns.</p>
<p><b>Returns Management Information System Speed<sup>c</sup></b></p> <p>Please evaluate your employees' ability to access information in the information system your firm uses to manage product returns: (6 point semantic differential scales; 2 items)            1-Very difficult to access/Very easy to access            2-Very slow to access/Very quick to access</p> <p>Please evaluate your employees' ability to complete the required screens in your firm's information system to disposition a product return: (6 point semantic differential scales; 2 items)            1-Very easy to complete/Very difficult to complete (R)            2-Takes very little time to complete/Takes a lot of time to complete (R)</p> <p>Please evaluate the overall responsiveness of your firm's information system used to manage product returns: (6 point semantic differential scales; 2 item)            1-Very Slow/Very Quick            2-Very Good/Very Bad (R)</p>
<p><b>Returns Management Information System Customization<sup>c</sup></b> (6 point semantic differential scales; 4 items)</p> <p>Please evaluate the ability of your firm to make modifications to the information system used to manage product returns:            1-Very difficult to make/Very easy to make            2-Requires a lot of work/Requires very little work</p>

Table 9. (continued)

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Construct
3-Takes a very long time/Takes a very short time
Please evaluate your firm's information system used to manage product returns: 1-Very Rigid/Very Flexible
<b>Firm Flexibility<sup>d</sup></b>
Please select the response that best describes how frequently each of the following statements describe your employees: (1 = Rarely: Less than 10% of the time, 6 = Most Always: More than 90% of the time; 3 items)
1-Employees can make adjustments to handle different problems.
2-Employees are willing to make changes to respond to problems, if necessary.
3-Employees can take action quickly when problems arise.
<b>Firm Adaptability<sup>e</sup></b>
Please indicate your agreement or disagreement with the following items regarding your firm: (1 = Rarely: Less than 10% of the time, 6 = Most Always: More than 90% of the time; 6 items)
1-My firm adapts to problems.
2-My firm monitors the dynamics of our industry.
3-My firm monitors environmental changes that may impact this firm.
4-My firm is willing to make substantial changes to remain competitive.
5-My firm is willing to make structural changes to remain competitive.
6-My firm solves complex problems.
<b>Firm Performance<sup>g</sup></b>
<i>Objective Performance Measures</i>
Please select the response that best approximates your firm's overall employee turnover rate in 2014:
1- 0-5%
2- 6-10%
3- 11-15%
4- 16-20%
5- 21-30%
6- 31-40%
7- 41-50%
8- Over 50%
Please select the response that best approximates your firm's employee turnover rate in 2014 for employees working in product returns:
1- 0-5%
2- 6-10%
3- 11-15%

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Table 9. (continued)

Construct
4- 16-20%
5- 21-30%
6- 31-40%
7- 41-50%
<p>Please select the response that best approximates your firm's 2014 revenues:</p> <p>1- Less than \$25 million</p> <p>2- \$26 million to \$50 million</p> <p>3- \$51 million to \$100 million</p> <p>4- \$101 million to \$250 million</p> <p>5- \$251 million to \$500 million</p> <p>6- \$501 million to \$1 billion</p> <p>7- More than \$1 billion</p>
<p>In the space provided, please type your firm's approximate market share:</p>
<p>In the space provided, please approximate your firm's product return costs, as a percentage of total costs:</p>
<p><i>Subjective Performance</i> (1 = Terrible: F letter grade, 6 = Outstanding: A+ letter grade; 3 items)</p> <p>Please select the response that best describes how your firm performs in each of the following areas:</p> <p>1-The amount of time it takes to process a return</p> <p>2-The value recovered from returned products</p> <p>3-The overall return rate</p>
<p><b>Relationship Quality<sup>f</sup></b></p>
<p><i>Commitment:</i></p> <p>For each of the following statements, please select the response that best completes each statement: (1- Not at all committed/6- Completely committed; 3 items)</p> <p>1-My firm is _____ to continuing this relationship for a long time.</p> <p>2-My firm is _____ to this customer.</p> <p>3-My firm is _____ to strengthening this relationship over time.</p>
<p><i>Trust:</i></p> <p>For each of the following statements, please select the response that best completes each statement: (1- Never trusts/6- Completely trusts; 5 items)</p> <p>1-My firm _____ our relationship with this customer.</p> <p>2-My firm _____ this customer to keep the promises it makes to us.</p> <p>3-My firm _____ the knowledge this customer brings to the relationship.</p> <p>4-My firm _____ this customer to keep our best interests in mind.</p> <p>5-My firm _____ this customer.</p>

Table 9. (continued)

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Construct

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*Satisfaction:*

For each of the following statements, please select the response that best completes each statement: (1- Not at all satisfied/6- Completely satisfied; 4 items)

- 1-My firm \_\_\_\_\_ with the coordination of activities in this relationship.
- 2-My firm is \_\_\_\_\_ with the level of commitment in this relationship.
- 3-My firm is \_\_\_\_\_ with the level of information sharing in this relationship.
- 4-My firm is \_\_\_\_\_ with the management of activities in this relationship.

*Relationship-specific investments:*

For each of the following statements, please select the response that best completes each statement: (1- Not invested at all/6- Completely invested; 4 items)

- 1-My firm is \_\_\_\_\_ in personnel dedicated to this relationship.
- 2-My firm is \_\_\_\_\_ in proprietary expertise to this relationship.
- 3-My firm is \_\_\_\_\_ in proprietary technology to this relationship.
- 4-My firm is \_\_\_\_\_ in investments to this relationship.

**Climate for Creativity<sup>g</sup>**

Please select the response that best describes how frequently each of the following activities occur in your work place: (1 = Rarely: Less than 10% of the time, 6 = Most Always: More than 90% of the time; 6 items)

- 1-My firm encourages employees to solve problems creatively.
- 2-My firm encourages employees to think up new ideas.
- 3-My firm encourages employees to take risks to solve problems.
- 4-Top management encourages employees to be creative.
- 5-My firm recognizes creative ideas from employees.
- 6-My firm rewards creative ideas from employees.

**Additional Questions:**

1-In the space provided, please type the name of the information system your firm uses to manage product returns:

2-Please select the response that best represents the age of your firm's information system used to manage product returns:

- Less than 5 years old/5-10 years old/11-15 years old/16-20 years old/more than 20 years old

3-Please select the response that best describes your firm:

- Distributor/Manufacturer/Retailer/Third Party Service Provider/Supplier/Wholesaler/Other (please specify)

4-Please select the response that best describes your firm's primary industry:

- Aviation or Airline/Automotive and Transport Equipment/Building Materials and Lumber Products/Chemicals and Plastics/Clothing and Textiles/Construction, Farm and
-

Table 9. (continued)

Construct
Garden/Department Store or General Merchandise/Electronics and Related Instruments/Food and Beverage/Furniture/Hardware/Machine Tools and Machinery/Metal Products/Mining and Materials/Office Equipment and Supplies/Paper and Related Products/Petroleum and Petrochemicals/Pharmacy, Drugs and Toiletries/ Other, please specify
5-Please select the category that best describes your firm: <ul style="list-style-type: none"> <li>Domestic/International/Both domestic and international operations</li> </ul>
6-Please select the response that best approximates how many years you've worked at your firm: <ul style="list-style-type: none"> <li>Less than one year/1-4 years/5-9 years/10-14 years/15-19 years/20-24 years/25-29 years/30 or more years</li> </ul>
7-Please select the response that best approximates how many years you have worked in your industry: <ul style="list-style-type: none"> <li>Less than one year/1-4 years/5-9 years/10-14 years/15-19 years/20-24 years/25-29 years/30 or more years</li> </ul>
8-Please select the response that best approximates how many years you have worked in product returns: <ul style="list-style-type: none"> <li>Less than one year/1-4 years/5-9 years/10-14 years/15-19 years/20-24 years/25-29 years/30 or more years</li> </ul>
9-Please indicate the highest level of education you have completed: <ul style="list-style-type: none"> <li>Professional Degree (JD, MD)/Doctoral Degree/Masters Degree/4-year College Degree/2-year College Degree/Some College/High School/GED/Less than High School</li> </ul>
10-In the space provided, please type your current job title:
11-In the space provided, please type the name of your company:
12-Please indicate your gender: <ul style="list-style-type: none"> <li>Male/Female</li> </ul>
13-Please select the category that represents your current age: <ul style="list-style-type: none"> <li>Less than 18/18 to 24/25 to 34/35 to 44/45 to 54/55 to 64/65 or over</li> </ul>
<sup>a</sup> Adapted from Ciarocco et al. 2007
<sup>b</sup> Adapted from Withey, Daft and Cooper 1983
<sup>c</sup> Adapted from Iivari 2005
<sup>d</sup> Adapted from Liu et al. 2013
<sup>e</sup> Adapted from Carmeli, Jones and Binyamin 2015
<sup>f</sup> Adapted from Nyaga and Whipple 2011
<sup>g</sup> Adapted from Amabile et al. 1996

## Analysis

Utilizing a structural equation modeling (SEM) technique to analyze the conceptual framework shown in Figure 2 would be desirable due to the ability of SEM to estimate variable relationships and account for measurement error (Hair et al. 2010). However, due to the low response rate, the researcher was unable to collect a sufficient sample size to justify SEM analysis. Instead, the researcher will use a series of regression equations to estimate relationships between variables. One potential limitation of a regression approach is the inability of the researcher to account for measurement error (Hair et al. 2010).

*Reliability and Validity.* Before proceeding with hypotheses tests, several statistical tests were performed to check for any non-normality or heteroscedasticity issues. The normality of the data was checked by looking for outliers and for normally distributed residuals (visually checked through histogram and normal P-P plots of standardized residuals). The firm adaptability construct had one outlier, however, this outlier was retained as the residual plots still appeared to be normally distributed. The homoscedasticity of the data was verified by inspecting a scatterplot of regression standardized residuals against regression standardized predicted values. No instances of heteroscedasticity were detected. Thus, the data appear to be normally distributed and meet the assumptions for regression analysis.

Factor analyses were performed to assess the reliability and dimensionality of the constructs. Principal components factor analysis with an orthogonal Varimax rotation was used to extract the factors (Grawe, Daugherty and Dant 2012; Jack, Powers and Skinner 2010; Zsidisin and Wagner 2010).

*Employee Knowledge.* The first factor analysis was conducted on the items measuring different types of employee knowledge. In the analysis, only one eigenvalue greater than one was observed, suggesting a uni-dimensional construct. Factor loadings on the single factor ranged from .88 to .94, and together form the *employee knowledge* construct. The single factor extracted explains 88.4% of the variance. The results of the rotated factor matrix for employee knowledge are summarized in Table 10. The Cronbach alpha reliability estimate of .93 for the single factor exceeds the recommended .70 cutoff value, and provides satisfactory evidence of the internal consistency of the scale (Hair et al. 2010). For the analysis, an averaged employee knowledge scale was created (see Table 20 for the descriptive statistics about the scale). Averaged scales were created to aid in interpretability of the scales, by retaining the original scale points (e.g., if a respondent gave 2.2, 3.4, 5.1, and 3.9 ratings for the four facets of employee knowledge, the average value of 3.65 is more interpretable in the original scale points than the summated value of 14.6).

Table 10. Factor Analysis for Employee Knowledge

Items	Knowledge
The information system your firm uses to process product returns.	.899
Your firm's procedures to process product returns.	.943
How to process your firm's common product returns.	.928
How to process your firm's uncommon product returns.	.881
	Cronbach $\alpha$ .932

*Employee Decision-Making Resources.* The second factor analysis was conducted on the items measuring employees' available attention and mental processing capacity. In the analysis, three eigenvalues greater than one were observed. Factor loadings on these three factor ranged from .55 to .87, and together form the *employee decision-making resources*



construct. The first factor extracted representing the employee's energy level explains 35.4% of the variance, the second factor extracted representing the employee's ability to concentrate/pay attention explains 20.2% of the variance, and the third factor extracted describing the employees level of exhaustion explains 12.3% of the variance, for a cumulative total of 67.9% of the variance of the employee decision-making resources construct explained. The results of the rotated factor matrix for employee decision-making resources are summarized in Table 11. The Cronbach alpha reliability estimate of .85 for the first factor and .74 for the third factor exceed the recommended .70 cutoff

Table 11. Factor Analysis for Employee Decision-Making Resources

Items	Energy Level	Attention	Exhaustion
At the end of the work day, employees feel energetic.	.873	.241	-.108
At the end of the work day, employees feel sharp and focused.	.841	.268	-.134
Processing product returns takes a lot of concentration.	-.199	.727	.218
During the work day, employees are receptive to new information.	.291	.758	-.087
During the work day, employees are receptive to new challenges.	.344	.702	-.180
At the end of the work day, employees could make an important decision.	.225	.551	-.053
At the end of the day, employees feel mentally exhausted.	-.432	.150	.727
At the end of the work day, employees would find it difficult to plan ahead.	.267	-.160	.828
When employees finish work, they appear fatigued.	-.318	-.032	.762
Cronbach $\alpha$	.851	.655	.740

value, and provides satisfactory evidence of the internal consistency of the scale for those two factors. The Cronbach alpha reliability estimate of .66 for the second factor falls below the recommended .70 cutoff value, however, these items will be retained. For the

analysis, an averaged decision-making resources scale was created (see Table 20 for the descriptive statistics about the scale).

*Task Difficulty.* The third factor analysis was conducted on the items measuring how easy or difficult it is for employees to process product returns. In the analysis, two eigenvalues greater than one were observed. Factor loadings on these two factor ranged from .90 to .93, and together form the *task difficulty* construct. The first factor extracted representing task analyzability explains 42.9% of the variance and the second factor extracted representing task variety explains 41.6% of the variance, for a cumulative 84.5% of the variance of the task difficulty construct explained. The results of the rotated factor matrix for task difficulty are summarized in Table 12. The Cronbach alpha reliability estimate of .82 for task analyzability and .79 for task variety exceed the recommended .70 cutoff value, and provides satisfactory evidence of the internal consistency of the scale. For the analysis, an averaged task difficulty scale was created (see Table 20 for the descriptive statistics about the scale).

Table 12. Factor Analysis for Task Difficulty

Items	Analyzability	Variety
Procedures to process product returns.	.916	.109
Procedures to analyze product returns.	.925	-.004
The tasks employees perform are similar from day-to-day.	-.029	.916
Employee work is repetitive.	.135	.902
	Cronbach $\alpha$	.793

*Returns Management Information System Speed.* The fourth factor analysis was conducted on the items measuring how quickly employees can complete the steps and screens to process product returns. In the analysis, two eigenvalues greater than one were

observed. Factor loadings on the two factors ranged from .69 to .89 and together form the *returns management information system speed* construct. The first factor extracted describing how easily employees can access information in the RMIS explains 42.2% of the variance, and the second factor extracted describing the responsiveness of the RMIS to completing the screens explains 25.1% of the variance, for a cumulative total of 67.3% of the variance of the returns management information system speed construct explained. The results of the rotated factor matrix for returns management information system speed are summarized in Table 13. The Cronbach alpha reliability estimate of .79 for the first factor exceeds the recommended .70 cutoff value, while the .68 reliability estimate for the second factor falls slightly below this cutoff. These results provide some evidence of an internally consist scale. Although future research refining and improving the internal reliability of this scale is desirable, all scale items are retained in the current research. For the analysis, an averaged returns management information system speed scale was created (see Table 20 for the descriptive statistics about the scale).

Table 13. Factor Analysis for Returns Management Information System Speed

Items	Accessibility	Responsiveness
Very difficult to access/Very easy to access	.891	.070
Very slow to access/Very quick to access	.870	.194
Very slow/Very quick	.722	.009
Very easy to complete/Very difficult to complete	-.061	.805
Takes very little time to complete/Takes a lot of time to complete	.065	.818
Very good/Very bad	.342	.692
	Cronbach $\alpha$	.792
		.680

*Returns Management Information System Customization.* The fifth factor analysis was conducted on the items measuring how easy or difficult it is for the firm to change the structure of the returns management information system employees use to process

product returns. In the analysis, one eigenvalue greater than one was observed. Factor loadings on this single factor ranged from .85 to .93 and form the *returns management information system customization* construct. The single factor extracted explains 80.4% of the variance in the returns management information system customization construct. The results of the rotated factor matrix for returns management information system customization are summarized in Table 14. The Cronbach alpha reliability estimate of .92 exceeds the recommended .70 cutoff value, and provides satisfactory evidence of the

Table 14. Factor Analysis for Returns Management Information System Customization

<b>Items</b>	<b>Customization</b>
Very difficult to make/Very easy to make	.932
Requires a lot of work/Requires very little work	.889
Takes a very long time/Takes a very short time	.912
Very rigid/Very flexible	.851
	Cronbach $\alpha$ .918

internal consistency of the scale. For the analysis, an averaged returns management information system customization scale was created (see Table 20 for the descriptive statistics about the scale).

*Firm Flexibility.* The sixth factor analysis was conducted on the items measuring how much freedom employees have to respond quickly to problems as they arise. In the analysis, one eigenvalue greater than one was observed. Factor loadings on this factor ranged from .83 to .93 and form the *firm flexibility* construct. The single factor extracted explains 76.3% of the variance in the firm flexibility construct. The results of the rotated factor matrix for firm flexibility are summarized in Table 15. The Cronbach alpha reliability estimate of .84 for firm flexibility exceeds the recommended .70 cutoff value, and provides satisfactory evidence of the internal consistency of the scale. For the

analysis, an averaged firm flexibility scale was created (see Table 20 for the descriptive statistics about the scale).

Table 15. Factor Analysis for Firm Flexibility

Items	Flexibility
Employees can make adjustments to handle different problems.	.927
Employees are willing to make changes to respond to problems, if necessary.	.864
Employees can take action quickly when problems arise.	.826
Cronbach $\alpha$	
	.844

*Firm Adaptability.* The seventh factor analysis was conducted on the items measuring how well the firm can make structural changes to remain competitive. In the analysis, one eigenvalue greater than one was observed. Factor loadings on this factor ranged from .76 to .88 and form the *firm adaptability* construct. The single factor extracted explains 72.3% of the variance in the firm adaptability construct. The results of the rotated factor matrix for firm adaptability are summarized in Table 16. The Cronbach alpha reliability estimate of .92 for firm adaptability exceeds the recommended .70 cutoff value, and

Table 16. Factor Analysis for Firm Adaptability

Items	Adaptability
My firm adapts to problems.	.883
My firm monitors the dynamics of our industry.	.848
My firm monitors environmental changes that may impact this firm.	.760
My firm is willing to make substantial changes to remain competitive.	.849
My firm is willing to make structural changes to remain competitive.	.881
My firm solves complex problems.	.875
Cronbach $\alpha$	
	.921

provides satisfactory evidence of the internal consistency of the scale. For the analysis, an averaged firm adaptability scale was created (see Table 20 for the descriptive statistics about the scale).

*Subjective Organizational Performance.* The eighth factor analysis was conducted on the items measuring respondents' subjective perceptions on how well the firm performs on various tasks related to returns. In the analysis, one eigenvalue greater than one was observed. Factor loadings on this factor ranged from .76 to .81 and form the *subjective performance* construct. The single factor extracted explains 62.3% of the variance in the subjective performance construct. The results of the rotated factor matrix for subjective performance are summarized in Table 17. The Cronbach alpha reliability estimate of .70

Table 17. Factor Analysis for Subjective Performance

Items	Performance
Procedures to process product returns.	.795
Procedures to analyze product returns.	.808
The overall return rate.	.763
Cronbach $\alpha$	.696

for subjective performance provides some evidence of the internal consistency of the scale. For the analysis, an averaged subjective performance scale was created (see Table 20 for the descriptive statistics about the scale).

*Relationship Quality.* The ninth factor analysis was conducted on the items measuring the strength of the relationship between a firm and its customer. In the analysis, three eigenvalues greater than one were observed. Factor loadings on these three factor ranged from .68 to .89, and together form the *relationship quality* construct. The first factor extracted (representing trust and satisfaction) explains 37.9% of the variance, the second factor extracted (representing relationship investments) explains 23.5% of the variance, and the third factor extracted (representing commitment) explains 20.0% of the variance,

for a cumulative 81.0% of the variance of the relationship quality construct explained.

The results of the rotated factor matrix for relationship quality are summarized in Table

18. The Cronbach alpha reliability estimate of .86 for trust and satisfaction, .93 for

relationship investments and .95 for commitment exceed the recommended .70 cutoff

Table 18. Factor Analysis for Relationship Quality

Items	Trust & Satisfaction	Relationship Investments	Commitment
My firm _____ our relationship with this customer.	.809	.320	.241
My firm _____ this customer to keep the promises it makes to us.	.824	.177	.230
My firm _____ the knowledge this customer brings to the relationship.	.867	.157	.233
My firm _____ this customer to keep our best interests in mind.	.860	.110	.181
My firm _____ this customer.	.820	.352	.149
My firm _____ with the coordination of activities in this relationship.	.677	.486	.196
My firm is _____ with the level of commitment in this relationship.	.727	.381	.319
My firm is _____ with the level of information sharing in this relationship.	.710	.333	.210
My firm is _____ with the management of activities in this relationship.	.704	.433	.236
My firm is _____ in personnel dedicated to this relationship.	.212	.761	.399
My firm is _____ in proprietary expertise to this relationship.	.319	.780	.378
My firm is _____ in proprietary technology to this relationship.	.288	.866	.120
My firm is _____ in investments to this relationship.	.350	.816	.120
My firm is _____ to continuing this relationship for a long time.	.233	.264	.888
My firm is _____ to this customer.	.274	.263	.877
My firm is _____ to strengthening this relationship over time.	.304	.222	.869
Cronbach $\alpha$	.957	.925	.951

value, and provides satisfactory evidence of the internal consistency of the scale. Trust and satisfaction loaded on the same factor. The factor loadings for satisfaction are lower than the factor loading for trust (although all but one item meet the .7 cutoff value) and show some signs of cross-loading with relationship investments. For the analysis, an averaged relationship quality scale was created based on the trust, relationship investments and commitment items only (see Table 20 for the descriptive statistics about the scale).

*Climate for Creativity.* The tenth factor analysis was conducted on the items measuring a firm's policies and procedures regarding creativity in the workplace. In the analysis, one eigenvalue greater than one was observed. Factor loadings on this factor ranged from .82 to .94 and form the *climate for creativity* construct. The single factor extracted explains 80.1% of the variance in the climate for creativity construct. The results of the rotated factor matrix for climate for creativity are summarized in Table 19. The Cronbach alpha reliability estimate of .95 for climate for creativity exceeds the recommended .70 cutoff value, and provides satisfactory evidence of the internal consistency of the scale. For the

Table 19. Factor Analysis for Climate for Creativity

Items	Creativity
My firm encourages employees to solve problems creatively.	.935
My firm encourages employees to think up new ideas.	.944
My firm encourages employees to take risks to solve problems.	.815
Top management encourages employees to be creative.	.878
My firm recognizes creative ideas from employees.	.910
My firm rewards creative ideas from employees.	.880
	Cronbach $\alpha$ .947

analysis, an averaged climate for creativity scale was created (see Table 20 for the descriptive statistics about the scale).



Discriminant validity was evaluated by comparing the square root of the variance-extracted estimate to the correlations between the factors (Fornell and Larcker 1981; Hatcher 1994). For all 10 variables included in the current research, the square root of the variance extracted exceeded the correlations with other variables (see Table 20). The correlations observed between the majority of the constructs were small to moderate. Only seven large correlations were observed (between Task Difficulty-Employee Knowledge, Firm Adaptability-Firm Flexibility, and Firm Adaptability-Climate for Creativity, Subjective Performance-Firm Adaptability, Subjective Performance-Relationship Quality, Subjective Performance-Climate for Creativity, Climate for Creativity-Relationship Quality). Additionally, the variance-extracted (AVE) for all constructs exceeds the recommended .5 cut-off to show discriminant validity (Fornell and Larcker 1981).

Table 20. Correlations and Descriptive Statistics<sup>a</sup>

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)Know	<b>.91</b>									
(2)EDMR	.28**	<b>.80</b>								
(3)TD	.55**	.15	<b>.91</b>							
(4)RMISS	.43**	.07	.32**	<b>.85</b>						
(5)RMISC	.23*	.08	.15	.43**	<b>.90</b>					
(6)FFlex	.20*	.50**	.22*	.20*	.21*	<b>.87</b>				
(7)FAadapt	.17	.32*	.30**	.41**	.15	.49**	<b>.85</b>			
(8)SPerf	.33**	.12	.19	.45**	.32**	.25*	.47**	<b>.79</b>		
(9)RIQI	.16	.25*	.26*	.16	.10	.38**	.55**	.37**	<b>.84</b>	
(10)CC	.18	.43**	.14	.32**	.28**	.53**	.60**	.30**	.52**	<b>.89</b>
Mean	4.42	3.88	4.31	4.04	2.79	3.82	4.16	3.79	4.35	3.90
Standard deviation	1.07	.47	.83	.81	1.25	1.28	1.25	.87	.84	1.34

<sup>a</sup>SQRT(AVE) bolded along the diagonal

\*Significant at the .05 level.

\*\*Significant at the .01 level.

## Results

### Respondent Demographics

Of the total 102 respondents, manufacturers represented the largest group (38.6%), followed by distributors (20.8%), retailers (14.9%), and third-party service providers (10.9%). Respondents came from a variety of industries, including the electronics (13.9%), food and beverage (13.9%), clothing (5.9%), chemicals/plastics (5.9%), and pharmacy/toiletries (5%) industries. The majority of respondents conduct business in both domestic and international markets (66.3%), or just domestic markets (27.7%). Respondents indicated the use of a broad variety of returns management information systems. Some of the more frequently mentioned RMIS include SAP (26), custom built systems (15), Oracle (4), AS400 (2), Evolve (2), and Manhattan Associates (2). Two respondents indicated they use no RMIS, and instead use Excel to manage product returns. In regards to the age of the RMIS, 35.6% of respondents use a 5-10 year old system, and 31.7% use a system less than 5 years old.

In terms of general demographic characteristics, 89.9% of respondents were males. 38.4% of respondents were between the ages of 45 to 54, 26.3% of respondents were between the ages of 55 to 64, and 19.2% of respondents were between the ages of 35 to 44. 35.4% of respondents have completed a master's degree, and 39.4% of respondents have completed an undergraduate college degree.

### **Hypotheses Tests**

Multiple regression analysis, hierarchical multiple regression analysis, moderated multiple regression analysis, and moderated mediation regression analysis were used to test the hypotheses (See Tables 21 thru 34). First, in order to test the linear relationships between the employee component (employee knowledge and employee decision-making resources), the returns management information system component (speed and customization), and firm

Table 21. Regression Model 1 Summary Statistics

Model	Sum of Squares	df	Mean Square	F	Sig.	R <sup>2</sup>
Regression	43.47	4	10.87	8.71	.00	.28
Residual	112.33	90	1.25			
Total	155.79	94				

flexibility, the employee and RMIS component variables were regressed on the firm flexibility variable in model 1 (See Tables 21 and 22).

The standardized regression coefficient for employee decision-making resources is statistically significant ( $p < .05$ ), while the coefficients for employee knowledge and the RMIS component are statistically non-significant ( $p > .05$ ). The regression results show evidence of a positive relationship between employee decision-making resources usage and firm flexibility, meaning that as employee decision-making resources are consumed, firm flexibility increases. The standardized regression coefficients for alternative measures of employee knowledge (tenure at the firm, tenure in the industry, tenure in product returns, and education) were also statistically non-significant ( $p > .05$ ). This study finds support for H2, but fails to find support for H1, H5,

Table 22. Parameter Estimates of Regression Model 1

Terms	Dependent Variable: Firm Flexibility					
	Unstandardized Beta	SE	Standardized Beta	t	p-value	
Intercept	-2.47	1.10		-2.25	.03	
H1: KNOW	-.09	.13	-.07	-.67	.51	
H2: EDMR	1.40	.26	.50	5.31	.00	
H5: RMISS	.26	.18	.17	1.50	.14	
H6: RMISC	.05	.11	.05	.46	.65	

and H6. Since a main effect for employee knowledge was not found, the moderating effect of task difficulty predicted in H3 is not supported. To test the moderating effect of task difficulty on employee decision-making resources predicted in H4, hierarchical regression analysis was run

Table 23. Regression Model 1 with Interaction Summary Statistics

Model	Sum of Squares	df	Mean Square	F	Sig.
<i>Main Effects Model</i>					
Regression	43.47	4	10.87	8.71	.00
Residual	112.33	90	1.25		
Total	155.80	94			
<i>Interaction Effects Model</i>					
Regression	45.98	5	9.20	7.45	.00
Residual	109.81	89	1.23		
Total	155.79	94			

on model 1 with the interaction term between employee decision-making resources and task difficulty (see Tables 23 and 24). Evidence of a moderating relationship would appear through a significant increase of variance explained ( $R^2$ ) when entering the interaction term into the model (Hair et al. 2010). The

Table 24. Parameter Estimates of Regression Model 1 with Interaction

Variable	Model Coefficients					Model Summary			
	UnStd. Beta	SE	Std. Beta	t	Sig.	F	$R^2_a$	$R^2$ Change	F value of $R^2$ Change
<i>Main Effects Model</i>						8.71**	.25	.25	8.71**
Intercept	-2.47	1.10		-2.25	.03				
H1: KNOW	-.09	.13	-.07	-.67	.51				
H2: EDMR	1.40	.26	.50	5.31	.00				
H5: RMISS	.26	.18	.17	1.50	.14				
H6: RMISC	.05	.11	.05	.46	.65				
<i>Interaction Effects Model</i>						7.45**	.26	.01	2.04
Intercept	-1.94	1.15		-1.68	.10				
H1: KNOW	-.19	.15	-.15	-1.26	.21				
H2: EDMR	1.13	.32	.41	3.48	.00				
H4: EDMR x TDiff.	.06	.04	.20	1.43	.16				
H5: RMISS	.24	.18	.16	1.38	.17				
H6: RMISC	.05	.11	.04	.44	.67				

\*\* Significant at the .01 level.

regression coefficient for the interaction term was statistically non-significant ( $p > .05$ ), failing to find support for H4.

Table 25. Regression Model 2 Summary Statistics

Model	Sum of Squares	df	Mean Square	F	Sig.
<i>Main Effects Model</i>					
Regression	58.20	2	29.10	30.56	.00
Residual	89.52	94	.95		
Total	147.72	96			
<i>Interaction Effects Model</i>					
Regression	58.20	3	19.40	20.16	.00
Residual	89.52	93	.96		
Total	147.72	96			

Second, to test the linear relationship between firm flexibility, firm adaptability, and the potential moderating role of the firm's climate for creativity, a hierarchical regression analysis was run (results displayed in Tables 25 and 26). The standardized regression coefficient for firm flexibility is statistically significant in the main effects model with a standardized parameter estimate of .49 ( $p < .001$ ). This provides support for H7 that firm flexibility is positively related to firm adaptability.

Table 26. Regression Model 2 Summary

Variable	Model Coefficients					Model Summary			
	UnStd. Beta	SE	Std. Beta	t	Sig.	F	R <sup>2</sup> <sub>a</sub>	R <sup>2</sup> Change	F value of R <sup>2</sup> Change
<i>Main Effects Model</i>						30.56***	.38	.39	30.56***
Intercept	1.56	.36		4.37	.00				
H7: Flexibility	.25	.09	.25	2.68	.01				
C. Creativity	.43	.09	.46	4.88	.00				
<i>Interaction Effects Model</i>						20.12***	.37	.00	.00
Intercept	1.56	.75		2.09	.04				
Flexibility	.25	.22	.25	1.14	.26				
C. Creativity	.43	.21	.46	2.02	.05				
H10: E. Flexibility X C.Creativity	.00	.05	.00	.00	.99				

\*\*\* Significant at the .001 level.

Evidence of a moderating relationship would appear through a significant increase of variance explained ( $R^2$ ) when entering the interaction term into the model (Hair et al. 2010). The results of the interaction effects model do not support H10. Instead of acting as a moderator, as

predicted, the firm's climate for creativity shows a statistically significant ( $p < .001$ ) positive main effect on firm adaptability.

Third, to test the linear relationship between firm adaptability and firm performance, a series of regression analyses were run (See Tables 27 and 28). Since some debate exists regarding the best way to measure performance data, with some authors arguing for traditional, objective performance (e.g., revenues) measures (Heffernan et al. 2009), and other authors arguing for subjective performance measures (Nyaga and Whipple 2011), both were tested in the current research. Models 3-6 describe the results of the analyses.

Regression Model 3 tested the linear relationship between firm adaptability and the firm's

Table 27. Regression Models 3-6 Summary Statistics

Model	Sum of Squares	df	Mean Square	F	Sig.	R <sup>2</sup> <sub>a</sub>
<i>Model 3: Turnover Overall</i>						
Regression	.86	1	.86	.41	.52	-.01
Residual	203.77	97	2.10			
Total	204.63	98				
<i>Model 4: Turnover Returns</i>						
Regression	4.74	1	4.74	1.70	.20	.01
Residual	270.90	97	2.79			
Total	275.64	98				
<i>Model 5: Revenue</i>						
Regression	6.42	1	6.42	1.29	.26	.01
Residual	482.31	97	4.97			
Total	488.73	98				
<i>Model 6: Subjective Performance</i>						
Regression	16.79	1	16.79	27.64	.00	.21
Residual	58.92	97	.61			
Total	75.71	98				

overall turnover rate. The standardized regression coefficient of  $-.07$  was non-significant ( $p > .50$ ). Regression Model 4 tested the linear relationship between firm adaptability and the firm's turnover rate in the product returns area only. The standardized regression coefficient of  $-.13$  was

non-significant ( $p = .20$ ). Regression Model 5 tested the linear relationship between firm adaptability and the firm's revenues. The standardized regression coefficient of .12 was non-significant ( $p > .20$ ). The results of the regression Models 3 thru 5 fail to provide evidence for  $H_{8a}$  of a linear relationship between firm adaptability and objective firm performance.

Regression Model 6 tested the linear relationship between firm adaptability and respondents' subjective perception of firm performance. The standardized regression coefficient of .47 is statistically significant ( $p < .001$ ). This result provides evidence for  $H_{8b}$  and a positive relationship between firm adaptability and subjective firm performance.

Table 28. Parameter Estimates of Regression Models 3-6

Terms	Unstandardized Beta	SE	Standardized Beta	t	p-value
<i>Model 3: Turnover Overall</i>					
Intercept	2.96	.51		5.82	.00
Firm Adaptability	-.08	.12	-.07	-.63	.52
<i>Model 4: Turnover Returns</i>					
Intercept	2.79	.59		4.76	.00
Firm Adaptability	-.18	.14	-.13	-1.30	.20
<i>Model 5: Revenues</i>					
Intercept	3.97	.78		5.07	.00
Firm Adaptability	.21	.18	.12	1.14	.26
<i>Model 6: Subjective Performance</i>					
Intercept	2.42	.27		8.85	.00
Firm Adaptability	.33	.06	.471	5.26	.00

Fourth, to test the linear relationship between firm adaptability and relationship quality, a linear regression analysis was run (see Tables 29 and 30). The standardized regression

Table 29. Regression Model 7 Summary Statistics

Model	Sum of Squares	df	Mean Square	F	Sig.	$R^2$
Regression	20.49	1	20.49	40.58	.00	.29
Residual	48.47	96	.51			
Total	68.95	97				

coefficient of .55 is statistically significant ( $p < .001$ ) and provides evidence supporting H9 and a positive relationship between firm adaptability and relationship quality.

## Mediation

Using the Process macro in SPSS, post hoc tests were run to determine the extent of the mediating role of firm adaptability. All mediation analyses were conducted with

Table 30. Parameter Estimates of Regression Model 7

Terms	Dependent Variable: Relationship Quality				
	Unstandardized Beta	SE	Standardized Beta	t	p-value
Intercept	2.81	.25		11.25	.00
H9: Firm Adaptability	.37	.06	.55	6.37	.00

Model 4, and unstandardized effects were computed for 10,000 bootstrap samples at the 95% confidence level (Hayes 2013).

The first mediation test examines the relationship between firm flexibility and subjective performance with firm adaptability mediating the relationship. As Figure 3 and Table 31 illustrate, the standardized regression coefficient between firm flexibility and firm adaptability was statistically significant, as was the standardized regression coefficient between firm adaptability and subjective performance ( $p < .001$ ). The indirect effect of .14 is statistically different from zero, as revealed by a 95% BC bootstrap confidence interval that is entirely above zero (.07 to .23.,  $Z = 3.18$ ,  $p < .01$ ). This indirect effect of .14 means that two firms that differ by one unit of firm flexibility are estimated to differ by .14 units in subjective perceptions of firm performance as a result of those employees with more flexibility feeling their firm is more adaptable ( $a$  is positive), which in turn translates into a higher subjective performance rating ( $b$  is positive). Firm adaptability fully mediates the relationship between firm flexibility and subjective performance.



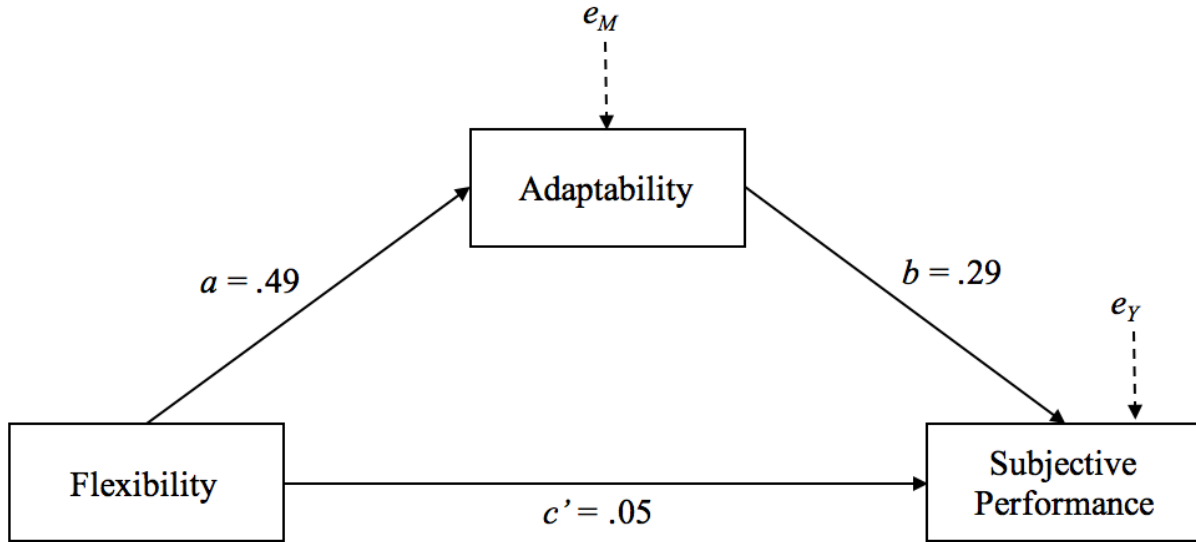


Figure 3. Mediation Model for Firm Flexibility, Firm Adaptability and Subjective Performance

The second mediation test examines the relationship between climate for creativity and subjective performance with firm adaptability mediating the relationship. As Figure 4 and Table 32 illustrate, the standardized regression coefficient between climate for creativity and firm adaptability was statistically significant, as was the standardized regression coefficient between

Table 31. Mediation Test for Firm Flexibility, Firm Adaptability and Subjective Performance

Antecedent		Consequent						
		M (F. Ada)			Y (S. Perf)			
		Coeff.	SE	<i>p</i>		Coeff.	SE	<i>p</i>
<i>X</i> (E. Flex)	<i>a</i>	.49	.09	.00	<i>c'</i>	.05	.07	.50
<i>M</i> (F. Ada)		--	--	--	<i>b</i>	.29	.07	.00
<i>Constant</i>	<i>i</i> <sub>1</sub>	2.32	.36	.00	<i>i</i> <sub>2</sub>	2.40	.31	.00
				$R^2 = .24$				
				$F(1, 95) = 30.11, p < .001$				
					$R^2 = .21$			
					$F(2, 94) = 12.35, p < .001$			

firm adaptability and subjective performance ( $p < .001$ ). The indirect effect of .18 is statistically different from zero, as revealed by a 95% BC bootstrap confidence interval that is entirely above zero (.09 to .29.,  $Z = 3.53, p < .001$ ). This indirect effect of .18 means that two firms that differ by one unit of climate for creativity are estimated to differ by .18 units in subjective perceptions

of firm performance as a result of those firms with more creative climates feeling their firm is more adaptable ( $a$  is positive), which in turn translates into a higher subjective performance rating ( $b$  is positive). Firm adaptability fully mediates the relationship between climate for creativity and subjective performance.

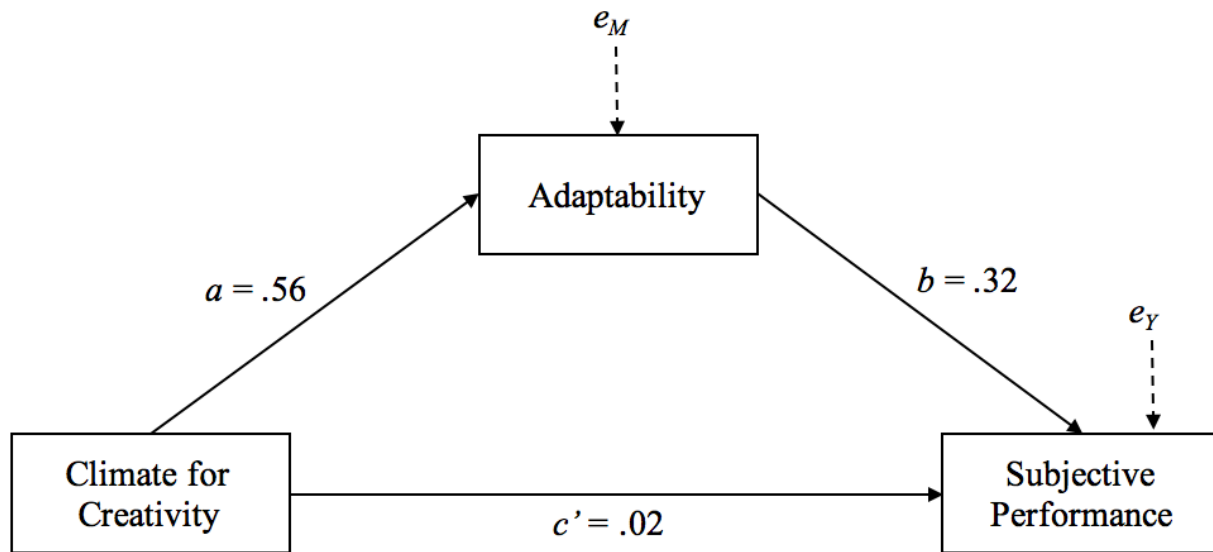


Figure 4. Mediation Model for Climate for Creativity, Firm Adaptability and Subjective Performance

The third mediation test examines the relationship between firm flexibility and relationship quality with firm adaptability mediating the relationship. As Figure 5 and Table 33

Table 32. Mediation Test for Climate for Creativity, Firm Adaptability and Subjective Performance

Antecedent		Consequent						
		M (F. Ada)			Y (S. Perf)			
		Coeff.	SE	<i>p</i>		Coeff.	SE	<i>p</i>
<i>X</i> (C. Creativity)	<i>a</i>	.56	.08	.00	<i>c'</i>	.02	.07	.82
<i>M</i> (F. Ada)	--	--	--	--	<i>b</i>	.32	.08	.00
<i>Constant</i>	<i>i</i> <sub>1</sub>	1.97	.31	.00	<i>i</i> <sub>2</sub>	2.40	.29	.00
$R^2 = .36$				$R^2 = .22$				
$F(1, 97) = 55.50, p < .001$				$F(2, 96) = 13.71, p < .001$				

illustrate, the standardized regression coefficient between firm flexibility and firm adaptability was statistically significant, as was the standardized regression coefficient between firm adaptability and relationship quality ( $p < .001$ ). The indirect effect of .15 is statistically different

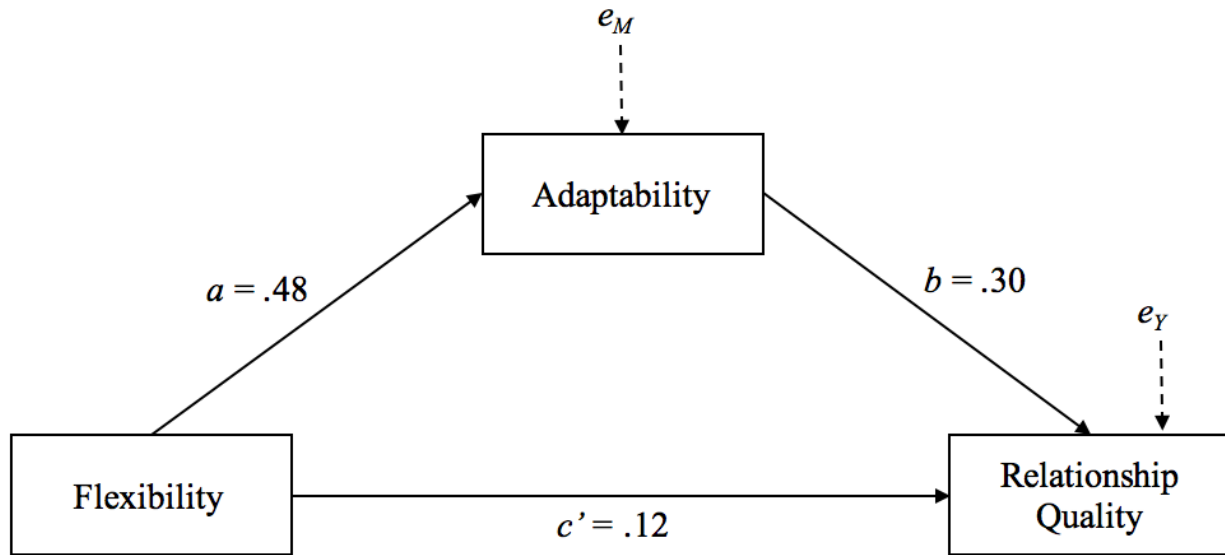


Figure 5. Mediation Model for Firm Flexibility, Firm Adaptability and Relationship Quality

from zero, as revealed by a 95% BC bootstrap confidence interval that is entirely above zero (.08 to .24.,  $Z = 3.43, p < .01$ ). This indirect effect of .15 means that two firms that differ by one unit of firm flexibility are estimated to differ by .15 units in the strength of the relationship with customers as a result of those firms with more flexible employees feeling their firm is more

Table 33. Mediation Test for Firm Flexibility, Firm Adaptability and Relationship Quality

Antecedent		Consequent						
		M (F. Ada)			Y (Rln QI)			
		Coeff.	SE	<i>p</i>		Coeff.	SE	<i>p</i>
X (E. Flex)	<i>a</i>	.48	.09	.00	<i>c'</i>	.12	.07	.08
M (F. Ada)		--	--	--	<i>b</i>	.30	.07	.00
Constant	<i>i</i> <sub>1</sub>	2.31	.36	.00	<i>i</i> <sub>2</sub>	2.66	.28	.00
				$R^2 = .24$				
				$F(1, 94) = 30.03, p < .001$				
					$R^2 = .30$			
					$F(2, 93) = 20.24, p < .001$			

adaptable ( $a$  is positive), which in turn translates into a higher relationship quality rating ( $b$  is positive). Firm adaptability fully mediates the relationship between firm flexibility and relationship quality.

The fourth mediation test examines the relationship between climate for creativity and relationship quality with firm adaptability mediating the relationship. As Figure 6 and Table 34 illustrate, the standardized regression coefficient between climate for creativity and firm adaptability was statistically significant, as was the standardized regression coefficient between

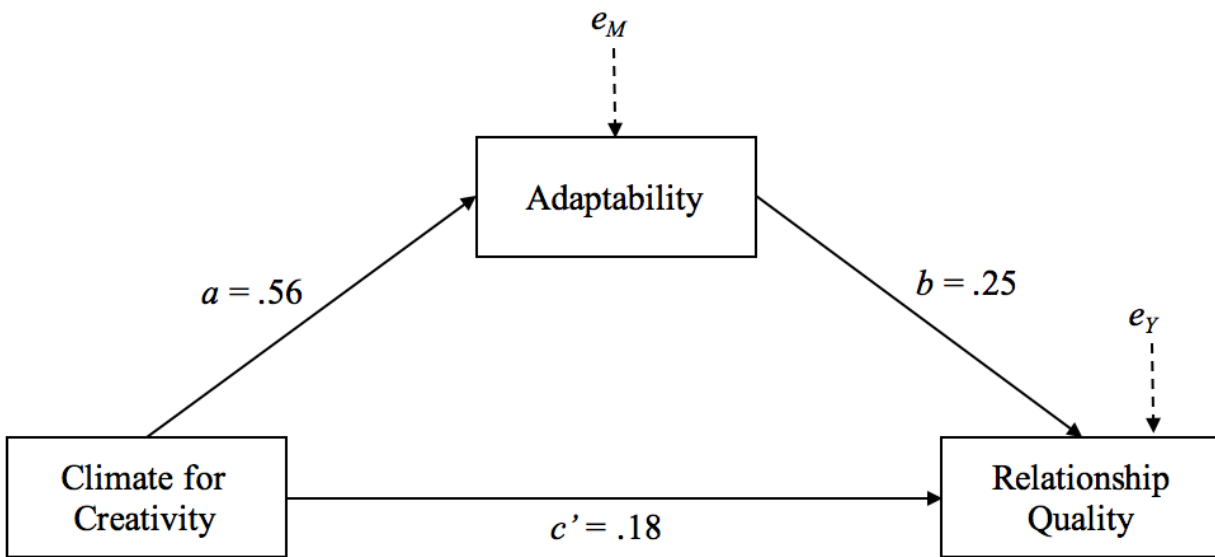


Figure 6. Mediation Model for Climate for Creativity, Firm Adaptability and Relationship Quality

firm adaptability and relationship quality ( $p < .001$ ). The indirect effect of .14 is statistically different from zero, as revealed by a 95% BC bootstrap confidence interval that is entirely above zero (.07 to .23.,  $Z = 3.19, p < .01$ ). This indirect effect of .14 means that two firms that differ by one unit of climate for creativity are estimated to differ by .14 units in the strength of the relationship with customers as a result of those firms with more creative climates feeling their firm is more adaptable ( $a$  is positive), which in turn translates into a higher relationship quality

Table 34. Mediation Test for Climate for Creativity, Firm Adaptability and Relationship Quality

Antecedent		Consequent						
		M (F. Ada)			Y (Rln Ql)			
		Coeff.	SE	<i>p</i>	Coeff.	SE	<i>p</i>	
<i>X</i> (CC)	<i>a</i>	.56	.08	.00	<i>c'</i>	.18	.06	.01
<i>M</i> (F. Ada)		--	--	--	<i>b</i>	.25	.07	.00
<i>Constant</i>	<i>i</i> <sub>1</sub>	1.98	.31	.00	<i>i</i> <sub>2</sub>	2.59	.25	.00

$R^2 = .36$   $R^2 = .35$   
 $F(1, 96) = 53.94, p < .001$   $F(2, 95) = 25.85, p < .001$

rating (*b* is positive). In addition to the .14 indirect effect, a .18 direct effect remains between climate for creativity and relationship quality. Firm adaptability partially mediates the relationship between climate for creativity and relationship quality.

Based on the results of the hypotheses tests, Figure 7 presents a revised conceptual framework. Hypothesis testing found support for a direct positive relationship between employee decision-making resources usage and firm flexibility. Originally, climate for creativity was proposed as a moderator between firm flexibility and adaptability, however the moderation tests performed on the collected survey data did not support the moderation hypothesis. The revised conceptual model proposes a direct positive relationship between climate for creativity and firm

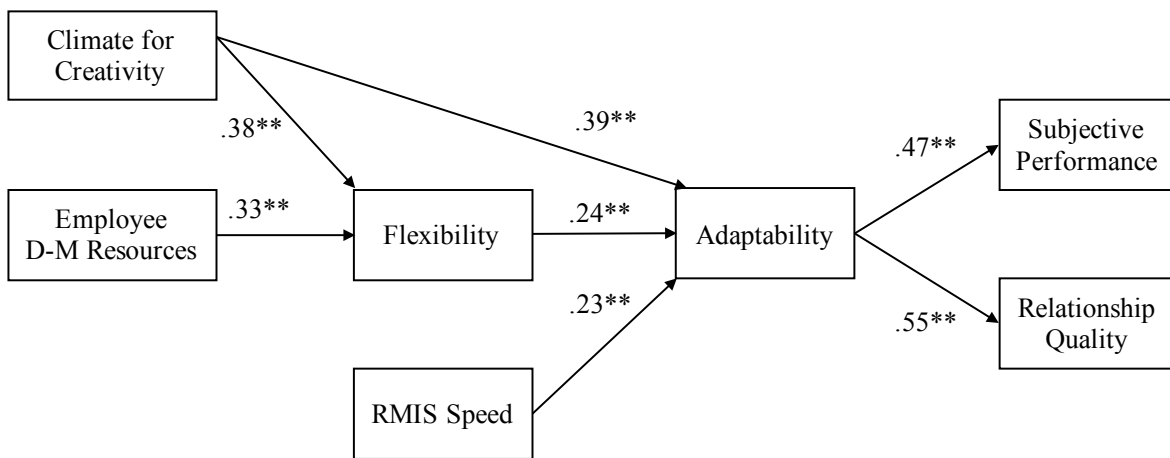


Figure 7. Revised Conceptual Framework

\*\*Significant at .01 level, \*Significant at .05 level.

flexibility, as well as between climate for creativity and firm adaptability. RMIS speed is also retained as an antecedent of firm adaptability. Hypotheses testing did not support any effect of RMIS speed on enhancing firm flexibility. Originally, quicker RMIS were proposed to better enable the firm to respond quickly when changes arise, however, the speed of the RMIS may instead be more beneficial when the firm is trying to make long-term structural changes. Tables 35 and 36 summarize the regression information for the revised conceptual framework.

Table 35. Summary of Regression Models for Revised Conceptual Framework

Model	Sum of Squares	df	Mean Square	F	Sig.	R <sup>2</sup> <sub>a</sub>
<i>Model A: Flexibility</i>						
Regression	49.65	2	24.82	21.52	.00	.30
Residual	106.15	92	1.15			
Total	155.80	94				
<i>Model B: Adaptability</i>						
Regression	65.02	3	21.67	24.37	.00	.42
Residual	82.71	93	.89			
Total	147.73	96				
<i>Model C: Subjective Performance</i>						
Regression	16.79	1	16.79	27.64	.00	.21
Residual	58.92	97	.61			
Total	75.71	98				
<i>Model D: Relationship Quality</i>						
Regression	20.49	1	20.49	40.58	.00	.29
Residual	48.47	96	.51			
Total	68.96	97				

### Discussion & Limitations

The current study set out to empirically examine how a product returns management system functions as a complex adaptive system and contributes to the overall health of the firm. The results of the hypotheses tests reveal that employee decision-making resources are connected to firm flexibility, and that as decision-making resources are consumed, firm flexibility increases.

Employees actively utilizing decision-making resources to make decisions enables the firm to

make changes quickly. However, firms need to be aware that when employees run out of decision-making resources, they may stop making decisions altogether (Tierney 2011).

Additionally, affording employees flexibility to make decisions and adjustments when processing product returns enhances the firm's overall adaptability. Also nurturing a climate that

Table 36. Parameter Estimates for Revised Conceptual Framework

Terms	Unstandardized Beta	SE	Standardized Beta	t	p-value
<i>Model A: Flexibility</i>					
Intercept	3.33	.74		4.50	.00
Employee D-M Resources	-.30	.13	-.21	-2.29	.02
Climate for Creativity	.44	.09	.46	5.04	.00
<i>Model B: Adaptability</i>					
Intercept	.46	.53		.88	.38
Climate for Creativity	.37	.09	.40	4.17	.00
Firm Flexibility	.24	.09	.24	2.66	.01
RMIS Speed	.34	.12	.23	2.77	.01
<i>Model C: Subjective Performance</i>					
Intercept	2.42	.27		8.85	.00
Firm Adaptability	.33	.06	.47	5.26	.00
<i>Model D: Relationship Quality</i>					
Intercept	2.81	.25		11.25	.00
Firm Adaptability	.37	.06	.55	6.37	.00

supports and encourages creativity enhances the firm's overall adaptability. Firm adaptability in turn enhances respondents' subjective perceptions of the firm's performance and contributes to stronger relationships with customers. The hypotheses tests do not support relationships between employee knowledge-flexibility, RMIS speed-flexibility, and RMIS customizability-flexibility. The lack of support for direct relationships may be due to a more complex relationship between these components of the product returns system. Table 37 summaries the results of all hypotheses tested in Essay II.

The current research is not without limitations, which provide opportunities for future research. The main limitation revolves around the sample size of this study. The conceptual

framework specified in Figure 2 to be tested contains 10 constructs. In order to analyze a model of this size with structural equation modeling, a sample size over 500 is recommended (Hair et al. 2010). Since only 102 respondents completed the online survey, regression analysis was used in place of structural equation modeling. The main drawbacks of a regression approach in

Table 37. Summary of Hypotheses Tests

Hypothesis	Prediction	Result
H1	Employee knowledge is positively related to firm flexibility.	Not Supported
H2	Employee decision-making resources usage is positively related to firm flexibility	Supported
H3	Task difficulty exerts a positive moderating effect on the relationship between employee knowledge and firm flexibility.	Not Supported
H4	Task difficulty exerts a positive moderating effect on the relationship between employee decision-making resources usage and firm flexibility.	Not Supported
H5	Returns management information system speed is positively related to firm flexibility.	Not Supported
H6	Returns management information system customization is positively related to firm flexibility.	Not Supported
H7	Firm flexibility is positively related to firm adaptability.	Supported
H8 <sub>a</sub>	Firm adaptability is positively related to objective firm performance.	Not Supported
H8 <sub>b</sub>	Firm adaptability is positively related to subjective firm performance.	Supported
H9	Firm adaptability is positively related to relationship quality.	Supported
H10	Climate for creativity exerts a positive moderating effect on the relationship between firm flexibility and firm adaptability.	Not Supported

comparison to a structural equation modeling are the inability to simultaneously consider all constructs in Figure 2 and account for measurement error (Hair et al. 2010). Collecting additional data will enable the conceptual framework to be analyzed with SEM in the future.

A second limitation appears in the lower than anticipated internal consistency of a few of the scale measurements. The 6-item measurement scale for the RMIS speed construct showed lower than desired internally reliability on one dimension ( $\alpha = .68$ ), as did the 9-item measure of



employee decision-making resources on one dimension ( $\alpha = .66$ ). Although the Cronbach alpha values border on the .7 cut-off value, the scales show room for improvement in future research.

## **CHAPTER V: GENERAL DISCUSSION, CONCLUSIONS AND IMPLICATIONS**

The primary purpose of this dissertation was to take an in-depth look at complexity that arises when managing product returns. Prior to the current research, we knew that supply chains show characteristics of complex adaptive systems (Choi, Dooley, and Rungtusanatham 2001; Li et al. 2010). This research goes beyond our initial understanding of supply chains resembling complex adaptive systems, by studying the components that create complexity and the role system components play in creating important outcomes in product returns management. Key insights come from interviews with and surveys completed by managers of product returns.

### **RQ1: What are the important components of a product returns system?**

Results from Essay I confirm product return systems display the qualities of a complex adaptive system, with multiple important components interacting together to keep the system functioning. The key components identified include firm capabilities (analysis and communication), employees (knowledge and decision-making resources), the returns management information system (speed and customizability), the organizational climate (climate for creativity, localization, and supportiveness), and the customer service boundary (flexibility). These components are the pieces of a product return system that interact to keep the system functioning.

### **RQ2: How does complexity arise in a product returns system?**

The five components identified in Essay I essentially represent a single ‘cell’ in the product returns system. Each employee who processes product returns resides in their own ‘cell,’

composed of their own knowledge, decision-making resources, communication capabilities and analysis capabilities. In addition, each cell relies upon the returns management information system and the customer service boundary to allow the cell to function. The overall organizational climate determines how much resource nourishment each cell receives. In the current context, nourishment describes how the firm encourages creativity, local incentives and overall support. Each employee 'cell' interacts with other employees' cells, as well as components of each cell interacting together, leading to a complex adaptive system.

Complexity also arises in product returns due to customer behavior. As informants in Essay I described, customers can be unpredictable in what they return, often sending back the wrong product or taking longer to return the product (see page 80).

**RQ3: To what extent does a product returns system resemble a complex adaptive system?**

Based on the answers to research questions 1 and 2, product return systems resemble complex adaptive systems in a number of ways. In accordance with Holland's (1995) description of CAS, product return systems rely upon three of the four key characteristics frequently. First, within a product return systems parts of the product returns system participate in numerous interactions, which permit knowledge and resources to be shared (providing evidence of a *flow of resources* within a CAS). Second, the outcome of interactions within the product returns system often exceeds the sum of the parts (providing evidence of *non-linear interactions*). Third, unique elements exist within the product returns system (i.e., the five components identified in RQ1; providing evidence of *diversity*). Although the product returns system likely involves some *aggregation* (the fourth characteristic), the number of examples were limited in this research.

In addition, Essay I also presented evidence from interviews with managers supporting existence of the three key mechanisms within a CAS (Holland 1995). Managers discussed the important role employees play in processing product returns, highlighting the specialized knowledge many employees have (see page 77). Although managers did not discuss in detail how employees are trained, CAS theory provides some suggestions. When an employee encounters an unfamiliar situation, the employee decomposes the situation into its basic components (*building blocks*). The employee will compare those building blocks to their own network of knowledge (*internal mental models*), and look for similarities. If similarities are found, the employee will group that building block with the appropriate node in their internal mental model (*tagging*). If similarities are not found, the employee builds a new node for that building block in their internal mental model.

**RQ4: To what extent do the employees within a product returns system influence a firm's flexibility, adaptability, performance and relationship quality with customers?**

Essay II finds that the employee component within the product returns system primarily influences firm adaptability, subjective performance and relationship quality through the firm's flexibility. Hypotheses tests showed support for a negative direct relationship between employee decision-making resources and flexibility. This result means that employees actively consuming their decision-making resources are increasing the firm's flexibility. No support was found for a direct relationship between employee knowledge and firm flexibility. This result does not necessarily mean that employee knowledge is unimportant, but that employee knowledge interacts with the other components in the product return system in a more complex manner than was modeled in the current research.

**RQ5: To what extent does the returns management information system within a product returns system influence a firm's flexibility, adaptability, performance and relationship quality with customers?**

Essay II does not find a direct effect of the returns management information system component on firm flexibility. Hypotheses tests for main effects of RMIS speed and customization on firm flexibility were not supported. This result does not mean RMIS speed and customization are unimportant, but that the way in which they impact firm outcomes is likely more complex than a direct main effect. Some preliminary tests indicate the components of the RMIS have more of a direct impact on firm adaptability than firm flexibility.

**RQ6: To what extent does the firm's climate for creativity influence a firm's flexibility, adaptability, performance and relationship quality with customers?**

Although the firm's climate for creativity was predicted to moderate the relationship between firm flexibility and firm adaptability, climate for creativity exerted a significant positive main effect on firm adaptability. A firm with a climate high in creativity is more practiced in implementing new ideas, and can more readily adapt when required to do so. Firm adaptability partially mediates the effect of climate for creativity on relationship quality, and fully mediates the effect of climate for creativity on subject firm performance. Some preliminary tests also indicate the firm's climate for creativity has a positive direct effect on flexibility, suggesting that climates high in creativity better enable the firm to make quick changes.

**Theoretical Contributions**

First, this dissertation contributes to the supply chain and returns management literatures by developing a substantive theory of the complexity of product returns management

rooted in CAS theory. The goal of this substantive theory is to better understand complexity in product returns management. To achieve this goal, Essay I relied on detailed data collected from interviews with managers, observations from site visits, and publically available information. From this detailed data, grounded theory analysis revealed five key components of a product return system. The first significant contribution of this dissertation is the identification of five key components- the capabilities, employees, information system, organizational climate and customer service boundary- that interact and permit a product returns system to function. The insights obtained in Essay I go beyond an explanation of the steps a company uses to physically process a product and highlights the importance of an employee's skills and behaviors in the product returns system.

The second significant contribution of the substantive theory is the identification of some of the interactions that take place within a product returns system. The numerous two-way and three-way interactions that occur among the components of the product return system shape a complex adaptive system. The presence of numerous interactions lends credence to the applicability of CAS theory to the product returns context. To summarize, the current research develops a theory specific to the product returns management context, but how the components within that theory behave is informed through the application of the characteristics and mechanisms of CAS theory.

Thirdly, the current research further contributes to the supply chain and returns management literature by empirically examining how the employee, RMIS and climate for creativity components of the product returns system relate to a firm's flexibility, adaptability, performance, and relationship quality. CAS theory suggests that the

interactions of the components of a complex adaptive system imbue the system with flexibility and adaptability, and thus enables a CAS to overcome unexpected changes and maintain relatively stable system performance. Essay II studies how the employee, RMIS and climate for creativity components of the product return system relate to firm performance and relationship quality with customers. The results of the empirical tests indicate that the usage of employee decision-making resources has a positive direct impact on increasing firm flexibility. In turn, firm flexibility has a positive direct impact on increasing firm adaptability. Firm adaptability showed a direct positive relationship with subjective firm performance and relationship quality with customers. Direct relationships between employee knowledge and firm flexibility, RMIS speed and firm flexibility, and RMIS customizability and firm flexibility were not supported. The lack of support may mean these components do not directly contribute to a firm's flexibility (although the managers interviewed in Essay I would argue otherwise), or the lack of support may mean that simple linear relationships do not fully describe these relationships. Instead, non-linear relationships may exist between these constructs. For example, the importance of employee knowledge to a firm's flexibility may have a plateau, where additional knowledge will no longer enhance a firm's flexibility. In summary, the results of Essay II represent a direct empirical test of a portion of the substantive theory described in Essay I, showing some initial validation of the importance of employee decision-making resources and the organizational climate to firm performance and relationship quality (Davis, Golicic, and Boerstler 2011).

Fourth, the empirical test of the relationship between firm flexibility and adaptability not only contributes to the supply chain and returns management literature in

the validation of the substantive theory, but also contributes by empirically validating a relationship theoretically proposed in the literature. Some authors have conceptualized a positive relationship between firm flexibility and firm adaptability, but have not empirically tested the relationship (Blome, Schoenherr, and Eckstein 2014; Stevenson and Spring 2007). The test of H<sub>7</sub> reveals a direct positive relationship between flexibility and adaptability, and provides some initial evidence supporting this theoretical relationship.

Fifth, this dissertation provides an important link between the supply chain management and marketing literatures by showing the importance of product returns management to maintaining relationships with customers. Most companies desire to maintain or build upon relationships with customers throughout the return process, and this dissertation provides some insights on how that can be done through the application of CAS theory. Empirically speaking the hypotheses tested in Essay II indicate supporting employee decision-making has the most direct positive effect on flexibility, which in turn enhances a firm's adaptability and relationship quality with customers. The revised conceptual framework (see Figure 7) also points to the importance of the firm's climate for creativity and RMIS speed in enhancing a firm's adaptability, which ultimately shapes subjective perceptions of firm performance and the quality of relationships with customers.

Sixth, the current research contributes to and extends the body of literature applying CAS theory to supply chain problems by studying the complexity inherent in product return systems. Complexity research within the supply chain management and returns management literatures still remains uncommon (Choi, Dooley and



Rungtusanatham (2001) and Manuj and Sahin (2011) are some notable exceptions; Nilsson and Gammelgaard 2012), but preliminary evidence indicates that adopting a complexity perspective is appropriate for studying supply chains. Choi, Dooley, and Rungtusanatham (2001) were among the first researchers to introduce the CAS perspective to supply chain management research with the development of theoretical propositions describing how a CAS perspective changes the management of some supply chain activities. The current research finds CAS theory applicable to the study of product returns systems, as well. To determine if CAS theory was suitable to the product returns context, in Essay I mechanisms and characteristics of CAS theory were identified and coded. The coding of the mechanisms and characteristics led to the identification of numerous two-way and three-way interactions that occur in a product return system. The presence of numerous interactions is consistent with Holland's conceptualization of complex adaptive systems. The current research begins to study some of the relationships between components of the product return system to better understand how product return systems stay healthy.

Finally, the current research contributes to the marketing and supply chain management literatures by following a MMR methodology including data collected from in-depth, semi-structured interviews, published documents, direct researcher observations of distribution centers, survey research, grounded theory and regression analysis to study the complexity of product returns management. The current research answers calls for more MMR in the marketing and supply chain management literatures (Davis, Golicic, and Boerstler 2011, p. 468). MMR represents an important opportunity to understand complex research problems, and the lack of application of MMR to logistics and supply

chain management research problems has been criticized in the literature (Golicic and Davis 2012; Naslund 2002).

### **Managerial Implications**

The results of the current research have a number of managerial implications. First, the five key components of a product returns system identified in Essay I are necessary, but not sufficient components, by themselves. Managers of product returns need to invest in all five components, but employee decision-making resources and the climate for creativity were the only two components with a direct impact on firm flexibility and adaptability. Preliminarily, the speed of the RMIS also shows a direct positive impact on firm adaptability. The non-significance of the direct links between employee knowledge and firm flexibility does not mean the employee component is unimportant. Many of the managers interviewed in Essay I attested to the importance of employee knowledge. One possible explanation for the lack of support for employee knowledge is that the employee knowledge component interacts with other components in the product returns system, meaning that the direct effect predicted in the current research is too simple of a relationship to capture the role employee knowledge plays in the system. In order to enhance a firm's adaptability, managers will need to invest in all components of the product returns system, as well as enhancing the freedom given to employees to respond to problems when they arise. Focusing on a single component of the product returns system only can increase the likelihood of failure of the investment due to the interactions of multiple components within the product returns system. For example, purchasing, and migrating to a returns management information system alone, is not enough for a firm to

properly deal with product returns. Managers must consider the important roles that the firm's capabilities, employees, organizational climate and customer service boundary play in the product returns system in conjunction with the information system.

Second, the current research finds that within the product returns system, employee decision-making resources and firm flexibility appear to be more important predictors of firm adaptability than employee knowledge. While it still remains important for employees to have knowledge bases to consult, and have the mental capacity to make decisions, having the capacity to make decisions and the flexibility to make changes and adjustments when problems arise in product returns plays a more important role than knowledge alone.

Third, the climate for creativity of the firm plays a positive, direct role in shaping the firm's adaptability. Firms with climates stronger in creativity are more adaptable. These climates encourage employees to present new ideas, and are willing to try out new ideas. When a problem arises, firms that are practiced in implementing new ideas are able to adapt more quickly than those firms with less practice implementing new ideas.

Fourth, the current research applies CAS theory to the product returns context. As described in the introduction, many firms struggle with product returns (Penske 2014). Another area many firms struggle with is sustainability. Applying CAS theory to the sustainability area also has the potential to shed light on why many firms struggle with sustainability. A research plan similar to the one used in the current research could be applied, leading to the identification of important components of sustainability systems, as well as the complexities of sustainable practices that arise from component interactions.

Fifth, the results of this research suggest the benefits of managing product returns well are not financial, but relational. Product return systems function to allow firms to maintain stability in subjective evaluations of performance and in relationships with customers. Since product returns occur when an exchange of value has failed, the product returns system represents a dissonance-reduction tool, which customers can utilize to resolve the exchange failure. Effective product return systems reduce dissonance by quickly restoring value to the customer (whether that value be a product exchange, credit, refund, etc.). Failure to effectively process product returns and restore equity to the marketing exchange can lead to reductions in the quality of relationships with customers.

In summary, product returns represent an important relationship management tool for firms. Effective product returns management has minimal improvements on a firm's bottom line, but has important impacts on subjective perceptions of performance and the quality of relationships with customers.

### **Future Research**

The current research can be extended in numerous ways. First, this research suggests the primary value of effective product returns management is in maintaining the quality of the relationship a firm has with its customers. Product returns occur when the marketing exchange fails to provide sufficient value to each party. This dissertation argues that product returns help to restore value to the exchange by helping reduce customer dissonance. Future studies examining how effective product returns management influences customers directly can test this prediction.

Second, this dissertation finds evidence that product returns systems resemble CAS. Within complex adaptive systems, numerous interactions occur amongst components. Within the current research, many of the relationships hypothesized and tested were direct relationships.

Many of the hypothesized relationships did not receive empirical support. The lack of empirical support for direct relationships points to the applicability of CAS theory. If direct effects fully explained product returns systems, CAS theory would not be useful. After testing some of the key direct effect relationships, the next step for the researcher is to look at non-linear relationships that may better describe the interactions occurring in the product returns system. Additionally, examining the direct relationships hypothesized in this dissertation with structural equation modeling will strengthen the contributions further.

Third, CAS theory can also likely be helpful in understanding a number of other supply chain phenomena, including sustainability behaviors and omni-channel retailing. Applying CAS theory to these areas will reveal the important components of sustainable behaviors and successful omni-channel retailing strategies, as well as how complexities arise in these phenomena.

In addition, numerous other research questions will extend the current research. First, how does the number of employees who process product returns alter a firm's flexibility and adaptability, if at all? Second, how does the nature of the relationship between adaptability and relationship quality change for different types of customers (e.g., end-user, business)? Third, how does the return rate of the firm change the nature of the relationships between firm flexibility and firm adaptability, if at all? Fourth, how does the procedural training given to employees impact the formation of mental models used to process product returns? Fifth, how do the characteristics and personality (other than knowledge and decision-making resources) of employees influence the product returns system? Sixth, how do external forces, such as sustainability and omni-channel retailing, alter the product returns system, if at all? Seventh, how does a product's shelf life alter the product returns system, if at all?

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## APPENDIX A. DEFINITIONS OF KEY CONSTRUCTS

This appendix presents a concise summary of the definitions of the key constructs used throughout this dissertation. Constructs are defined in the text, but Table 38 provides a handy reference of all the construct definitions in one place.

Table 38. Definitions of Dissertation Constructs

Construct	Definition	Source
Agents	Components or people within a system.	Von Bertalanffy 1972; Holland 1995
Capabilities	“Internal processes that the firm uses to efficiently implement its reverse logistics activities.”	Jack, Powers, and Skinner 2010, p. 233
Climate for Creativity	The environment surrounding individual employee and team creativity within an organization.	Carr et al. 2003
Complexity	A system containing many intricate parts that interact.	Campbell 1988
Creativity	“The generation or production of ideas that are both novel and useful.”	George 2007, p. 441
Customer Service Boundary	The gateway between the customer and the product returns system.	
Decision-Making Resources	The level of attention and mental processing capacity a task requires.	Patten et al. 2006
Employee	The agent responsible for inspecting, verifying, and dispositioning returned products.	
Firm Adaptability	The ability of a firm to make long-term structural changes to remain competitive.	Carmeli, Jones, and Binyamin 2015; Stevenson and Spring 2007
Firm Flexibility	The ability of a firm to respond quickly to changes in the environment.	Liu et al. 2013; Stevenson and Spring 2007
Firm Performance	The objective financial success and subjective success of a firm.	Nyaga and Whipple 2013
Flexibility of Customer Service Boundary	The willingness of a firm to alter responses to customers, when necessary.	
Forward Logistics	The creation and delivery of products to customers;	Stock & Lambert

	conceptualized as the movement of goods from point-of-origin to point-of consumption.	2001
Grounded Theory	“Systematic, yet flexible guidelines for collecting and analyzing qualitative data to construct theories from the data themselves.”	Charmaz 2014, p. 1
Information System Customization	The ability of a firm to change the setup and screens of the returns management information system.	
Information System Speed	The quickness of the system in processing product returns.	
Internal Mental Models	Mental networks of knowledge of agents.	Holland 1995
Knowledge	The internal mental models of information related to processing returns.	
Localization of the Climate	The expression of values and attributes unique to a specific location of a firm.	
Multiple Methods Research	Research incorporating at least two different sources of information and two different types of analyses.	Davis, Golicic, and Boerstler 2011
Organizational Climate	The surface-level manifestation of the values and beliefs important to organizational members.	Denison 1996
Organizational Creativity	The ability of a firm to leverage the creative abilities of employees to produce new and useful outcomes.	Rasulzada 2014; Woodman, Sawyer, and Griffin 1993
Product Returns System	The system a firm uses to manage items returned from customers.	
Relationship Quality	The strength of the relationship the firm forms with vendors and customers.	Fynes, de Burca, and Voss 2005; Su et al. 2008
Returns Management	The movement of returned products through the reverse channel.	Rogers et al. 2002
Returns Management Information System	The software system used to manage product returns.	
Reverse Logistics	The processing and management of returned products and materials “from the point of consumption to the point of origin for the purpose of recapturing or creating value.”	Rogers and Tibben-Lembke 2001, p. 130
Supply Chain Management	The integration of key business activities across the supply chain.	Blanchard 2010
Supportiveness of the Climate	The organization’s willingness to provide employees with the resources needed to process returns.	
Task Difficulty	The characteristics of a task (variability and analyzability) that determine the amount of decision-	

	making resources required to complete the task.	
Theoretical Sampling	The joint collection, coding, and analysis of data.	Glaser and Strauss 1999
Theoretical Saturation	The point where no new information emerges about a conceptual category in grounded theory research.	Charmaz 2014

## APPENDIX B. FINAL INTERVIEW PROTOCOL

### ***Opening***

- Introductions of interviewers and interview participant
- Overview of purpose of the study
- Confidentiality assurance (sign informed consent and non-disclosure agreement)
- Permission to digitally record (start recorder)

### ***Demographic Data***

- Title of interview, tenure and job duties of the participant(s)
- Organizational structure
- Background on organization, industry

### ***Initial Question: GRAND TOUR***

- Tell me about your firm's product return and remanufacturing activities.
- What systems and processes do you use to manage returns?
- What are the different end-life options for returned products?
- How many vendors/customers do you accept returns from?
- What similarities in your returns process exist across most of your vendors? Unique to each vendor?
- How do you try to reduce returns?

### ***Additional Prompts***

- Who is involved? (Functions? Supply chain partners?)
- Walk me through what happens to products/components that are returned
- How important is [the returns process] to your organization?
- How are return initiatives developed? Who helps develop them? What areas of your business do these initiatives help?
- What kind of software do you use to manage your returns?
- What are the key functionalities of this software?

### ***Additional Questions***

- Discuss drivers and motivators for product return activities --- Why is this important?
- Discuss outcomes of product return activities --- Why is this important?

### ***NOTE to Interviewers***

- Listen for sources/components of creativity
- Listen for examples of complexity (cause & effect unclear, solving problems through experiments, uncertainty, many agents involved, importance of interactions)

- Listen for examples related to CAS (aggregation to group similar things, non-linear interactions, flow of resources, diversity of agents, info-processing rules, tagging to form boundaries & internal mental models)
- Listen for examples related to sustainability

***RE: Creativity***

- If 45 minutes pass, and no mention of creativity, prompt for this.
- ASK: Tell me how creativity and innovation fit in to this discussion? (May require an example: for example, how does employee creativity fit in to your product return activities for [product x]?)

***Additional Unplanned/Floating Prompts***

- How?
- Describe?
- Can you tell me more about that?
- Will you explain that in more detail?
- Can you give me examples or tell a story of an experience about that?
- How does that work?
- Tell me about a time when that did (not) happen.

**PLAN for SNOWBALLING....** When other people are mentioned that might know more about something of interest, we need to make arrangements to meet/talk with those people.

## APPENDIX C. IRB APPROVAL FOR ESSAY I



RESEARCH INTEGRITY AND COMPLIANCE  
Institutional Review Boards, FWA No. 00001669  
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799  
(813) 974-5638 • FAX (813) 974-7091

October 16, 2014

Jennifer Espinosa  
Marketing  
College of Business  
BSN 3403  
Tampa, FL 33612

RE: **Expedited Approval for Initial Review**  
IRB#: Pro00019177  
Title: Complexity and Creativity in Reverse Logistics

**Study Approval Period: 10/15/2014 to 10/15/2015**

Dear Ms. Espinosa:

On 10/15/2014, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents outlined below.

**Approved Item(s):**

**Protocol Document(s):**

[Study Protocol, Version 1](#)

**Consent/Assent Document(s)\*:**

[Informed Consent, Version 1.pdf](#)

\*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,



John Schinka, Ph.D., Chairperson  
USF Institutional Review Board



## APPENDIX D. IRB APPROVAL FOR ESSAY II



RESEARCH INTEGRITY AND COMPLIANCE  
Institutional Review Boards, FWA No. 00001669  
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799  
(813) 974-5638 • FAX (813) 974-7091

September 30, 2015

Jennifer Espinosa  
Marketing  
College of Business  
BSN 3403  
Tampa, FL 33612

RE: **Exempt Certification**

IRB#: Pro00023856

Title: Understanding the Complexity of Product Returns Management: A Complex Adaptive Systems Theory Perspective

Dear Ms. Espinosa:

On 9/30/2015, the Institutional Review Board (IRB) determined that your research meets criteria for exemption from the federal regulations as outlined by 45CFR46.101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:  
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

**Approved Items:**

[Study Protocol, Version 1](#)

[Informed Consent](#)

As the principal investigator for this study, it is your responsibility to ensure that this research is conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF HRPP policies and procedures.

Please note, as per USF HRPP Policy, once the Exempt determination is made, the application is closed in ARC. Any proposed or anticipated changes to the study design that was previously declared exempt from IRB review must be submitted to the IRB as a new study prior to initiation

of the change. However, administrative changes, including changes in research personnel, do not warrant an amendment or new application.

Given the determination of exemption, this application is being closed in ARC. This does not limit your ability to conduct your research project.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,



Kristen Salomon, Ph.D., Vice Chairperson  
USF Institutional Review Board