

**BUSINESS INNOVATION AND REGULATORY ENFORCEMENT:
CASE STUDIES OF THE BIG BOX RETAIL INDUSTRY AND ENFORCEMENT OF RCRA**

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**BUSINESS INNOVATION AND REGULATORY ENFORCEMENT:
CASE STUDIES OF THE BIG BOX RETAIL INDUSTRY AND ENFORCEMENT OF RCRA**

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LIST OF ACRONYMS

Acronym	Definition
BMP	Best Management Practices
CFR	Code of Federal Regulations
CGPA	Consumer Goods Pricing Act
ECHO	Enforcement and Compliance History Online
EPA	US Environmental Protection Agency
NPM	National Program Managers
OECA	Office of Enforcement and Compliance Assurance
P.L.	Public Law
RCRA	Resource Conservation and Recovery Act
SOP	Standard Operating Procedures
SQG	Small Quantity Generator
SRF	State Review Framework
US	United States

SUMMARY

The purpose of this research is to examine the following research question: how has enforcement of Resource Conservation and Recovery Act (RCRA) adapted to the Big Box business system innovation? Additionally, the study explored the possible nature of regulatory choke points that may emerge from the enforcement of RCRA in the Big Box retail system. This study used contingency theory to establish a foundation for analysis of the Big Box business system innovation through identification of structural elements, external influences, and their subsequent interactions associated with the Big Box retail system in terms of environmental compliance with the RCRA enforced by the United States (US) Environmental Protection Agency (EPA). This research employed an embedded comparative case study design using the comparison of two Big Box firms, Walmart Stores, Inc. and Target Corporation, nationally and for the following states with opposing enforcement strategies: Arizona, Kentucky, Missouri, and Texas. The data used was obtained from third-party federal or firm-maintained sources.

Findings indicate Walmart adheres to the structural models developed using contingency theory principles and incurs more impacts from regulatory agencies due to the enforcement of RCRA. Furthermore, it was observed that inspections of the firms are not distributed throughout the organizational structural elements by all states. Additionally, the use of different enforcement strategies resulted in the emergence of regulatory choke points by Arizona, Kentucky, and Texas; however, Missouri appears to balance enforcement without causing a regulatory choke point.

This research has identified that the enforcement of RCRA has not universally adapted to the demands of the Big Box business system innovation. Agency implications, firm implications, directions for further research, and continued development of a regulatory choke point theory are discussed.

CHAPTER 1: INTRODUCTION

This research explores the enforcement strategies of states as they adapt an environmental regulation for hazardous materials to the emergence of “Big Box” retail systems. This topic provides a way of exploring two important questions. First, how are states adapting a regulation designed for large scale industrial systems to one of the defining large scale business innovations of the modern era, i.e. the Big Box retail industry? Second, what challenges do the variety of state enforcement patterns pose to Big Box firms for compliance strategies?

The emergence of the Big Box business system innovation in the late-1970s is a business and organizational innovation that has drastically changed the nature of retail commerce domestically through the creation of a new business system innovation intricately driven by market forces. Big Box, also known as hypermarkets or category killer stores, are designed to provide a one-stop shopping experience where consumers can purchase a wide variety of products, such as, but not limited to, household goods and small appliances, clothing, jewelry, electronics, toys, groceries, and pharmaceuticals. The Big Box business system innovation developed in response to economic market pressures from a burgeoning US economy for products provided at discount prices and in larger quantities. (Hutter & Jones, 2007)

Few people would debate the Big Box business system innovation has established itself as an iconic industrial development in the United States and across the globe through the intense physical presence of stores and as well as technological innovations, such as internet shopping, product differentiation, and media. Big Box chains, such as Walmart and Target, are often synonymous with suburbia and are a staple in many people’s retail experiences. The Big Box business system innovation is founded on the ability to use technological innovations facilitating the perpetual increase in the size of structural elements comprising the organizational system. Examples of increases in the size of structural elements of the Big Box business

system innovation are: 1) number of facility locations; 2) facility sizes ranging between 90,000 to 200,000+ square feet; 3) extensive variety of products; and 4) classification as a national chain due to operating in more than 10 states (Kane, 1993).

Most research conducted on the Big Box business system innovation has revolved around economic development concerns, market impacts, and employment impacts. (Boarnet & Crane, 1999; Chen, 2003; Clanton, 1993; Goetz & Swaminathan, 2006; Jones & Doucet, 2000; Mitchell, 2007; Salkin, 2004) However, in comparison, the research on environmental regulation and compliance has been strangely quiet on the environmental impacts associated with Big Box retail industry operations. In practice, the Big Box retail industry has to ensure environmental compliance ranging from a diversity of environmental impacts associated with, but not limited to, wastewater, stormwater, hazardous waste, universal waste, spills, air, municipal waste, and aboveground/underground tanks. This research will utilize the Big Box retail industry's implementation of hazardous wastes and universal wastes regulations, which are regulated through the Resource Conservation and Recovery Act (RCRA), to look at one of the areas of environmental impacts associated with this new business system innovation. Big Box stores are so large that normal stockpiles of products can trigger standards of enforcement for accumulations of hazardous waste.

Ensuring compliance across the magnitude of facility locations associated with the Big Box business system innovation could result in stresses to the regulatory enforcement capabilities of federal, state, county, and municipal regulatory groups. It is anticipated that stresses applied to the regulatory enforcement system would result in the use of adaptation strategies by regulatory groups that may include modification of enforcement strategies. Variation in enforcement strategies at the state level; between states and US Environmental Protection Agency (EPA); and between EPA regions has been identified in a study performed on RCRA hazardous waste penalties across 32 states and all EPA regions. (Atlas, 2007)

Different patterns of enforcement have the potential to cause stresses for the firm in complying with the enforcement of RCRA. From a firm perspective, different enforcement strategies create a lack of feasible alternatives from outside of the organizational system and reduced support capabilities from within the organizational system, known as regulatory choke points. The focus of this study is to explore the reciprocal relationship between state patterns of enforcement and managerial challenges that such patterns pose for Big Box firms in developing compliance strategies. Challenges include the large number of inspections and enforcement events nationally, adapting to the variance in enforcement patterns, and effectively targeting compliance resources. Of particular interest is understanding the nature and level of threat that may cause a firm to experience regulatory choke points in compliance resulting from aggregate enforcement patterns. Therefore, it is important to understand the enforcement strategies used by regulatory groups to address the emergence of business system innovations, such as the Big Box business system innovation, because it could result in stresses to the business innovation, the regulatory group, and the regulation itself.

This research will employ an embedded comparative case study design where the primary unit of analysis is the firm. A comparison is made of two Big Box retail firms which differ in the size and scope of their operations. The embedded case studies examine the experiences of these firms in the patterns of enforcement across states. The embedded cases are of states classified as high enforcement states or low enforcement states, both considered deterrent regulatory strategies, based on the number of inspections performed over a five year period. (Potoski, 2004) This research will utilize different state patterns of enforcement, low and high, as a basis for within case and between case variance across the states and between the firms.

The rest of this study is organized as follows. In the remaining portion of Section 1, a high-level overview is provided on the selection of RCRA; the Big Box business system innovation; the use of Contingency Theory; enforcement strategies; and regulatory choke points. Sections 2 and 3 consist of in-depth discussions into the application of Contingency

Theory to the Big Box business system innovation and regulatory enforcement, respectively. Sections 4 and 5 provide the hypothesis tested and the methods utilized for the research. Sections 6 and 7 provide histories of the Big Box business system innovation and RCRA, respectively. Section 8 consists of the case studies of Walmart, Target, and a cross-case comparison. Section 9 concludes with a discussion of policy implications.

This study will provide a foundation for the application of contingency theory in understanding environmental impacts through interactions of regulatory groups with organizations. Additionally, this study will establish the Big Box retail industry as a dynamic industry suitable for future research.

1.1 Why RCRA?

In the 1970s, the first wave of the environmental regulatory movement resulted in environmental laws, such as, but not limited to, RCRA. RCRA, Public Law (P.L.) 94-580, primarily addresses the identification, classification, management, recovery, and disposal of hazardous waste materials and universal waste materials. (The Library of Congress, 1976) RCRA established a scale for the generation of hazardous waste materials and universal waste materials to identify different levels of threat to the environment and health of US citizens based upon total monthly and yearly quantities. Through reporting mechanisms, RCRA identifies industries accumulating hazardous waste materials and universal waste materials in large quantities.

RCRA is administered by EPA while being managed and implemented by state and territory governments. Currently, 50 states and territories have received state authorization for the implementation of RCRA. (US Environmental Protection Agency, 2010c) The statutory basis and intention behind RCRA is extensive and far reaching. The broad spectrum nature of RCRA results in a comprehensive regulation encompassing a wide variety of organizations and industries, which creates the opportunity for focused enforcement strategies to be used by regulatory groups. RCRA requires organizational submissions pertaining to notifications of

hazardous waste activities facilitating monitoring activities for new business system innovations. In conjunction, RCRA, also, requires organizational submissions of yearly hazardous waste reports facilitating monitoring of existing regulated facilities. Due to the extensive nature of the RCRA regulations and the prevalence of implementation on a national-scale, this research will utilize RCRA as the environmental policy for analysis and environmental regulatory agencies as the external influences regulatory group for analysis.

1.2 Why the Big Box business system innovation?

An outcome of the increased facility size and extensive variety of products associated with the Big Box business system innovation resulted in triggering the enforcement of RCRA due to increasing the quantity of hazardous waste materials and universal waste materials generated through business operations. The structural elements of the Big Box business system innovation results in profound environmental implications due to the multitude of media regulated as a result of daily business operations. Two unique characteristics of the Big Box business system innovation are multi-state operations and number of Big Box facility locations. For example, Walmart Stores, Inc. operates approximately 4,200 facilities across the 50 US states and 6 US territories (Wal-mart Stores Inc., 2010a). The number and diversity of locations of the Big Box business system innovation requires the industry to be in compliance with US environmental regulations ranging across federal, state, county and municipal levels of government, such as RCRA. Due to the multitude of media, extensive facility locations, and RCRA applicability, the Big Box business system innovation will be used as the business system innovation for analysis.

1.3 Contingency Theory, Big Box, and RCRA

The focus of this study is to apply contingency theory to the Big Box business innovation to establish a foundation for analysis of the business system innovation in terms of environmental compliance with RCRA enforced by EPA. Many different theories are used in regulatory research, such as, but not limited to, the principle-agent model, economic market-

based theories, rational crime theory, cost-benefit analysis, regulatory federalism model, and the prisoner's dilemma, to name a few. (Atlas, 2007; Helland, 1998; Heyes, 2000; Potoski, 2004; Schauer & Zeckhauser, 2007) Contingency theory is appropriate for this study, because it is designed to understand the interaction between external influences and patterns of behavior; and organizational structures. According to Earnhart (2009), EPA has been investigating whether facility characteristics, such as size or permit conditions, are directly related to the effectiveness of regulatory enforcement. Furthermore, this research contributes to the regulation literature by addressing industry-specific factors and assessment of the influence of structural elements on a firm's compliance with regulations, as suggested by Heyes (2000).

Structural contingency theory facilitates the identification of the structural elements, external influences, and their subsequent interactions associated with the Big Box business system innovation. (Scott, 2003; Thompson, 1967) Contingency theory provides the foundation for looking at an organization as an "open system" interacting with its external influences¹ through its structural elements, which require continual change and adaptation mechanisms for continued firm survival. The Big Box business system innovation is a complex organizational structure operating as an "open system" experiencing demands and constraints between the varieties of external environments and the internal structure of the organization. From a contingency theory perspective, the Big Box business system innovation is a distributive system due to the "open systems" nature of the interactions between structural elements and external influences over the extensive number of facility locations comprising the firm. (Daft, 1995; Daft & Weick, 1984; Hall & Tolbert, 2005; Hutter & Jones, 2007)

Fluctuations in external influences can result in business operational constraints and lead to negative direct economic impacts for the organization resulting in additional costs, loss

¹ Contingency theory typically uses the term "environmental elements" due to the influences occurring from the external environment instead of the internal organizational environment. This study will use the term "external influences" to ensure the context of the word "environmental" is not misunderstood. The word "environmental" in this research specifically refers to the ecological effects of altering the environment due to source(s) of pollution.

of profits, and/or product obsolescence. (Hall & Tolbert, 2005) Additionally, external influences are hard to negotiate and anticipate from an organizational perspective; however, conceptualizing external influences in terms of business sectors provides a manageable approach for firms. Contingency theory facilitated the identification of the external influences interacting with the Big Box business system innovation. The external influences discussed in this research are: regulatory groups and economic markets. The external influence sector driving the creation of the Big Box business system innovation is unequivocally economic market pressures domestically and globally. However, required interactions with the regulatory environment put compliance pressures not only on organizational business managers, but on the regulatory enforcement group. This study will focus on the regulatory group external influence and its interaction with the Big Box business system innovation. (Daft, 1995; Daft & Weick, 1984; Thompson, 1967)

Acknowledging the complex, variable, “open systems” organization structure of the Big Box business system innovation, contingency theory argues that the Big Box business system innovation would attempt to rationalize those aspects of the external environment that are influenced by regulations stemming from environmental policies (Simon, 1999).

1.4 Enforcement Strategies and Regulatory Choke Points

An organization’s ability to respond and its level of flexibility in addressing regulatory enforcement is constrained by the number of inspections performed and whether the regulatory group is using distributive enforcement or focused enforcement. The overall number of inspections performed allows a state to be classified as a low enforcement and a high enforcement state. Both of these enforcement strategies are a deterrent enforcement strategy approach founded in command-and-control regulation, such as RCRA. (Potoski, 2004) In addition to a classification based upon number of inspections, states will employ different strategies for the selection of facilities to inspect. (Earnhart, 2009; Telle, 2009) From the firm perspective, distributive enforcement is the occurrence of regulatory enforcement events evenly

distributed across the different elements of an organizational system. In contrast, focused enforcement is the repeated occurrence of regulatory enforcement events at particular facility locations. Firm adaptation strategies vary based upon the type of enforcement used. (Wu, 2009) If a firm experiences distributive enforcement, the use of Standard Operating Procedures (SOPs) to standardize, formalize, and centralize the process associated with the regulation in question is typically sufficient. In contrast, focused enforcement requires in-depth training and assignment of personnel to address the higher incidence of regulatory attention. Regulatory enforcement and firm adaptation costs would have to be high for market-driven firms, such as the Big Box business system innovation, to change the structural elements of an organizational system. (Wu, 2009)

The types of enforcement strategies listed above in their most pathological form can result in the emergence of a regulatory choke point. A regulatory choke point can occur when an organization experiences the imposition of a large number of contingencies on their organizational structure from external influences and/or a high-level of congestion from within the organizational system due to adaptation to external influences. The regulatory choke point theory is intended to identify enforcement events performed in high levels of frequency or magnitude. This theory is not intended to provide firms with the ability to claim all regulatory enforcement events result in the emergence of a choke point, as this statement is against the basis of the theory.

A chronic choke point occurs when a regulatory group uses distributive enforcement, but the magnitude of inspected facilities across the entire organizational system is large. A chronic choke point results in congestion of the business system. In comparison, an acute choke point occurs when a regulatory group uses focused enforcement through repeated inspections at specific facilities. This high incidence of regulatory enforcement can result in a risk to the business system. Firms have accepted environmental enforcement as an expected cost of business; however, organizations attempt to minimize the net burden associated with

enforcement through damage mitigation, such as, but not limited to, loopholes and/or litigation (Kane, 1993; Wu, 2009).

1.5 Significance of Research

This study is unique for a variety of reasons. First, there has been no research conducted pertaining to the environmental impacts associated with the enforcement and compliance of the Big Box business system innovation. Second, the application of contingency theory to a business system innovation to provide the foundation for understanding environmental impacts through interactions of the regulatory group and the core structural elements has not been conducted. Third, the use of compliance data maintained by the EPA Enforcement and Compliance History Online (ECHO) system (US Environmental Protection Agency, 2010a) has not been utilized to assess regulatory enforcement strategies used by different states on a particular business system innovation. Therefore, the beneficial application of this research goes beyond understanding adaptation strategies and possible nature of regulatory choke points to include the application of contingency theory in an innovative way providing a catalyst for environmental research conducted around the Big Box business system innovation.

CHAPTER 2: STRUCTURAL CONTINGENCY THEORY

2.1 Understanding the Elements of an Organization

Contingency theory arose out of the “open systems” organizational research focusing on ways the organization avoids uncertainty from internal and external sources. Thompson (1967) proposed all organizations are open to external influences requiring adaptation through development or implementation of appropriate response components with varying levels of external influence exposure within the existing organizational system. Earnhart (2009) stated the lack of research in the regulatory compliance literature regarding the connections between facility-related influences and regulatory enforcement may have resulted in erroneous conclusions. To address this criticism, this study uses Thompson’s approach because it facilitates the identification of external influence interaction within an organizational structure through assessment of, but not limited to, the level of interdependence among organizational components and stability and/or homogeneity of the external influences. (Hutter & Jones, 2007; Scott, 2003)

The interaction with external influences occurs within or through the three components of the organizational system: 1) inputs, 2) technological activities, and 3) outputs. Inputs can range from raw materials to products to personnel to information. The technological core is where the inputs are modified for export back into the external environment. Outputs are comprised of the end-products of the system and can include items such as, but not limited to, end-products to customer satisfaction to environmental pollution to by-products. (Daft, 1995) The “open system” organization is comprised of the three internal interdependent components (inputs, technological activities, and outputs) operating as an organization ultimately interdependent upon the external influences. However, an organization’s operation requires it to understand all aspects of its business system in terms of rational measures. This conversion of abstract factors into rational measures for a system is referred to as organizational rationality. (Thompson,

1967) In conjunction with organizational rationality from an “open systems” approach, the overriding goal of organizations is to survive, instead of goal accomplishment, through the uncertainty emerging into the organizational system from internal and external sources.

Organizations approaching organizational rationality with an open-system logic acknowledging the complexity, variability, and unpredictability of the complex factors of core technologies have an increased operational fluidity and responsiveness to changes to the system as a result of external influences. (Thompson, 1967) To reduce uncertainty through organizational viability and operationality, the organizational rationality components and external influences must be cohesive and have a level of connectedness.

2.2 The Structural Elements and Big Box

The deregulation of the retail industry through the Consumer Goods Pricing Act (CGPA) of 1975 led to the development and use of technological innovations in novel ways to accomplish aggregation of facility locations, facility sizes, and diverse products. In the case of the Big Box business system innovation, the organizational structure is primarily driven by economic market influences. (Hutter & Jones, 2007) Evolution of the US culture embracing suburban residential developments, suburban shopping malls, discount stores, and a developing interstate highway system set the foundation for the emergence of the Big Box business system innovation. (Spector, 2005) These market opportunities created the opportunity for the business system innovation that lead to the development of the organizational system associated with the Big Box retail industry. (Hutter & Jones, 2007)

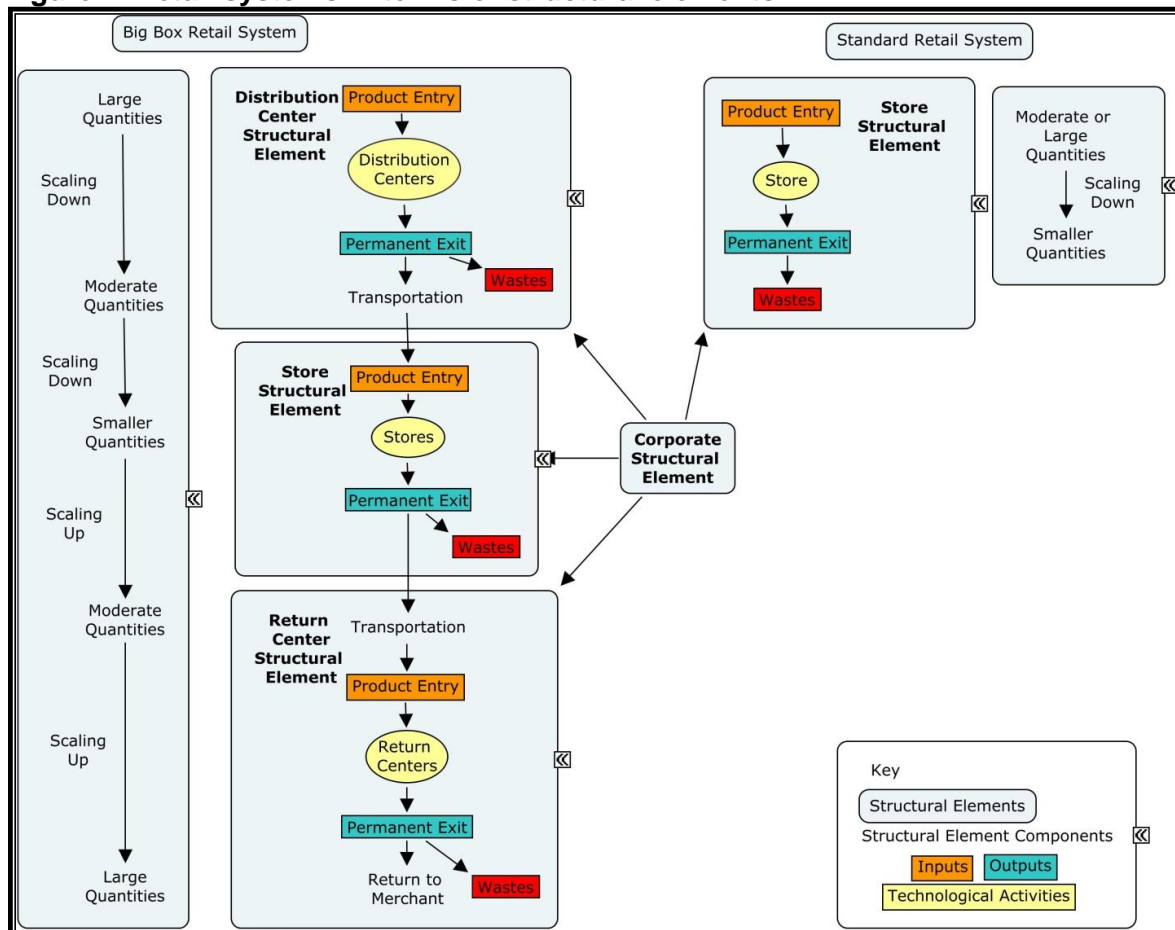
In terms of contingency theory, the difference between standard retail establishments and the Big Box business system innovation is the number of components comprising the organizational structure in conjunction with the scaling of the inputs and outputs throughout the organizational system. Big Box’s core technology is based upon the distribution of mass quantities of products. In comparison, the standard retail system’s core technology is based upon the distribution of products in smaller quantities. Both systems have no direct involvement

with development and manufacturing. There are four structural elements of the Big Box business system innovation: 1) Distribution Centers; 2) Stores; 3) Return Centers; and 4) Corporate facilities. Corporate facilities are comprised of the administrative support facilities and ancillary divisions of the organization in place to provide supportive services to the core technology structural elements, Distribution Centers, Stores, and Return Centers, of the organizational system.

The basis of the Big Box business system innovation is founded on the structural “size” of the organization. As established in contingency theory, size is an important aspect of understanding the contextual nature of the structural elements of an organization, referred to as the domain effect in the regulatory literature. (Hutter & Jones, 2007) In comparison with the standard retail business system, the Big Box business system innovation has drastically modified many size-related structural elements of the overall system through the addition of the Logistics and Return Center divisions; increase of the diversity of products offered; increase the quantity of products offered; innovative nation-wide technological-based product distribution processes; innovative product scaling as a dimension of the organizational structure; developed nation-wide facility locations; and an increase in the nation-wide organizational visibility through media innovations. (Wu, 2009)

Figure 1 depicts the structural elements of the standard retail system and Big Box retail system in terms of the structural elements described above. The complexity of the Big Box retail system’s organizational structure is influenced by the number of structural elements combined with the number of inputs, technological activities, and outputs associated with each structural element. Based upon the number of structural elements of the Big Box business system innovation, the Big Box retail system has higher levels of complexity, variability, and unpredictability.

Figure 1. Retail systems in terms of structural elements



2.3 The External Influences and Big Box

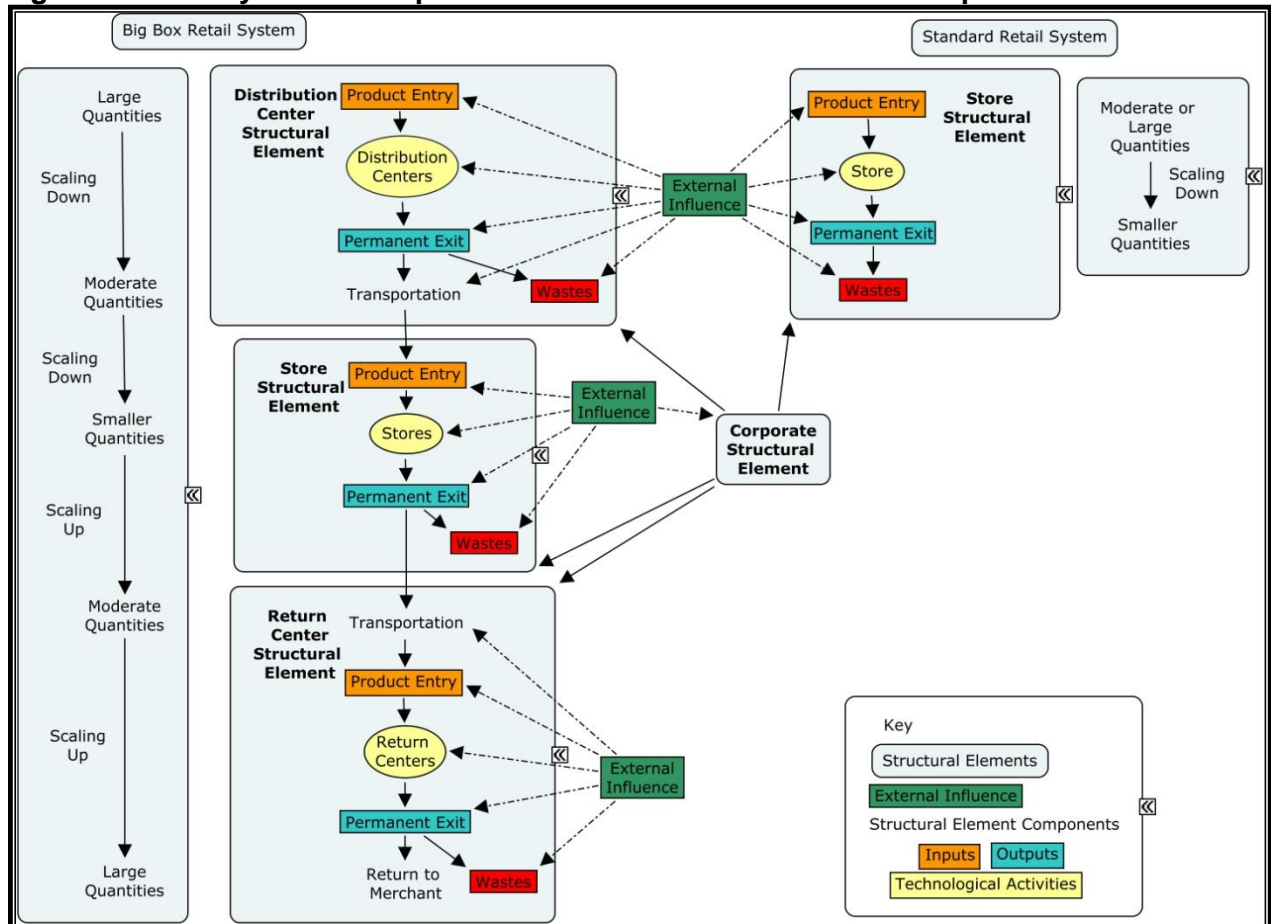
External influences are hard to negotiate and anticipate from an organizational perspective due to their unbounded nature. Bounding external influences in terms of business sectors provides a manageable approach for organizations. The sectors discussed in this research are: regulatory groups and economic markets. (Daft, 1995; Thompson, 1967)

The Big Box retail industry has established a dominant foothold in the US and is increasingly using new technological innovations to adapt its organizational structural elements in response to economic market external influence. (Hutter & Jones, 2007) In addition to the economic market external influence, the Big Box business system innovation is influenced by environmental regulatory groups. In contrast with economic markets, environmental regulatory

groups do not drive the foundation of the organizational structural elements. As a secondary influence on the organizational system, environmental regulatory enforcement and compliance are necessary costs of daily business operations. Interdependency amongst the interactions between the structural element components and the external influences shows that external influences have the ability to impact the organization.

Figure 2 depicts potential external influence interaction points of the standard retail system and Big Box retail system. The complexity of the Big Box retail system's organizational structure depicts the strong occurrence of external influences on the Big Box business innovation system. Due to the number of inputs, technological activities, and outputs in the Big Box system compounded by the number of external influence interactions, the Big Box business system innovation has higher levels of complexity, variability, and unpredictability. (Daft, 1995; Scott, 2003; Thompson, 1967)

Figure 2. Retail systems with potential external influence interaction points



External influences can become constraints, temporary or long-term, to the organizational system requiring the adaptation of the organization or develop into contingencies requiring the readjustment of the organizational system. (Thompson, 1967) Therefore, “either controlling or effectively predicting [external] influences shaping organizational output[s] is essential to the efficient accomplishment of organizational goals” (Simon, 1999). However, not all external influences affect organizations to the same degree. From the firm’s perspective, the different levels of affect and fluctuations associated with external influences result in business operational constraints and increased levels of organizational uncertainty. These fluctuations require the application of a variety of business adaptation techniques to address. Based upon the occurrence of external influences in the Big Box business system innovation, Big Box is at a

higher risk for development of constraints and contingencies associated with external influences resulting in negative direct economic impacts. (Wu, 2009)

From the regulatory group external influence perspective, business operational constraints and organizational uncertainty result in compliance variation within organizations and across industries. (Wu, 2009) To further complicate the influence of the environmental regulatory groups, the Big Box business system innovation strains the aggregation-based nature of RCRA's regulatory structure due to the sheer magnitude of facility locations. In terms of this research, both firms and regulatory groups are trying to adapt to external influence within the confines of the enforcement of RCRA.

CHAPTER 3: REGULATORY ENFORCEMENT

3.1 Regulatory Enforcement

The regulatory group is a highly variable and unique external influence requiring organizational responsiveness and flexibility. A notable business and regulatory group interaction has revolved around the enforcement of environmental policies. (Earnhart, 2009) The regulatory group is comprised of the following sub-components: regulatory modifications; regulatory innovations, and regulatory enforcement. The sub-components create a plethora of opportunities for interaction between the regulatory group external influence and organizations. New business system innovations can trigger interactions through each of the sub-components listed above; however, regulatory enforcement is typically the origination of interactions between the regulatory group external influence and new business system innovations. New business system innovations are obligated to adhere to existing regulations associated with new structural elements and/or technological innovations. Regulatory groups monitor organizational submissions for adherence with regulations. Often, the voluntary compliance of organizational submissions results in the identification of new business system innovations for regulatory groups. The standard regulatory group process is often referred to as the regulation dilemma, because it places stress on the regulatory group and the firm. Regulatory groups have to choose between the use of deterrent regulatory enforcement strategies or flexible enforcement strategies. In conjunction, the firm has to weigh the cost of evasion versus self-policing. (Potoski, 2004).

An organization's ability to respond and its level of flexibility in addressing regulatory enforcement is constrained by the number of inspections performed and whether the regulatory group is using distributive enforcement or focused enforcement. (Atlas, 2007) The overall number of inspections performed allows a state to be classified as a low enforcement and a

high enforcement state. In addition to a classification based upon number of inspections, states will employ different strategies for the selection of facilities to inspect.

Enforcement strategies are composed of two components: number of inspections and facility selection. (Potoski, 2004) Variations in these components results in different enforcement strategies, which have the potential to cause stresses for the firm, the regulatory group, and challenge overall enforcement. (Telle, 2009; Wu, 2009) From a firm perspective, different enforcement strategies create the imposition of a large number of contingencies on their organizational structure from external influences and/or a high-level of congestion from within the organizational system due to adaptation to external influences, known as regulatory choke points. It is speculated regulatory choke points occur as a result of the enforcement strategies used by regulatory groups interacting with the structural elements of the organizational system.

3.2 Regulatory Enforcement and Big Box

Equivocally, the Big Box business system innovation has high levels of complexity, variability, and unpredictability. Additionally, the Big Box business system innovation is a distributive structural system due to the distribution of mass quantities of diverse products and the copious number of facility locations in different states. (Thompson, 1967) Due to the distributive structural system of the Big Box business system innovation, one would expect the regulatory group to use distributive enforcement activities as an adaptation mechanism. This raises questions concerning the nature of the regulatory enforcement experienced by the Big Box business system innovation, which is largely unknown. The ability for a firm to effectively create mechanisms to address impacts associated with enforcement events is dependent upon being able to either identify or predict the type of enforcement strategy used. If a firm is unable to ascertain the influences of the regulatory group on the structural system components, the level of uncertainty for the firm increases leading to risks for the viability of the organization. (Wu, 2009) Regulatory enforcement can directly and indirectly impact the operations of an organizational system through the emergence of regulatory choke points.

Ensuring compliance across the magnitude of facility locations associated with the Big Box business system innovation could result in stresses to the regulatory enforcement capabilities of federal, state, county, and municipal regulatory groups. It is anticipated that stresses applied to the regulatory enforcement system would result in the use of adaptation strategies by regulatory groups. (Telle, 2009; Wu, 2009) It is hypothesized the unique organizational structure of Big Box business system innovation has resulted in different enforcement strategies by states pertaining to the enforcement of RCRA.

CHAPTER 4: HYPOTHESIS

The purpose of RCRA is to assess the total quantities of hazardous waste materials and universal waste materials generated by facilities monthly and yearly. In terms of contingency theory, the Big Box business system innovation created a distributive organizational system comprised of facilities with operations sufficient in size to generate quantities of hazardous waste materials in monthly and/or yearly quantities triggering the application and subsequent enforcement of RCRA. The hypothesis tested in this study is as follows:

Distributed structural organizational systems create distributed, but large, concentrations of hazardous wastes and universal wastes and, thus, will experience distributed environmental enforcement events.

CHAPTER 5: METHODS

This research will employ an embedded comparative case study design using the comparison of two Big Box firms across high-enforcement and low-enforcement states to identify within case variance and between case variance. To facilitate a detailed analysis of the data, state enforcement strategies will consist of embedded cases of high-enforcement and low-enforcement states. These two embedded cases were selected due to the lack of defined separation between state enforcement strategies and the enforcement events. The purpose of this research is to examine the following research question: how has enforcement of RCRA adapted to the Big Box business system innovation?

5.1 Research Design

The research conducted herein is qualitative in design. An embedded case study approach was chosen to facilitate the use of qualitative data to identify emerging patterns pertaining to regulatory enforcement of a new business system innovation to develop a contextual understanding of the outcomes recorded by EPA. The research was designed to discover the regulatory enforcement strategies used by states administering RCRA for the Big Box business system innovation and extrapolate the impact of the dynamic relationship between regulatory agencies and firms. The research is approached from a firm approach instead of a facility approach. The firm approach allows the analysis of aggregated data collected across the organizational system of the firm to understand the impact to the overall system instead of impacts to specific facilities within the system. (Earnhart, 2009)

Contingency theory was used to develop a framework for understanding the basis of the interactions occurring between the Big Box business system innovation and the EPA in terms of structural and external influences. Additionally, contingency theory facilitated the development of a conceptual design of regulatory enforcement strategies leading to regulatory choke points

by providing the foundation of understating distributive organizational systems and external influences.

The data used in this research was collected and compiled by third-parties. Firm data was obtained through review of archival publicly-available organizational documents, such as firm-managed websites and annual reports. The independent variables obtained were: variety of products; number of facility locations; operations in 10+ states; evidence of innovative business practices; facility size; and annual revenues. Review of these independent variables facilitated the selection the following firms: Walmart Stores, Inc. and Target Corporation.

The enforcement event data was obtained through the EPA ECHO system, which provides publicly-available data reported from states to EPA. The dependent variable obtained was number of inspections reported over a five year period to EPA by state agencies. State enforcement strategies were determined based upon review of archival regulatory information contained with SRF reports and the ECHO database, as well as review of state-maintained websites. Review of the SRF and ECHO data, facilitated the classification and selection of the following states: Arizona and Texas as low enforcement states; Kentucky and Missouri as high enforcement states.

The data obtained was analyzed to provide the ratio of inspection frequencies and aggregate inspection ratios for each firm nationally and across the four selected states. In addition, the firms were combined into a single data set to simulate a representation of the Big Box business system innovation. The Big Box business system innovation was, also, analyzed to provide the ratio of inspection frequencies and aggregate inspection ratios nationally and across the four selected states

5.1.1 Threats to Validity and Generalizability

There are a variety of extrinsic selection factors with the potential of affecting the internal validity of the research. Matching of the selection of firms and states was performed by the use of rigorous criteria discussed further in the data section. Additionally, the firms were selected to

represent a large firm and a small firm of the same Big Box business system innovation category: discounters. Similarly, the overall state size of reported active SQGs was reviewed to ensure the states used were commensurate in size of their regulated community. It is acknowledged that selection-based rival variables exist, such as exclusion of non-size based structural elements, which were not controlled in this research design.

There are a variety of intrinsic factors with the potential of affecting the internal validity of the research: history, maturation, and instrumentation. Each of these factors could be directly associated with influencing the state enforcement strategies to change or evolve over the five year period representing the inspection data used for the dependent variable. A prime example would be the NPM guidance published yearly by EPA, which has the potential to result in subtle and/or extreme changes to state enforcement strategies ultimately impacting the inspection dependent variable. It is acknowledged that intrinsic-based rival variables exist, such as states operating without defined enforcement strategies; the occurrence of no enforcement events by a state; and states utilizing a dual distributed, focused enforcement strategy, which were not controlled in this research design.

The conceptual design of regulatory enforcement strategies leading to regulatory choke points is generalizable to organizations using a distributive organizational structure. However, it would likely be limited in organizations with other forms of organizational structures. Additionally, the classification of the selected states enforcement strategies is only applicable in the context of this research design with said variables, because states may utilize different state enforcement strategies for different firms and/or industries.

5.2 Logic Model

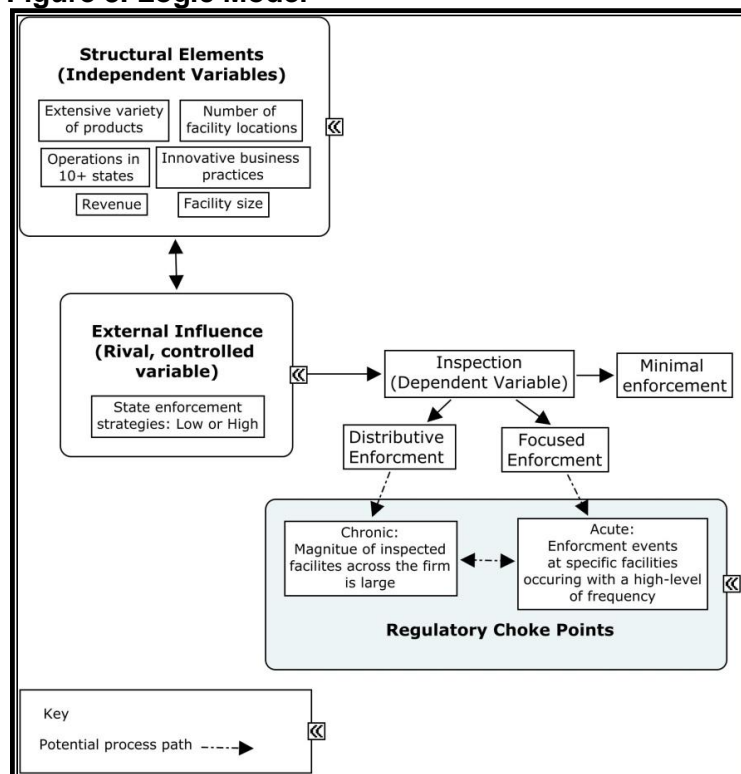
The embedded comparative case study design will be structured according to the variable depicted in the logic model below to determine if regulatory choke points are emerging due to state enforcement strategies of RCRA in the Big Box business system innovation. The Logic Model depicts a regulatory enforcement process that could potentially lead to the

emergence of regulatory choke points from the firm perspective. The firm perspective is an aggregate view of regulatory enforcement events experienced by a firm overall instead of utilizing a micro perspective from the point of individual facility locations. The use of the embedded variable, state enforcement strategies will have within case variance and between case variance. The logic model depicts the interactions between the variables presented in Table 1 below, which are depicted in Figure 3.

Table 1. Dependent, independent, and rival variables.

Variable	Type of Variable	Contingency Theory Classification	Data Source
Inspection	Dependent	External influence	EPA ECHO database
Innovation of Organizational Structure Extensive variety of Products Number of facility locations Operations in 10+ states Innovative business practices Facility size Revenue	Independent	Structural elements	Archival firm information
State enforcement strategies	Rival controlled, embedded	External influence	Archival state regulatory information

Figure 3. Logic Model



5.2.1 *Dependent Variable*

The dependent variable, inspections, represents the regulatory enforcement event used to determine the type of enforcement strategies used by states and lay the foundation for determining if a regulatory choke point is occurring. The inspection variable represents the count of inspections reported by a state over a five year period and originates out of external influence from regulatory groups.

5.2.2 *Independent Variables*

The independent variables represent the innovation of the organizational structure and the size of the organization structure in terms of contingency theory. I have the total number of facilities by state and classified structural element reported by the firm and ECHO; the reported number of products offered within a particular store platform; the average size of particular store platforms; annual revenues; and assessment of the historical and continual use of innovative business practices.

5.2.3 *State Enforcement Strategies*

State enforcement strategies are a rival, embedded variable which this research has controlled through the assessment and characterization of states as low and high enforcement. The overall number of inspections performed allows a state to be classified as a low enforcement and a high enforcement state. Both of these enforcement strategies are a deterrent enforcement strategy. (Potoski, 2004)

5.2.4 *Regulatory Enforcement Types and Choke Points*

There are three types of regulatory enforcement²: minimal enforcement, distributive enforcement; and focused enforcement. Minimal enforcement is characterized as enforcement events occurring so infrequently negligible impact occurs to the organizational system and does

² It is worth noting that a determination of regulatory applicability does not mean the organization will experience regulatory enforcement activities. With the sheer numbers of regulated facilities throughout the US, it is possible that facilities adhering to regulatory submission requirements will never trigger a regulatory enforcement event or be randomly selected for an enforcement event. EPA does not establish universal inspection percentages; the percentage of regulatory enforcement events is determined at the state/territory level and varies according to the state/territory priorities in conjunction with EPA.

not lead to emergence of a regulatory choke point. Distributive enforcement is when a regulatory agency conducts enforcement events across all structural elements of the system on a regular frequency. Focused enforcement is when a regulatory agency targets specific facility locations for enforcement events on a regular frequency. Distributive and focused enforcement events have the potential to lead to the emergence of regulatory choke points; however, the use of these enforcement strategies does not guarantee the emergence of a regulatory choke point. In order for a regulatory choke point to occur, the additional characteristic of listed below must also occur.

A chronic regulatory choke point occurs when the magnitude of inspected facilities across the entire organizational system is large and the regulatory group uses distributive enforcement. A chronic choke point results in congestion of the business system. An acute choke point occurs when a high-level of repeated inspections occur at particular facilities and the regulatory group uses focused enforcement. This high incidence of regulatory enforcement can result in a risk to the business system. Additionally, a firm experiencing chronic and/or acute regulatory choke points can experience fluctuations between the two different types of choke points or a transition from one type of choke point to the other.

Due to the complexity of external influence, the potential exists for other rival variables. Known rival variables not controlled in this study are, but not limited to: 1) the occurrence of no enforcement events by a state; 2) emergence of a combination of acute and chronic enforcement events; 3) the lack of state enforcement strategies; and 4) non-size-based structural elements.

5.3 Enforcement and Compliance History Online (ECHO) Data

The inspection data used in this study was obtained through the EPA ECHO³ system (US Environmental Protection Agency, 2010a). ECHO represents a compilation of compliance

³ The accuracy of the information obtained from ECHO is not guaranteed. An example of inaccurate reporting information from a state would be seen in the California data. California reports no inspections within the last five

and enforcement records pertaining to facilities regulated by federal, state and/or local agencies, such as Clean Air Act stationary sources, Clean Water Act permitted dischargers, and RCRA hazardous waste generators entered into EPA national databases. The EPA national databases of interest for this study are the Resource Conservation and Recovery Act Information System (RCRAInfo) and the supplemental Federal-only database Integrated Compliance Information System. EPA reports the databases are “copied monthly into the Integrated Data for Enforcement Analysis system and made available in the ECHO Web interface to allow internet access to integrated data.” (US Environmental Protection Agency, 2010a) The information contained within the ECHO database does not provide facility-level information pertaining to observations made during an inspection event. Therefore, I have more complete data regarding the size structural elements and the aggregate inspections performed at the firm level. Table 2 provides a list of the data variables obtained from ECHO and generated by the researcher.

Table 2. Data variables obtained from ECHO and researcher generated

Data Variable	Origination of Data	Timeframe of Data
Facility Name	EPA Form 8700-12	Current
Facility Street	EPA Form 8700-12	Current
Facility City	EPA Form 8700-12	Current
Facility State	EPA Form 8700-12	Current
Facility ZIP Code	EPA Form 8700-12	Current
Program ID#	State Databases	Current
Inspections ⁴	State Databases	5 yrs

years for any of the retailers selected. However, the State of California settled an environmental lawsuit against Home Depot U.S.A., Inc. in 2007 for \$9.9 million and filed an environmental lawsuit against Target Corporation in 2009 for \$8.65 million. Environmental enforcement events are the foundation for determining the violation of environmental regulations leading to lawsuits; therefore, it is with conviction that I state California inspected a percentage of the facilities listed within the ECHO database. The extensive nature of the criteria for selection for states was developed to attempt to exclude states with suspect and/or inaccurate reporting information from the research. Therefore, the data provided by the ECHO database system is not robust due to reporting inconsistencies by states and territories. All the variables are restricted by the information reported and managed by state and federal agencies.

⁴ There are inherent limitations to the data obtained through ECHO. The “inspections” variable provides information pertaining to the number of facility inspections within the past 5 years; however, the frequency of the inspections is not provided. For example, if a facility has been inspected five times in the past years, one does not know if the inspections occurred one per year or were clustered surrounding a particular environmental violation. This lack of distinction limits the ability to determine if an individual facility is experiencing minimal, chronic, and/or acute enforcement. However, the lack of distinction does not preclude the assessment of minimal, chronic, and/or acute regulatory choke points at the firm level through aggregated descriptive analysis.

Obtaining the variable information provided in Table 2 above facilitated the generation of the structural element variable. The structural element variable was generated by the researcher for classification of facilities by contingency theory structural elements of the organizational system: distribution center, store, return center, and corporate facilities. Identification and classification of the structural element was performed by verifying facility address location and facility identification numbers from firm-managed websites, firm-managed materials, and review of aerial photographs. Table 3 provides the structural element variables generated.

Table 3. Structural element variables generated by researcher

Generated Data Variable	Origination of Data	Timeframe of Data
Structural element Distribution Center Store Return Center Corporate facilities	Classification by researcher	N/A

5.4 Firm Selection

For the purpose of this study, the following Big Box retailers have been selected: Walmart Stores, Inc. and Target Corporation. The selection of these firms was based upon a variety of criteria established in contingency theory. The criteria selected below addresses the Big Box retail industry's perpetual increase in the size of structural elements comprising the organizational system and the prevalence of the use of innovation. First, the selected firm's organizational structural elements had to conform to the Big Box retail system logic model established using contingency theory provided in Figure 1, which is consistent for the retailers selected. Second, the organization had to meet the distinguishing characteristics of a Big Box business system innovation of: 1) number of facility locations; 2) facility sizes ranging between 90,000 to 200,000+ square feet; 3) extensive variety of products; and 4) classification as a national chain due to operating in more than 10 states (Kane, 1993). Third, the firm was ranked

within the top five retail establishments in the 2009 STORES Top 100 Retailers⁵ list. Fourth, the firm was ranked within the top five favorite online retailers in the 2009 STORES Favorite 50 Online Retailers⁶ list. Fifth, the firms were selected to represent the same type of Big Box retail system: discounters. Sixth, the firms were selected to represent a large discounter and a small discounter based upon total number of facility locations. Table 4 provides the selection criteria and results below.

Table 4. Selection criteria by firm.

Firms ⁷	Selection Criteria						Pair Selection
	Number of facility locations	Facility size: 90,000 to 200,000 ft ²	Extensive variety of products	Operating in 10+ states	Ranked Top 5 Retail Establishments	Ranked Top 5 Online Retailers	
Walmart Stores, Inc.	3,503	Yes	Yes	Yes	1	2	Discounter
Target Corporation	1,777	Yes	Yes	Yes	5	6 ⁸	Discounter

5.5 State Selection

For the embedded analysis, the following states have been selected: Arkansas, Kentucky, Missouri, and Texas. To be able to classify a state as a high enforcement and low enforcement state, the following criteria were established and analyzed, which in turn facilitated the creation of the state enforcement strategy variables low enforcement and high enforcement⁹. Each state is required to undergo the State Review Framework (SRF) for assessment of state performance in regards to program effectiveness, identification of areas for the improvement of program management practices, and to ensure fair and consistent

⁵ "The STORES Top 100 Retailers are ranked by annual revenues as reported in SEC filings, public statements by the companies and, where noted, estimates based on Planet Retail research." (Schulz, 2009)

⁶ The STORES Favorite 50 Online Retailers are ranked according to consumer surveys conducted by Netezza. (Reda, 2009)

⁷ Firm information obtained from the following sources: (Wal-mart Stores Inc., 2010a), (Target Corporation, 2010b), (Schulz, 2009), (Reda, 2009)

⁸ Target Corporation did not satisfy the requirements for selection regarding ranking as an online retailer; however, it was determined the ranking of six was not significant enough to warrant exclusion.

⁹ The determination of state enforcement strategies relied on the use of SRF reviews conducted by EPA due to the lack of publicly-available information on state websites regarding enforcement strategies. The possibility exists that the determination of enforcement strategy could be in opposition to the state's recognized enforcement strategy. Due to the limitations of the data and generated variables, results of this study should be interpreted accordingly.

enforcement and compliance across all regions and states. (US Environmental Protection Agency, 2010a) The selection of these states was based upon an assessment of both SRF data and ECHO data.

First, the SRF Trend Reports were reviewed to determine the inspection coverage for active small quantity generators (SQGs) from 2004 to 2008. Second, the SRF multi-state report was reviewed to determine the inspection coverage of active Small Quantity Generators (SQGs) from 2004 to 2008. For the criteria listed above, a high enforcement state is classified as a state exceeding 20% inspection coverage and a low enforcement state is classified as a state with inspection coverage below 20%.

Third, to be consistent with selection criteria for the firms, the states were selected based upon total number of SQG facility locations. A 15% variation between total numbers of SQG facility locations was considered sufficient for comparative purposes. Fourth, the number of total firm locations for both Walmart and Target reported in ECHO had to exceed 100. Fifth, the ratio of firm locations to inspections reported in ECHO had to exceed 50% for high enforcement states and be below 5% for low enforcement states with inspections performed¹⁰. Table 5 provides the selection criteria and results below.

¹⁰ The following states reported no inspections of Walmart and Target facilities within the past five years: CA, DC, HI, LA, MD, MS, NE, and VT. Due to the lack of inspections reported within the ECHO database, these states were excluded from inclusion in the research.

Table 5. Classification of enforcement strategies by state¹¹.

State	SRF Trend Report Data					SRF Multi-State Report		ECHO Data		Enforcement Classification
	Inspection % coverage of active SQGs					Total SQG Facilities	Insp. %	Firm Facilities	Insp. %	
AR	8.8%	11.3%	11.0%	11.0%	12.2%	343	11.7%	125	2.4%	Low
KY	57.8%	59.5%	62.0%	67.0%	75.2%	405 ¹²	77.3%	96 ¹³	92.7%	High
MO	15.5%	16.9%	16.1%	15.7%	19.6% ₁₄	2516	20.2%	158	39.9% ₁₅	High
TX	11.1%	11.1%	11.6%	12.6%	13.7%	2852	14.7%	554	1.3%	Low

After classification of the states according to SRF and ECHO data as low and high enforcement states, the classifications of the states were compared with the agency's mission statement and philosophy, which are presented in Table 5. "Race-to-the-bottom" regulatory theory looks at the effect of interstate competition for industry resulting in leniency of environmental regulations. In contrast, "Race-to-the-top" regulatory theory suggests states actively seek out less pollution-intensive industries through active enforcement and activities. It is suggested a citizen-centered approach closely resembles a "race-to-the-top" approach toward regulatory enforcement while "race-to-the-bottom" resembles a collaborative-centered approach. A state's mission and policies should typically reflect a state's use of either a race-to-the-bottom or a race-to-the-top approach towards regulatory enforcement. (Konisky, 2007)

¹¹ Information obtained from: (US Environmental Protection Agency, 2010a, 2010b)

¹² Kentucky did not satisfy the requirements for selection regarding a 15% variation for the total number of SQG facility locations with Arkansas. The 15% variation represented facilities with total number of SQG facility locations ranging from 344 to 466. It was determined the total number of SQG facility locations at 343 was not significant enough to warrant exclusion.

¹³ Kentucky did not satisfy the requirements for selection regarding total number of firms reported in the ECHO data for Walmart and Target to exceed 100. It was determined the total number of firms reported of 96 was not significant enough to warrant exclusion.

¹⁴ Missouri did not satisfy the requirements for selection regarding inspection percentage coverage of active SQGs at 20%; however, it was determined the percentage coverage of 19.6% was not significant enough to warrant exclusion.

¹⁵ Missouri did not satisfy the requirements for selection regarding the ratio of firm locations to inspections reported in ECHO to exceed 50% for high enforcement states. It was determined 39.9% was significantly outside the established protocol; however, review of the ECHO data indicated no other states, with the exclusion of Kentucky, met the 50% standard. Therefore, it was determined Missouri would be included as a High Enforcement State.

Table 6. Agency mission and philosophy by state¹⁶

State	Agency Mission	Agency Philosophy
Arizona Department of Environmental Quality	"To protect and enhance public health, welfare and the environment in Arizona."	"... ADEQ today administers a variety of programs to improve the health and welfare of our citizens and ensure the quality of Arizona's air, land, and water resources meets healthful, regulatory standards"
Kentucky Department for Environmental Protection	"To protect and enhance Kentucky's environment. This mission is important because it has a direct impact on Kentucky's public health, our citizens' safety and the quality of Kentucky's valuable natural resources - our environment."	"...Kentucky's residents and businesses must work together to preserve the resource quality and diversity that make Kentucky a great place to live, work and play. ... By working together, we will successfully keep Kentucky's environment as one of our greatest treasures "
Missouri Department of Natural Resources	"To protect, preserve and enhance Missouri's natural, cultural and energy resources"	"...The department deals with the critical area of energy, helps develop mineral resources in an environmentally safe manner, protects Missouri's land, air and water resources and works to preserve the state's historic and natural heritage through state parks and state historic sites"
Texas Commission on Environmental Quality	"Strives to protect our state's human and natural resources consistent with sustainable economic development. Our goal is clean air, clean water, and the safe management of waste."	"...we will: ...ensure that regulations are necessary, effective, and current; apply regulations clearly and consistently; ensure consistent, just, and timely enforcement when environmental laws are violated; promote and foster voluntary compliance with environmental laws and provide flexibility in achieving environmental goals; ..."

Review of the agency missions and philosophies reveals two trends: 1) a citizen-centered approach and 2) a collaborative-centered approach. Arizona and Missouri take a citizen-centered approach whereas Kentucky and Texas clearly attempt to have a collaborative approach with businesses. Therefore, the classification of states as high and low enforcement does not appear to be directly related to the agency's mission statement and philosophies. Additionally, the selection of states has resulted in opposing comparisons with Arizona and Texas classified as low enforcement states with divergent philosophies and Kentucky and Missouri as high enforcement states with divergent philosophies.

¹⁶ Information obtained from: (Arizona Department of Environmental Quality, 2010; Kentucky Department for Environmental Protection, 2010; Missouri Department of Natural Resources, 2010; Texas Commission on Environmental Quality, 2010)

CHAPTER 6: HISTORY OF THE BIG BOX BUSINESS SYSTEM INNOVATION

The retail industry has a varied extensive background in the US. At the turn of the 19th century, the reliance on retailers for the acquisition of goods and services was firmly established. In the mid-19th century, the department store, chain store, and mail-order business began to emerge in the marketplace. The chain store foundation revolved around the ability to provide similar types of merchandise while maintaining low overhead operational costs.

Fundamentals of the early-Big Box retail chains maintained the low overhead costs of the chains store through the development of stores using boilerplate, large, single-floor structures in undeveloped or underdeveloped areas. By 1962, Walmart, K-mart, and Target were established retail organizations utilizing a chain store organizational platform. The key differences between the chain store organization and the Big Box business system innovation are the expansion of products to include related products and the increased quantity and variety of products. By the 1990s, the Big Box retail chains started to focus on consumers and markets by stepping away from the boilerplate store structure towards a more appealing consumer and product-focused experience. (Hendrickson, 1979; Lebharr, 1963; Spector, 2005)

The retail industry is currently comprised of many different types of businesses; however, the appearance of the “Big Box” sector has transformed the US landscape and business operations. “Big Box” retailers are categorized into three different categories: 1) category killers, 2) discounters, and 3) warehouse clubs (Hahn, 2000). Category killers are classified as chains with niche specializations, such as, but not limited to, The Home Depot, Office Depot, and PetSmart. Discounters are classified as chains providing products at reduced prices, such as, but not limited to, Walmart, Target, and K-mart. Warehouse clubs are classified as chains providing products in larger quantities than observed at traditional department stores or grocery stores, such as, but not limited to, Sam’s Club, BJ’s, and Costco.

CHAPTER 7: RESOURCE CONSERVATION AND RECOVERY ACT

7.1 Legislative Review

RCRA was enacted as P.L. 94-580 in 1976. The act was “to provide technical and financial assistance for the development of management plans and facilities for the recovery of energy and other resources from discarded materials, for the safe disposal of discarded materials, and to regulate the management of hazardous waste” (The Library of Congress, 1976). In 1980, RCRA was promulgated in the Code of Federal Regulations (CFR) in sections 262 and 263 of Title 40: Protection of the Environment. In 1984, amendments to RCRA were enacted as P.L. 98-616 (United States, 1984) and promulgated as 40 CFR §260 to §265. Since 1984, RCRA has experienced minor regulatory changes. From a contingency theory perspective, the enforcement of RCRA is associated with the regulatory group external influence.

RCRA was passed to “express the intent and findings of Congress that alternative energy sources for public and private consumption are necessary to reduce dependence on petroleum, natural gas, and nuclear and hydroelectric generations as a power source. Establishes the objective of establishing a cooperative effort to recover potential energy sources and other valuable materials from discarded material “ (The Library of Congress, 1976).

In addition, the 1976 P.L. required the following: 1) development of guidelines for solid waste management; 2) publishing of guidelines for solid waste management; 3) establishment of criteria for identifying hazardous waste materials; 4) development of standards to seasonably protect human health from hazardous waste; 5) establish standards for State hazardous waste programs; and 6) establish procedures for federal enforcement of hazardous waste regulations. (The Library of Congress, 1976)

The 1984 P.L. amendments required the following key provisions to RCRA: 1) revision of identification and listing of hazardous waste for small quantity waste generators; 2) manifest

system analysis associated with small quantity waste generators; 3) develop minimization guidelines for hazardous wastes; and 4) development of federal enforcement provisions for hazardous waste management. (The Library of Congress, 1984)

7.2 Intent of RCRA

One of the difficulties with regulation is often in the determination of the extent the scope of the regulation will impact organizations and businesses, which become the regulated community. In 1980, EPA began publishing guidance documents for the regulated community to provide clarification on RCRA regulations. In the Hazardous Waste Information pamphlet (1980, p. 1), EPA stated “unavoidably generated in the production of many common materials...hazardous waste emerged in the late 1970's as a national health and environmental concern. Agriculture, hospitals, laboratories, and governmental activities also generate hazardous wastes.” RCRA encompasses “facilities typically thought of as hazardous waste generators, such as industrial manufacturers, but also government agencies and small businesses, such as a local dry cleaner generating small amounts of hazardous solvents, or a gas station with underground petroleum tanks” (US Environmental Protection Agency, 2008b, pp. I-5).

Guidance documents provided by EPA are clear in regards to the applicability of RCRA to the generation of hazardous wastes through the productions of materials by industrial operations and/or activities. The identification of the regulated community in terms of industrial processes, operations, and/or activities and/or generation associated with processes, operations, and/or activities is consistent throughout the documents from 1980 to 2008. In 2008, the use of the word “commercial” was introduced into the guidance documents in relation to the definition of a solid waste.

Specifically, the document stated: “RCRA defines the term solid waste as: ... Other discarded materials, including solid, semisolid, liquid, or contained gaseous materials resulting from industrial, commercial, mining, agricultural, and community activities (e.g., boiler slags)”

(US Environmental Protection Agency, 2008b, p. II2). In comparison, 40 CFR §261.2 states the following:

(a) (1) A solid waste is any discarded material that is not excluded under §261.4(a) or that is not excluded by a variance granted under §§260.30 and 260.31 or that is not excluded by a non-waste determination under §§260.30 and 260.34.

(2)(i) A discarded material is any material which is:

(A) Abandoned, as explained in paragraph (b) of this section; or

(B) Recycled, as explained in paragraph (c) of this section; or

(C) Considered inherently waste-like, as explained in paragraph (d) of this section; or

(D) A military munition identified as a solid waste in §266.202.

(b) Materials are solid waste if they are abandoned by being:

(1) Disposed of; or

(2) Burned or incinerated; or

(3) Accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated.

The codified definition of solid waste provided at 40 CFR §261.2(a),(b) does not specifically identify types of organizations in association with the determination of solid waste. The evolution of organizational types used within the definition of solid waste in guidance documents has changed drastically over the years. To complicate the confusion presented by the guidance documents, definitions for the following, at a minimum, are not provided in the codified regulations or the guidance documents: industry, commercial, operation, and/or activities.

In 1980, the organizations identified industrial manufactures (i.e. production of many common materials), agriculture, hospitals, laboratories, and governmental activities were clearly associated with organizations generating hazardous wastes through the productions of materials by operations and/or activities. By 2008, the organizations were identified industrial, commercial, mining, agricultural, and community activities. Industrial, mining, and agricultural activities continue to be organizations generating hazardous wastes through the productions of materials by operations and/or activities. However, commercial and community activities are

organizations generating hazardous wastes through operations and/or activities, exclusive of the productions of materials.

The clear introduction and migration of terms regarding applicability to organizational types indicates a potential divergence from the original intent of RCRA. This migration and intent divergence brings to the forefront questions regarding the impact of RCRA enforcement on the Big Box business system innovation. The conflict between the intent and impact of RCRA to the Big Box business system innovation has not been addressed and has policy implications at a national, state, and/or local level. As existing US environmental regulations age, it is questionable whether the enforcement of the regulations will be able to adequately address the environmental concerns associated with new business system innovations without causing excessive impacts to organizations. Therefore, it is arguable that business system innovations stress the enforcement of regulations.

7.3 RCRA and Enforcement

RCRA is administered by EPA while being managed and implemented by state and territory governments. Currently, 50 states and territories have received state authorization for the implementation of RCRA. (Atlas, 2007; US Environmental Protection Agency, 2010c). Due to the extensive nature of the RCRA regulations and the prevalence of implementation on a national-scale, this research will utilize RCRA as the environmental policy associated with the environmental factor regulatory groups.

The EPA Office of Enforcement and Compliance Assurance (OECA) is tasked with the development of short-term and long-term strategic plans for EPA and associated state/territory agencies. OECA publishes the National Program Managers (NPM) Guidance document on a revolving three year cycle supplemented with annual updates. The NPM is the primary long-term planning document used to establish the basis for national program priorities and activities for the enforcement and compliance assurance program. Using the time span of the ECHO data, the NPMs covering 2005 to 2010 were reviewed to ascertain the EPA recommended

factors states should consider in developing compliance and enforcement activities. The factors have remained relatively consistent from 2005 to 2010 recommending the focusing of enforcement activities as follows:

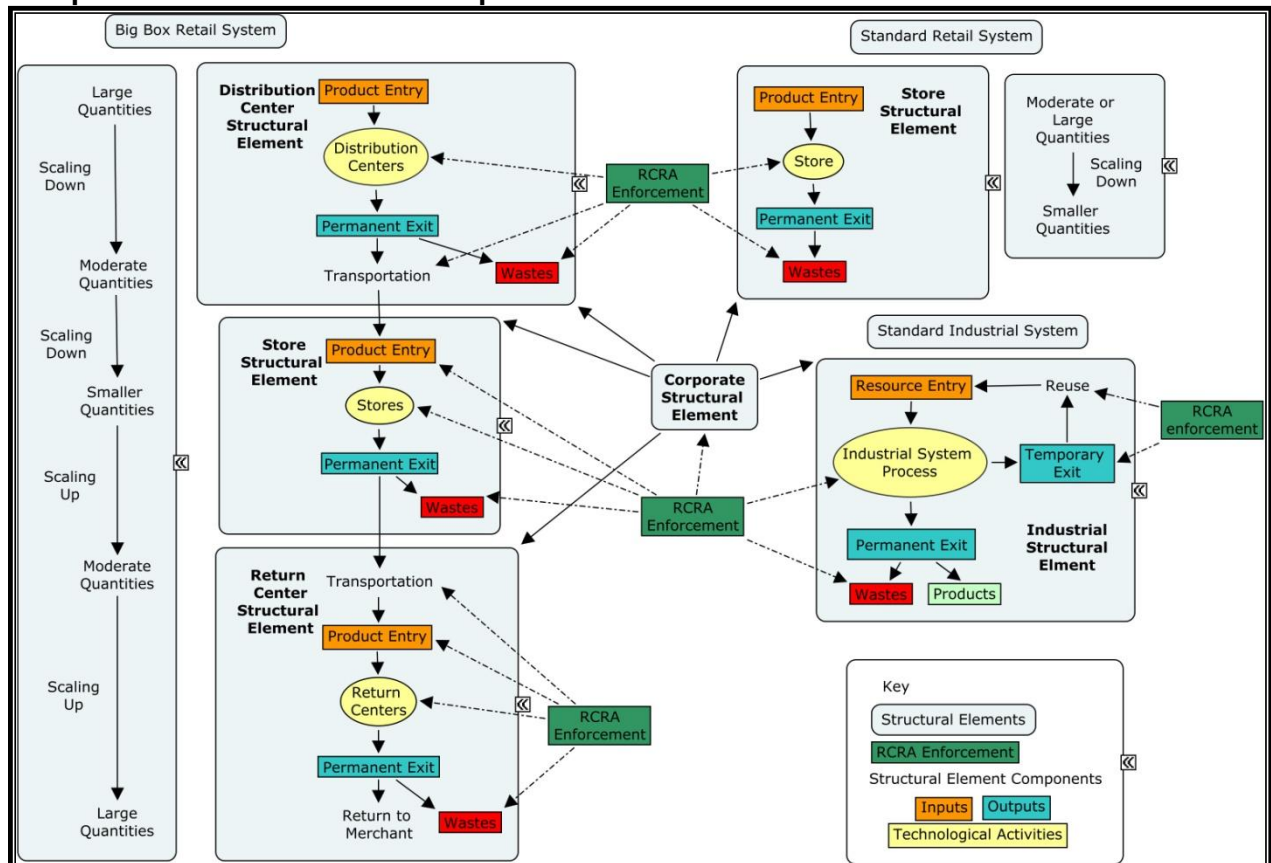
- 1) Never inspected generators;
- 2) Facilities that are significant non-compliers;
- 3) Facilities that are the subject of citizen complaints;
- 4) Non-notifier facilities that are believed to be generating hazardous waste;
- 5) Persons that generate, transport, treat, store, or dispose of significant quantities of hazardous wastes, in particular those in proximity to population centers or environmentally sensitive areas; and
- 6) Recalcitrant or repeat violators.

Priority five would indicate a national compliance and enforcement strategy applicable to the Big Box business system innovation due to an emphasis placed on locations with “proximity to population centers”. (US Environmental Protection Agency, 2004, 2005, 2006, 2007, 2008a, 2009) It is expected the enforcement strategies and priorities used by the states will vary in their enforcement levels from low to high enforcement. The difference of implementation strategies of a regulation by 50 different states and territories drastically increases the uncertainty and variability associated with enforcement strategies. (Atlas, 2007)

In addition, states and territories with authorization for the implementation of RCRA are able to codify and expound the requirements of RCRA as state statutes and laws. Therefore, in addition to the base requirements of RCRA, organizations are subject to additional state regulations to ensure compliance. These factors increase the uncertainty of an organization’s structural elements due to the high degree of variability associated with the influence of the regulatory group external influence due to the enforcement and implementation of RCRA and associated state statutes. It is hypothesized the trigger for enforcement of RCRA will experience variance based upon political priorities from the state/territory-level and EPA. (Atlas, 2007)

The RCRA regulations commonly impact business operations associated with implementation of hazardous waste classification, storage, and disposal. From a contingency theory perspective, these aspects are associated with size of the organization. Examples of implementation of RCRA observed as aspects of size are: cumulative hazardous waste storage quantities; cumulative hazardous waste yearly disposal quantities; and variance in the diversity, quantity, and scaling of hazardous waste products maintained on-site. Figure 4 depicts the potential RCRA interactions of the Big Box retail system, standard retail system, and standard industrial systems.

Figure 4. Big Box retail system, standard retail system, and standard industrial system with potential RCRA enforcement points



The standard industrial system has four potential interactions associated with RCRA enforcement. The standard retail industry system has two potential interactions associated with

RCRA enforcement. In comparison, the Big Box retail system has 10 potential interactions associated with RCRA enforcement. Table 7 below quantifies the potential RCRA interactions in term of structural element depicted in Figure 4 above.

Table 7. Number of potential RCRA enforcement interactions in structural element.

	Distribution Center	Store/Industrial	Return Center	Corporate	Total Interactions
Standard Industrial System	N/A	4	N/A	1	5
Standard Retail System	N/A	2	N/A	1	3
Big Box Retail System	3	3	4	1	11

The standard industrial system and standard retail system experience 80% and 66%, respectively, of potential RCRA enforcement interaction within a single structural element. The remaining potential RCRA enforcement interaction occurs in the corporate element for the standard industrial system at 20% and the standard retail system at 33%. In comparison, the Big Box retail system experiences 90% of potential RCRA enforcement interactions across three integral structural elements. The corporate structural element represents 9% of potential RCRA enforcement. The high percentage of potential RCRA interactions occurring within the integral structural elements can have substantial impacts to the Big Box retail system.

To further complicate the implementation of RCRA, the enforcement process is hypothesized to occur through formal and informal processes. The formal process of enforcement of RCRA is centered around the monitoring of the base application of the RCRA regulations through required organizational submissions, such as, but not limited to notifications of hazardous waste activities and/or yearly reports, to state and federal agencies. These base requirements of the RCRA regulations are linked with the organizational size components listed above. If one of the size components listed above exceeds codified requirements, it triggers the beginning of the enforcement process. It is suggested that informal monitoring is performed of additional organizational size components of the Big Box business system innovation, such as nation-wide facility locations and nation-wide organizational visibility through media innovations.

These components are not intrinsically linked through codification of RCRA regulations; however, it is suggested they are linked to the current environmental political climate of the states and EPA. Informal enforcement monitoring is perceived as a rival variable and will not be investigated further in this study.

CHAPTER 8: CASES

8.1 Walmart

8.1.1 *Firm History and Innovation*

Walmart's core mission, "We save people money so they can live better", is at the heart of the growth Walmart has exhibited and pursued since 1962. Since the opening of Walmart's first store in Rogers, Arkansas, Walmart has encouraged growth and innovation in the retail industry. By the mid-1970s, Walmart quickly embraced the innovation associated with the emergence of the Big Box business system innovation through growth in facility locations and advances in product distribution; product and service differentiation; product processing services; and communications. Walmart has grown domestically to have facility locations in the 50 US states and many US territories. Financially Walmart has grown from sales of \$340.3 million in 1975 to \$401.2 billion in 2009. (Wal-mart Stores Inc., 2006, 2007, 2008, 2009, 2010a, 2010b)

Walmart operates four store platforms: Supercenters, Discount Stores, Neighborhood Markets, and Sam's Club. The store formats differ based upon square footage and number of items. The two platforms that meet the requirements of a Big Box business system innovation are the Supercenter with an average of 186,000 ft² including approximately 142,000 products and the Discount Store with an average of 108,000 ft² including approximately 120,000 products. Furthermore, Walmart opened its first distribution center in Bentonville, Arkansas in 1970 and continued to push the limit on size by opening the largest distribution center in 1980, commensurate with the time, in Palestine, Texas. The Supercenter and Discount Store organizational system adheres to the structural elements depicted in Figure 1.

As early as 1978, Walmart was expanding the diversity of their product base and adding additional services, such as the Walmart pharmacy, auto service center, jewelry department, and 1-hour photo lab. In 1991, Walmart introduced the "Sam's American Choice" brand

products to further capitalize on the ability to provide mass quantities of products at discount prices. (Wal-mart Stores Inc., 2010b) With the number of products carried by Walmart, many of the products can become hazardous wastes if the product is thrown away or the container/product is damaged causing the product to spill. Examples of products that could become hazardous or universal wastes found in retailers throughout the US are, but not limited to, concentrated cleaning supplies, drain cleaning products, make-up, fertilizers, soil with fertilizer additives, automotive engine oil, paint, compact fluorescent lamps, pool chemicals, and automotive batteries. These products, and many more, are the triggers for the RCRA enforcement points depicted in Figure 4.

Technological innovations facilitated the development of the Walmart Satellite Network in 1987, which is the largest private satellite communication system in the United States. The network effectively connects the operating units of the company and the Home Office with two-way voice, data, and one-way video communication. Embracing technological advancements in product processing systems, Walmart installed bar-code scanning capabilities in 99 percent of stores by 1988. (Wal-mart Stores Inc., 2010b)

Walmart joined the fight for environmental sustainability and awareness in 1994 with the development of environmentally-friendly facilities intended to save energy, conserve natural resources, and reduce pollution. By 2005, environmental sustainability became one of Walmart's core business missions and objectives. (Wal-mart Stores Inc., 2010b) By 2009, Walmart had developed the "Sustainability 360" program to become a leader in sustainability for the retail industry, as well as, "...take sustainability beyond our direct footprint to encompass Walmart's associates, suppliers, communities, and customers" (Wal-mart Stores Inc., 2010a).

8.1.2 Nationally

The ECHO data reported a total of 3,284 facilities for Walmart across 48 states. ECHO reported 89 distribution centers, 3,176 stores, eight return centers, and 11 corporate facilities. Walmart experienced 487 inspections over the past five years. The frequency of the inspections

per facility ranged from one visit to five visits, with a mean of 1.34 visits. Specifically, 290 facilities were inspected once; 43 facilities were inspected twice; 17 facilities were inspected three times; 10 facilities were inspected four times; and four facilities were inspected 5 times. Based upon the ECHO data, the ratio of inspection frequency is 1:9.02, whereas the aggregate inspection ratio is 1:6.74. Therefore, across all states, Walmart received an inspection for approximately every six facilities with the inspections concentrated within the store structural element.

8.1.3 *Arkansas, Kentucky, Missouri, and Texas*

The ECHO data reported a total of 751 facilities for Walmart for the selected states: Arkansas, Kentucky, Missouri, and Texas. ECHO reported 29 distribution centers, 710 stores, four return centers, and eight corporate facilities. Walmart experienced 146 inspections over the past five years. The frequency of the inspections per facility ranged from one visit to five visits, with a mean of 1.39 visits. Specifically, 77 facilities were inspected once; 17 facilities were inspected twice; 10 facilities were inspected three times; and one facility was inspected 5 times. The high enforcement strategy states, Kentucky and Missouri, conducted 135 inspections and the low enforcement strategy states, Arkansas and Texas, conducted 11 inspections.

Table 8 depicts a comparison of ECHO data and firm data pertaining to the number of facilities. The comparison of ECHO data depicts more store and return center locations than reported by the firm; however, the number of distribution centers is less than reported by the firm and the reported corporate office locations match. The inflated numbers for stores and return centers in the ECHO data confirms reporting errors within the ECHO system. It is assumed the errors are a result of duplicate entries or reflect facilities that have closed.

Table 8. Number of facilities, inspections, and enforcement type by state¹⁷

State	Number of Facilities								Inspections	Enforcement Type
	ECHO Data ¹⁸				Firm Data					
	DC	Store	RC	Corp.	DC	Store	RC	Corp.	ECHO Data	
Arkansas	11	96	3	7	20	80	0	7	3	Low
Kentucky	2	90	0	0	2	84	0	0	87	High
Missouri	3	118	0	0	3	119	0	0	48	High
Texas	13	406	1	1	16	338	0	0	8	Low
Total	29	710	4	8	41	621	0	7	146	
Total	751				669					

Table 9 depicts the incident of inspections by state and structural element for the past five years as reported in the ECHO database. Across the states, distribution centers were inspected twice; stores were inspected 140 times; return centers were inspected four times, and corporate facilities received no inspections. Comparing frequency of inspections across states, distribution centers and corporate facilities received no repeat inspections; however, a single return center in Arkansas was inspected three times and stores received repeat inspections. Based upon the ECHO data, the aggregate inspection ratio is 1:5.56 for the high enforcement states and the aggregate inspection ratio is 1:125.17 for the low enforcement states. Additionally, both the high enforcement and low enforcement state inspections were concentrated primarily within the store structural element. Therefore, Walmart received higher frequencies of inspections from the high enforcement states than low enforcement states.

A review of Arkansas reveals 117 facilities reported in the ECHO database; however, minimal regulatory activity has occurred over the past five years with inspection of a single return center facility three times. Based upon the ECHO data, the ratio of inspection frequency is 1:3, whereas the aggregate inspection ratio is 1:1. Based upon review of the ECHO data, Arkansas showed a concentration of inspections within the return center structural element; however, this could be a misleading assessment due to the fact a single facility was inspected.

¹⁷ Information obtained from: (US Environmental Protection Agency, 2010a; Wal-mart Stores Inc., 2010b)

¹⁸ The Neighborhood Market and Sam's Club platforms were not included in the ECHO data obtained due to the name differentiation excluding "Walmart" within the facility name.

A review of Kentucky reveals 92 facilities reported in the ECHO database with the majority of inspection occurring at the store structural element with a single inspection of a distribution center. Based upon the ECHO data, the ratio of inspection frequency is 1:2 for distribution centers and 1:1.17 for stores. In comparison, the aggregate inspection ratio is 1:2 for distribution centers and 1:1.03 for stores. Based upon review of the ECHO data, Kentucky showed a concentration of inspections within the store structural element.

A review of Missouri reveals 121 facilities reported in the ECHO database with the majority of inspection occurring at the store structural element with a single inspection of a distribution center. Based upon the ECHO data, the ratio of inspection frequency is 1:3 for distribution centers and 1:2.57 for stores. In comparison, the aggregate inspection ratio is 1:3 for distribution centers and 1:2.51 for stores. Based upon review of the ECHO data, Missouri showed a concentration of inspections within the store structural element.

A review of Texas reveals 421 facilities reported in the ECHO database; however, minimal regulatory activity has occurred over the past five years with inspection of four stores and a single return center. Based upon the ECHO data, the ratio of inspection frequency is 1:101.5 for stores and 1:1 for return centers. In comparison, the aggregate inspection ratio is 1:58 for stores and 1:1 for return centers. Based upon review of the ECHO data, Texas showed a concentration of inspections within the return center structural element; however, this could be a misleading assessment due to the relatively small number of return centers located within the state.

Table 9. Incident of inspections by state and structural element.

State	Structural element	Inspection Frequency (5 yrs)				Total Insp. Frequency	Ratio of Inspection Freq. to Facility #	Ratio of Aggregate Insp. per Facility #
		1	2	3	5			
AR	Distribution Center	0	0	0	0	0	0	0
	Store	0	0	0	0	0	0	0
	Return Center	0	0	1	0	1	1:3	1:1
	Corporate	0	0	0	0	0	0	0
	<i>Total Aggregate Insp.</i>	0	0	3	0	3		
KY	Distribution Center	1	0	0	0	1	1:2	1:2
	Store	27	15	8	1	51	1:1.7	1:1.03
	Return Center	--	--	--	--	--	--	--
	Corporate	--	--	--	--	--	--	--
	<i>Total Aggregate Insp.</i>	28	30	24	5	87		
MO	Distribution Center	1	0	0	0	1	1:3	1:3
	Store	45	1	0	0	46	1:2.57	1:2.51
	Return Center	--	--	--	--	--	--	--
	Corporate	--	--	--	--	--	--	--
	<i>Total Aggregate Insp.</i>	46	2	0	0	48		
TX	Distribution Center	0	0	0	0	0	0	0
	Store	2	1	1	0	4	1:101.5	1:58
	Return Center	1	0	0	0	1	1:1	1:1
	Corporate	0	0	0	0	0	0	0
	<i>Total Aggregate Insp.</i>	3	2	3	0	8		

8.2 Target

8.2.1 Firm Innovation

Target's core mission, "Expect More. Pay Less", is at the heart of Target's growth and expansion. Since 1961, the founders of Target drove the retail industry towards the development of discount retail chains, which laid the foundation for the emergence of the Big Box business system innovation. Target has been on the cutting edge of the development of the core characteristics of the Big Box business system innovation through growth in facility locations and advances in product distribution; product and service differentiation; product processing services; and media. Target has grown domestically to have facility locations in 49 US states. Financially Target has grown from annual sales of \$1 billion in 1975 to \$62.9 billion in 2008. (Target Corporation, 2006, 2007, 2008, 2009, 2010a)

Target operates two store platforms: General Merchandise stores and SuperTarget. The store formats differ based upon square footage and number of items. Both platforms meet the requirements of a Big Box business system innovation with an average of 126,000 ft² and 174,000 ft², respectively. Target does not provide information pertaining to the number of products contained within each platform; however, they state they carry general merchandise and selected grocery products offering the convenience of one-stop shopping for customers. Target opened its first distribution center in Fridley, Minnesota in 1969. The organizational system for both the General Merchandise stores and SuperTarget conforms to the structural elements depicted in Figure 1.

The foundation for the development of Target was to provide the "best of the fashion world with the best of the discount world" by having a retail store with more than 75 departments (Target Corporation, 2010a). Target has expanded the diversity of their product base through premier specialty brands, such as Archer Farms premium grocery products, Sonia Kashuk Professional Makeup Collection, Sutton & Dodge exclusive premium meat brand, and Choxie exclusive premium brand of chocolates. In 2001, Target introduced the "Market Pantry" brand products to further capitalize on the ability to provide mass quantities of quality products at discount prices. Target is, also, well-known for their collaborative efforts with designers to create exclusive product lines ranging from, but not limited to, kitchen goods to fashion to furniture. (Target Corporation, 2010a) The diversity of products carried by Target means many of the products can become hazardous wastes if the product is thrown away or the container/product is damaged causing the product to spill. Examples of products that could become hazardous or universal wastes found in retailers throughout the US are, but not limited to, concentrated cleaning supplies, drain cleaning products, make-up, fertilizers, soil with fertilizer additives, automotive engine oil, paint, compact fluorescent lamps, pool chemicals, and automotive batteries. These products, and many more, are the triggers for the RCRA enforcement points depicted in Figure 4.

Target has embraced the use of media and technological innovations to further the growth of its enterprise. In 1974, Target began the use of planograms to accomplish a standardized product display to facilitate consistency across their stores. The first Target weekly newspaper advertisement appeared in 1975 and appeared online at www.target.com in 2000. Embracing technological advancements in product processing systems, Target was the first Big Box business system innovation to implement UPC bar-code scanning in 1988. (Target Corporation, 2010a)

Target's environmental commitments are centered on the following: providing eco-friendly choices for consumers; maintaining regulatory compliance; recycling; reducing their carbon footprint; building sustainable facilities; and reducing waste from products and packaging. In 2006, Target decided to use recycled plastic in the construction of their shopping carts to reduce the environmental impacts associated with the construction of metal shopping carts. (Target Corporation, 2010a)

8.2.2 *Nationally*

The ECHO data reported a total of 1,484 facilities for Target across 49 states. ECHO reported 32 distribution centers, 1,438 stores, one return center, and 13 corporate facilities. Target experienced 134 inspections over the past five years. The frequency of the inspections per facility ranged from one visit to three visits, with a mean of 1.12 visits. Specifically, 108 facilities were inspected once; 10 facilities were inspected twice; and two facilities were inspected three times. Based upon the ECHO data, the ratio of inspection frequency is 1:12.37, whereas the aggregate inspection ratio is 1:11.07. Therefore, across all states, Target received an inspection for approximately every 11 facilities with the inspections concentrated within the store structural element.

8.2.3 *Arkansas, Kentucky, Missouri, and Texas*

The ECHO data reported a total of 182 facilities for Target for the selected states: Arkansas, Kentucky, Missouri, and Texas. ECHO reported two distribution centers, 179 stores,

and one corporate facility. Target experienced 17 inspections over the past five years. The frequency of the inspections per facility ranged from one visit to two visits, with a mean of 1.21 visits. Specifically, 11 facilities were inspected once; and three facilities were inspected twice. The high enforcement strategy states, Kentucky and Missouri, conducted 17 inspections and the low enforcement strategy states, Arkansas and Texas, conducted zero inspections.

Table 10 depicts a comparison of ECHO data and firm data pertaining to the number of facilities. The comparison of ECHO data depicts less store locations than reported by the firm; however, the number of corporate facilities is more than reported by the firm and the reported distribution center facilities match. The numbers for stores in the ECHO data confirms reporting errors within the ECHO system. The errors could be associated with a lack of updated state facility information or the different RCRA facility classification of some of the Target store locations.

Table 10. Number of facilities, inspections, and enforcement type by state¹⁹.

State	Number of Facilities								Inspections	Enforcement Type
	ECHO Data ²⁰				Firm Data					
	DC	Store	RC	Corp.	DC	Store	RC	Corp.	ECHO Data	
Arkansas	0	8	0	0	0	8	0	0	0	Low
Kentucky	0	4	0	0	0	13	0	0	2	High
Missouri	1	35	0	1	0	39	0	0	15	High
Texas	1	132	0	0	2	198	0	0	0	Low
Total	2	179	0	1	2	258	0	0	17	
Total	182				260					

Table 11 depicts the incident of inspections by state and structural element for the past five years as reported in the ECHO database. Across the states, distribution centers and return centers were not inspected; stores were inspected 15 times; and a corporate facility was inspected twice. Comparing frequency of inspections across states, stores and corporate facilities received repeat inspections. The cross state comparison indicates the store structural element of the business system innovation receives the most enforcement events. Based upon

¹⁹ Information obtained from: (Target Corporation, 2010a; US Environmental Protection Agency, 2010a)

²⁰ Both the General Merchandise and SuperTarget platforms were included in the ECHO data obtained due to the name containing "Target" within the facility name.

the ECHO data, the aggregate inspection ratio is 1:10.71 for the high enforcement states and the aggregate inspection ratio is zero for the low enforcement states due to no inspections. Additionally, the high enforcement state inspections were concentrated primarily within the store structural element. Therefore, Target received higher frequencies of inspections from the high enforcement states which were concentrated within the store structural element.

A review of Arkansas reveals 8 facilities reported in the ECHO database; however, no regulatory activity has occurred over the past five years. A review of Texas reveals 133 facilities reported in the ECHO database; however, no regulatory activity has occurred over the past five years. Based upon review of the ECHO data, Arkansas and Texas showed no concentration of inspections within a specific structural element; however, this could be a misleading assessment due to the fact no facilities were inspected.

A review of Kentucky reveals four facilities classified as the store structural element reported in the ECHO database with the inspections occurring at the store structural element. Based upon the ECHO data, the ratio of inspection frequency and the aggregate inspection ratio are 1:2 for stores. Based upon review of the ECHO data, Kentucky showed a concentration of inspections within the store structural element; however, this could be a misleading assessment due to no other structural elements located within the state.

A review of Missouri reveals 37 facilities reported in the ECHO database with the majority of inspection occurring at the store structural element with a single inspection of a corporate facility. Based upon the ECHO data, the ratio of inspection frequency is 1:1 for corporate facilities and 1:3.18 for stores. In comparison, the aggregate inspection ratio is 1:1 for corporate facilities and 1:2.33 for stores. Based upon review of the ECHO data, Missouri showed a concentration of inspections within the corporate facility element; however, this could be a misleading assessment due to the relatively small number of return centers located within the state.

Table 11. Incident of inspections by state and structural element.

State	Structural element	Inspection Frequency (5 yrs)				Total Insp. Frequency	Ratio of Inspection Freq. to Facility #	Ratio of Aggregate Insp. per Facility #
		1	2	3	5			
AR	Distribution Center	--	--	--	--	--	--	--
	Store	0	0	0	0	0	0	0
	Return Center	--	--	--	--	--	--	--
	Corporate	--	--	--	--	--	--	--
	<i>Total Aggregate Insp.</i>	0	0	0	0	0		
KY	Distribution Center	--	--	--	--	--	--	--
	Store	2	0	0	0	2	1:2	1:2
	Return Center	--	--	--	--	--	--	--
	Corporate	--	--	--	--	--	--	--
	<i>Total Aggregate Insp.</i>	2	0	0	0	2		
MO	Distribution Center	0	0	0	0	0	0	0
	Store	9	2	0	0	11	1:3.18	1:2.33
	Return Center	--	--	--	--	--	--	--
	Corporate	0	1	0	0	1	1:1	1:1
	<i>Total Aggregate Insp.</i>	9	6	0	0	15		
TX	Distribution Center	0	0	0	0	0	0	0
	Store	0	0	0	0	0	0	0
	Return Center	--	--	--	--	--	--	--
	Corporate	--	--	--	--	--	--	--
	<i>Total Aggregate Insp.</i>	0	0	0	0	0		

8.3 Comparison Case

8.3.1 Walmart and Target Nationally

The ECHO data reported a total of 3,284 facilities for Walmart and a total of 1,484 facilities for Target with 487 and 134 inspections, respectively, over the past five years. Walmart's ECHO report facilities were 2.21 times Target's ECHO reported facilities. Additionally, Walmart experienced 4.23 times more inspections than Target. Across all US states, Walmart experienced an aggregate inspection ratio of 1:6.74, whereas Target experienced an aggregate inspection ratio of 1:11.07. Overall across all states, the Big Box business system innovation experienced an aggregate inspection ratio of 1:7.68. Therefore, across all states, Walmart was inspected more frequently and received more inspections than Target.

8.3.2 Low Enforcement and High Enforcement States

The high enforcement strategy states, Kentucky and Missouri, conducted 152 inspections and the low enforcement strategy states, Arkansas and Texas, conducted 11 inspections. Table 12 depicts a comparison of ECHO data and firm data pertaining to the number of combined facilities for Target and Walmart.

Table 12. Number of facilities, inspections, and enforcement type by state for Walmart and Target²¹.

State	Number of Facilities								Inspections	Enforcement Type
	ECHO Data				Firm Data					
	DC	Store	RC	Corp.	DC	Store	RC	Corp.	ECHO Data	
Arkansas	11	104	3	7	20	88	0	0	3	Low
Kentucky	2	94	0	0	2	97	0	0	89	High
Missouri	4	153	0	1	3	158	0	0	63	High
Texas	14	538	1	1	18	536	0	7	8	Low
Total	31	889	4	9	43	879	0	7	163	
Total	933				929					

Table 13 depicts the incident of inspections by state and structural element for the past five years as reported in the ECHO database. Based upon the ECHO data, the aggregate inspection ratio is 1:1.67 for the high enforcement states and the aggregate inspection ratio is 1:61.73 for the low enforcement states. Additionally, both the high enforcement and low enforcement state inspections were concentrated primarily within the store structural element. Therefore, the Big Box business system innovation received higher frequencies of inspections from the high enforcement states; however, the inspections were concentrated within the store structural element for both high and low enforcement states.

A review of Arkansas reveals 125 facilities reported in the ECHO database; however, minimal regulatory activity has occurred over the past five years with inspection of a single return center facility three times. Based upon the ECHO data, the ratio of inspection frequency is 1:3, whereas the aggregate inspection ratio is 1:1. Based upon review of the ECHO data,

²¹ Information obtained from: (Target Corporation, 2010a; US Environmental Protection Agency, 2010a; Wal-mart Stores Inc., 2010b)

Arkansas showed a concentration of inspections within the return center structural element; however, this could be a misleading assessment due to the fact a single facility was inspected.

A review of Kentucky reveals 96 facilities reported in the ECHO database with the majority of inspection occurring at the store structural element. Based upon the ECHO data, the ratio of inspection frequency is 1:2 for distribution centers and 1:1.77 for stores. In comparison, the aggregate inspection ratio is 1:2 for distribution centers and 1:1.15 for stores. Based upon review of the ECHO data, Kentucky showed a concentration of inspections within the store structural element.

A review of Missouri reveals 158 facilities reported in the ECHO database with the majority of inspections occurring at the store structural element. Based upon the ECHO data, the ratio of inspection frequency is 1:4 for distribution centers; 1:2.68 for stores; and 1:1 for corporate facilities. In comparison, the aggregate inspection ratio is 1:4 for distribution centers; 1:2.43 for stores; and 2:1 for corporate facilities. Based upon review of the ECHO data, Missouri showed a concentration of inspections within the corporate structural element; however, this could be a misleading assessment due to the relatively small number of corporate facilities located within the state.

A review of Texas reveals 554 facilities reported in the ECHO database; however, minimal regulatory activity has occurred over the past five years with inspection of four stores and a single return center. Based upon the ECHO data, the ratio of inspection frequency is 1:134.5 for stores and 1:1 for return centers. In comparison, the aggregate inspection ratio is 1:76.86 for stores and 1:1 for return centers. Based upon review of the ECHO data, Texas showed a concentration of inspections within the return center structural element; however, this could be a misleading assessment due to the relatively small number of return centers located within the state.

Table 13. Incident of inspections by state and structural element for Walmart and Target.

State	Structural element	Inspection Frequency (5 yrs)				Total Insp. Frequency	Ratio of Inspection Freq. to Facility #	Ratio of Aggregate Insp. per Facility #
		1	2	3	5			
AR	Distribution Center	0	0	0	0	0	0	0
	Store	0	0	0	0	0	0	0
	Return Center	0	0	1	0	1	1:3	1:1
	Corporate	0	0	0	0	0	0	0
	<i>Total Aggregate Insp.</i>	0	0	3	0	0		
KY	Distribution Center	1	0	0	0	1	1:2	1:2
	Store	29	15	8	1	53	1:1.77	1:1.15
	Return Center	--	--	--	--	--	--	--
	Corporate	--	--	--	--	--	--	--
	<i>Total Aggregate Insp.</i>	30	30	24	5	109		
MO	Distribution Center	1	0	0	0	1	1:4	1:4
	Store	54	3	0	0	57	1:2.68	1:2.43
	Return Center	--	--	--	--	--	--	--
	Corporate	0	1	0	0	1	1:1	2:1
	<i>Total Aggregate Insp.</i>	55	8	0	0	63		
TX	Distribution Center	0	0	0	0	0	0	0
	Store	2	1	1	0	4	1:134.5	1:76.86
	Return Center	1	0	0	0	1	1:1	1:1
	Corporate	0	0	0	0	0	0	0
	<i>Total Aggregate Insp.</i>	3	2	3	0	0		

8.4 Cross-Case Comparisons

8.4.1 Big Box and Structural Elements

Based upon the assessment of each firm, Walmart exceeds Target in all the independent variables obtained for the study. The Target to Walmart ratio for facilities is 1:1.97 and annual revenue is 1:6.38 billion.

The basis of the Big Box business system innovation is founded on the structural “size” of the organization. The independent variables used in this research represent the innovation of the organizational structure and the size of the organization structure in terms of contingency theory. Overall, the structural systems operated by both firms is the same and consistent with the Big Box retail system depicted in Figure 1. However, the prevalence of structural elements varied between the firms. Walmart’s ratios for structural elements are: 1:36.90 for distribution

centers; 1:1.03 for stores; 1:410.5 for return centers; and 1:298.55 for corporate facilities. In comparison, Target's ratios for structural elements are: 1:46.38 for distribution centers; 1:1.03 for stores; 1:1,484 for return centers; and 1:114.15 for corporate facilities. Both firms, regardless of overall size, have the same ratio for stores and a similar ratio for distribution centers. However, Walmart has more return centers and Target has more corporate facilities.

Based upon this assessment, Walmart's structural system is consistent with the potential RCRA enforcement points identified in Figure 4 resulting in 90% of potential RCRA enforcement interactions occurring across three integral structural elements. However, the Target structural system would likely experience 85% of potential RCRA enforcement points across two integral structural elements, the distribution centers and stores. The low number of return center facilities in Target's structural system reduces the impacts to their organizational structure from enforcement of RCRA than experienced by Walmart.

Additionally, based upon review of the archival firm data, the overall size of the firms are very different. Walmart is unequivocally larger than Target in the number of facilities, store platforms, number of products, and revenue. Walmart's larger organizational system will likely be responsible for larger amounts of hazardous wastes generated by the firm, as well as a larger geographical presence for the firm.

Therefore, Walmart should experience more enforcement events (i.e. inspections) and incur more external influence impacts from regulatory agencies due to the enforcement of RCRA.

8.4.2 Inspections

Based upon assessment of the aggregate inspection ratios, Walmart exceeded Target and the combined Big Box business system innovation nationally for inspections; however, the combined Big Box Business system exceeded both firms for inspections conducted by the low enforcement and high enforcement states. Ranking the states in order of most active to least active regulatory activity is the following: Kentucky, Missouri, Texas, and Arizona.

Consistent with the distributive organizational structure of the Big Box business system innovation presented as Figure 4, inspections occur within the different structural elements of the organizational system. Looking at the inspection data would indicate a predilection for inspections concentrated within the Stores instead of evenly distributed throughout the system for all states; however, this assessment is erroneous. Table 14 depicts the aggregate inspection ratios by state. Kentucky and Missouri have aggregate inspection ratios indicating inspections are performed comparably across the whole system. In comparison, Arizona and Texas has aggregate inspection ratios indicating inspections are performed more regularly in the Return Centers than Stores. Based upon this assessment, inspections of the Big Box business system innovation do not occur distributively throughout the organizational structures by all states.

Table 14. Aggregate inspection ratios by state for cases

		Structural Element			
		Distribution Center	Store	Return Center	Corporate
Walmart					
Nationally	1:6.74				
AR	1:125.17	0	0	1:1	0
TX		0	1:58	1:1	0
KY	1:5.56	1:2	1:1.03	--	--
MO		1:3	1:2.51	--	--
Target					
Nationally	1:11.07				
AR	0	--	0	--	--
TX		0	0	--	--
KY	1:10.71	--	1:2	--	--
MO		0	1:2.33	--	1:1
Comparative-Big Box business system innovation					
Nationally	1:7.68				
AR	1:61.73	0	0	1:1	0
TX		0	1:76.86	1:1	0
KY	1:1.67	1:2	1:1.15	--	--
MO		1:4	1:2.43	--	2:1

8.4.3 Enforcement Strategies and Regulatory Choke Points

The type of enforcement strategies used varied between high-enforcement and low-enforcement states and was consistent across all cases. The low-enforcement states, Arkansas and Texas, used a focused enforcement strategy, whereas the high-enforcement states, Kentucky and Missouri, used a distributive enforcement strategy. The use of a distributive

enforcement strategy resulted in the emergence of a chronic regulatory choke point in Kentucky for the Walmart case and the comparative case. Missouri's use of a distributive enforcement strategy resulted in minimal regulatory enforcement which did not result in the emergence of a regulatory choke point in any of the cases. No acute regulatory choke point was identified. Table 15 depicts the enforcement strategy and regulatory choke point by cases.

Table 15. Enforcement strategies and regulatory choke point emergence by case

	Focused or Distributive Enforcement	Regulatory Choke Point	Orientation of state mission/policies
Walmart			
AR	Focused	N/A	Citizen
TX	Focused	N/A	Business
KY	Distributive	Chronic	Business
MO	Distributive	N/A	Citizen
Target			
AR	N/A		Citizen
TX	N/A		Business
KY	Distributive	N/A	Business
MO	Distributive	N/A	Citizen
Comparative-Big Box business system innovation			
AR	Focused	N/A	Citizen
TX	Focused	N/A	Business
KY	Distributive	Chronic	Business
MO	Distributive	N/A	Citizen

Walmart experienced focused and distributive enforcement strategies between the four states. Kentucky's active regulatory enforcement strategies resulted in emergence of a chronic regulatory choke point. In comparison, Missouri appears to balance the distributive enforcement strategy without causing a regulatory choke point for Walmart. No acute regulatory choke point was identified.

Target experienced distributive enforcement strategies between the four states; however, it is important to note that the lack of inspections performed by Arkansas and Texas prohibited assessment of their enforcement strategy. Missouri and Kentucky appear to balance the distributive enforcement strategy without causing a regulatory choke point for Target. No acute regulatory choke point was identified.

Analysis of the Big Box business system innovation indicates it experienced focused and distributive enforcement strategies between the four states. Kentucky's active regulatory enforcement strategies results in emergence of a chronic regulatory choke point. However, Missouri appears to balance the distributive enforcement strategy without causing a regulatory choke point for the Big Box business system innovation. No acute regulatory choke point was identified.

Review of the state missions and policies depict an interesting divergence amongst the states. Kentucky and Texas have collaborative-centered missions and policies; however, Kentucky was the most active state in enforcement and Texas the third. In comparison, Missouri and Arizona have citizen-centered missions and policies and exhibited the second and least active state. Additionally, the orientation of the state mission/policies is not consistent with the classification of the states as high and/or low enforcement strategies; the enforcement strategy used; and/or the likely emergence of a regulatory choke point due to enforcement events.

8.5 Hypothesis

The Big Box business system innovation provided a diverse canvas to study the adaptation of regulatory enforcement to business innovations. The focus of this study was to develop a theory for the emergence of regulatory choke points from the enforcement of RCRA in the Big Box retail system. The purpose of this research was to examine the following research question: how has enforcement of RCRA adapted to the Big Box business system innovation? The following hypothesis was proposed:

Distributed structural organizational systems create distributed, but large, concentrations of hazardous wastes and universal wastes and, thus, will experience distributed environmental enforcement events.

Based upon the analysis of the case studies, distributive enforcement was not experienced universally across both firms either individually or cumulatively. Therefore, the analysis does not support the hypothesis listed above. However, it is worth noting that the high enforcement states, Kentucky and Missouri, did use a distributive enforcement strategy.

CHAPTER 9: CONCLUSION

This research provided the first, important insight into the regulatory enforcement of RCRA experienced by the Big Box business system innovation. The organizational structure of the Big Box business system innovation is a highly complex, distributive system requiring fluidity from its structural elements and its interactions with external influences. Due to the unique organizational structure and presence of the Big Box business system innovation firms, one would expect the Big Box business system innovation would be exposed to regular regulatory enforcement events across all states; states would develop different enforcement strategies to address the enforcement of RCRA; and the size of a firm, through assessment of their structural elements, would be representative of the magnitude of enforcement events. (Earnhart, 2009)

The use of contingency theory facilitated the understanding of the interactions occurring between the Big Box business system innovation and the selected states in the cases conducted herein. Contingency theory allowed the research to determine that the size of the Big Box business system innovation does not appear to be directly associated with regulatory enforcement events across all states. In contrast, the size of the Big Box business system innovation does appear to be associated with the magnitude of inspections experienced by a firm. As discovered herein, Walmart consistently receives more regulatory enforcement events per structural element than Target. Additionally, the ability to define the Big Box business system innovation as a distributive system facilitated the understanding of the different regulatory enforcement strategies used by states and the impact to the firm of the enforcement strategies.

9.1 State Implications

From the state perspective, the variation of enforcement strategies observed between states is consistent with the compliance and enforcement policy research. State regulatory agencies use different and, often, contradictory enforcement strategies. (Atlas, 2007; Potoski,

2004) Overall, EPA and state agencies should be aware of the continuing disparity and inconsistencies of regulatory enforcement of firms. This research has identified that the enforcement of RCRA has not universally adapted to the demands of the Big Box business system innovation. This research provided evidence that organizational structural elements, such as number of facility locations, were directly related to the magnitude of RCRA inspections over a five year period. (Telle, 2009) Therefore, EPA and state agencies are responding to external influences in making enforcement strategy decisions. These external influences will increase the likelihood of the emergence of regulatory choke points as a direct result of regulatory enforcement.

Furthermore, these findings suggest the importance of rival, non-controlled variables, such as influences by state political priorities and budget constraints as an influencing factor on state enforcement strategies. (Atlas, 2007; Helland, 1998; Konisky, 2007) This finding, also, suggests the use of informal processes in the selection of firms for enforcement activity, which was preliminarily discussed in Section 7.3, but not addressed in this research.

In order to develop a harmonious regulatory arena, EPA and state agencies should re-evaluate regulatory enforcement strategies being utilized by EPA and state agencies to prevent the development of adversarial interactions revolving around environmental regulatory enforcement.

9.2 Firm Implications

From the firm perspective, the variation of enforcement strategies observed between high-enforcement and low-enforcement states creates a situation where it is difficult to develop adaptation strategies. For distributive enforcement strategies, a firm will standardize, formalize, and centralize the processes associated with the regulation in question through the development of SOPs, Best Management Practices (BMPs), and corporate policies. For a firm experiencing a chronic regulatory choke point in association with distributive enforcement, the repeated enforcement event throughout the system will result in congestion of the business

system. The use of the adaptation strategies listed above is not sufficient to relieve the stresses the system is experiencing through the magnitude of enforcement events. Furthermore, the ability to ensure consistency in the implementation of adaptation strategies, such as SOPs and BMPs, decreases. (Schauer & Zeckhauser, 2007; Wu, 2009)

For focused enforcement strategies, a firm will focus on in-depth training and potentially assignment of specialize personnel to address the higher incidence of regulatory enforcement. These strategies are used within the standard industrial manufacturing industry. For a firm experiencing an acute regulatory choke point in association with focused enforcement, the repeated inspection events at targeted facility locations will result in constraints on the organizational system. The Big Box business system innovation is further impaired in its response capabilities by the magnitude of geographical locations of the system. The higher the frequency of focused enforcement events dispersed throughout the US further restricts the firm's ability to adapt.

The variation in enforcement strategies experienced by the Big Box business system innovation presents a challenge for developing a uniform adaptation strategy. Firms will be essentially stuck between a rock and a hard place due to the different requirements associated with variation of enforcement strategies. The Big Box business system innovation is further complicated by the number of geographical locations, because the geographical diversity of the distributed system constrains the organizational system's ability to respond. (Schauer & Zeckhauser, 2007; Wu, 2009)

When a firm begins to experience variation in enforcement strategies, it will attempt to create one-off solutions to immediately reduce the congestion of its organizational system. However, focusing on adaptation strategies geared towards one enforcement strategy will result in leaving a portion of the organizational system unprotected and unable to deal with enforcement events.

As the variation continues, the level of congestion will escalate until it causes a constraint to appear with the organizational structure. As the number of constraints increases and the level of congestion does not abate, the firm will begin to implement organizational-wide policies and procedures in an attempt to reduce the level of uncertainty existing within the firm. However, the implementation of organizational-wide policies and procedures will result in an over-correction to the organizational system, thereby effectively creating firm-imposed organizational congestion. The firm will attempt to operate within the confines of organizational congestion; however, this strategy is not sustainable long term. It is unclear what the breaking point for a firm will be; however, it is speculated that firm adaptation costs would have to be high for market-driven firms, such as the Big Box business system innovation, to change the structural elements of the organizational system. (Schauer & Zeckhauser, 2007; Wu, 2009)

9.3 Regulatory Choke Points

This research attempted to develop a theory revolving around the emergence of regulatory choke points occurring from different types of enforcement strategies; however, the research failed to provide a fully developed theory. The theory failed to provide a threshold for the triggering of a regulatory choke point.

Due to the small magnitudes of inspections by the low enforcement states using a focused enforcement strategy, this research was unable to determine if an acute regulatory choke point had emerged. The lack of a threshold affected the ability for the determination of emergence of an acute regulatory choke point. However, it is suggested the emergence of an acute regulatory choke point would resemble the ratio of inspection frequency and aggregate inspection ratios described above for the low enforcement states, but using much larger quantities of inspections.

It is without question that I believe the theory of emerging regulatory choke points is valid. This research empirically proved two firms from the same industry experience different regulatory enforcement strategies, as well, different magnitudes of enforcement events. These

variations will result in different stresses to identical organizational systems requiring different firm adaptation strategies. The regulatory choke point theory is an attempt to provide justification and explain the reason firms have to utilize different firm adaptation strategies. Further research at the facility level, instead of the firm level, would be required to adequately establish a threshold for precipitating the emergence of regulatory choke points.

9.4 Directions for further research

The magnitude and impact of environmental regulation and enforcement on Big Box has the potential to be extensive and on a scale not seen to date. Furthermore, the extent of business and government interactions occurring as a result of the breadth of the Big Box business system innovation has far-reaching implications. Areas of analysis that could contribute to the research would include the following:

- ◆ Assessment of a state utilizing a dual distributed, focused enforcement strategy resulting in the emergence of simultaneous chronic and acute regulatory choke points. Based upon the number of environmental lawsuits filed against Big Box business system innovation firms and the lack of reported enforcement activity in ECHO, I suggest California might be utilizing the dual enforcement strategy.
- ◆ Analysis of the other categories of the Big Box business system innovations, such as the category killer retailers like Home Depot and Lowe's Home Improvement Centers. The nature of their business operations could result in the potential to accumulate larger quantities of hazardous materials, which would likely result in the use of different enforcement strategies by states.
- ◆ Classification of regulatory choke points in terms of the business costs to facilitate an understanding of the level of risk assumed by firms.

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