

**LABOR SHORTAGES OR LACK OF VISION:
RISK PERCEPTIONS IN THE MUSHROOM INDUSTRY**

by

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TABLE OF CONTENTS

LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	ix

Chapter

1	INTRODUCTION	1
2	LITERATURE REVIEW	7
2.1	Introduction	7
2.2	Reflexive Modernization	10
2.3	The Issue with Risk	13
3	Methodology and Methods	18
3.1	Introduction	18
3.2	Research Questions and the Theory of Reflexive Modernization	18
3.3	Positionality	21
3.4	Study Area	23
3.5	Participants	26
3.5.1	Interview Participants	26
3.5.2	Survey Participants	27
3.6	Methods and Strategy	29
3.6.1	Data Collection and Administration	29
3.6.2	Data Analysis and Interpretation	31
3.7	Ethical Considerations	32
4	GOVERNMENT REGULATION: RISKS AND THE POLITICS OF KNOWLEDGE	33
4.1	Introduction	33
4.2	Background Information	34
4.2.1	Stage 1: Raw Ingredients	36
4.2.2	Stage 2: Compost and Substrate	37
4.2.3	Stage 3: Spent Mushroom Substrate (SMS)	39
4.2.4	The Politics of Knowledge	40

4.3	Results on the Risk of Government Regulation	44
4.3.1	Rank and Duration of Government Regulation.....	44
4.3.2	Causes and Risks Related to Government Regulation	46
4.3.3	Participants' Strategies for Prevention and Mitigation of Government Regulation.....	49
4.3.4	Pests and Diseases	52
4.3.5	Food Safety.....	58
4.3.6	Raw Material Shortages and Climate Change.....	64
4.4	Discussion and Conclusion.....	66
5	LABOR SHORTAGES: THE DESTANDARDIZATION OF LABOR IN THE MUSHROOM INDUSTRY.....	69
5.1	Introduction	69
5.2	Background.....	70
5.2.1	Kennett Square and the History of the Mushroom Industry in Chester County	71
5.2.2	The Destandardization of Labor	74
5.3	Results on the Risk of Labor Shortages	84
5.3.1	Rank and Duration of Labor Shortages	85
5.3.2	Causes and Related Risks.....	88
5.3.3	Participants' Strategies for Prevention and Mitigation	92
5.4	Discussion and Conclusion.....	99
6	CONCLUSION	106
6.1	Introduction	106
6.2	Overview of Results	106
6.3	Arguments from study.....	108
6.4	Limitations.....	109
6.5	Summary.....	109
	REFERENCES	111
	Appendix	
	IRB DETERMINATION OF EXEMPT STATUS	117

LIST OF TABLES

Table 3.1:	Table adapted from Beck’s theory for testing reflexive modernization. Source: (Beck et al., <i>The Theory of Reflexive Modernization: Problematic, Hypotheses and Research Programme</i> , 2003)	19
Table 5.1:	Shows the demographic comparisons for the primary areas of study for this research, Chester County, Pennsylvania, California, and the broader United States.	73
Table 5.2:	Compares the Chester County official election results for 2012 and 2016. Source:	83
Table 5.3:	Displays the survey results for the Mann-Whitney U test that was conducted on the participants’ level of agreement with the questions on Labor Shortages and Immigration Policy	98

LIST OF FIGURES

Figure 1.1:	Comparison of mushroom yield per square feet of growing space to the price of U.S. dollars per pound of mushrooms (NASS, 1967-2017) ..	2
Figure 1.2:	Results on the participants’ perceptions of the greatest risks to the mushroom industry. Participants were asked to select the three greatest risks facing the mushroom industry, ranking them in order of importance with Rank 1 indicating the greatest of the three.	4
Figure 2.1:	Traditional model used for organizational risk assessment.....	7
Figure 2.2:	Model of the process of Reflexive Modernization. Source: He Chuanqi, <i>Orient Renaissance</i> , 2003.	12
Figure 3.1:	Depicts the current generational gap in American politics. Source: Pew Research Center.	22
Figure 3.2:	Depicts the town of Kennett Square, Chester County, and the surrounding counties.	24
Figure 3.3:	Shows the rise in fresh market sales and imports. Source: Bureau of the Census, Department of Commerce, 1979-2017.	25
Figure 3.4:	Displays the decline in mushroom growers in both Pennsylvania and the United States from 1983-2016. Source: NASS, 1983-2016.	26
Figure 3.5:	Shows the results for the independent variables of the survey.....	28
Figure 3.6:	3.6-A (left) depicts the ‘Cause’ word cloud used in the survey while 3.6-B (right) depicts the ‘Prevention and/or Mitigation’ word cloud.	30
Figure 4.1:	Illustrates the composting and growing process involved in mushroom production.....	35
Figure 4.2:	Shows the participants’ perceptions of the duration of the risk of Government Regulation.	45
Figure 4.3:	Displays the most commonly selected words from the ‘Causes’ word cloud by survey participants.....	48
Figure 4.4:	Displays the survey participants’ most common word selections from the ‘Prevention and/or Mitigation’ word cloud	50

Figure 4.5:	Shows the survey results for the participants' perceptions of the duration of the risk.	53
Figure 4.6:	Illustrates the survey results for the participants' perceptions of the causes of the risk of Pests and Diseases.	54
Figure 4.7:	Shows the survey participants' most common selections for the prevention and mitigation of Pests and Diseases.	57
Figure 4.8:	Displays the survey participants' perceptions of the duration of the Food Safety risk.....	59
Figure 4.9:	Shows the survey participants' perception of the 'Causes' of the risk of Food Safety.	61
Figure 4.10:	Depicts the participants' perceptions of the 'Prevention and/or Mitigation' tactics for the risk of Food Safety.	63
Figure 5.1:	Displays the process of the destandardization of labor using the same diagram style from chapter two.....	76
Figure 5.2:	Depicts the participants' perception of the duration of the Labor Shortages risk.	85
Figure 5.3:	Source: U.S. Immigration and Customs Enforcement, Jared Whalen, Staff Artist at the Philadelphia Inquirer. The Philadelphia ICE office overseas Pennsylvania, West Virginia, and Delaware	86
Figure 5.4:	Shows the participants' perceptions of the perceived 'Causes' of the Labor Shortages risk.....	91
Figure 5.5:	Displays the survey participants' perceptions of the strategies for 'Preventing and/or Mitigating' against the risk of Labor Shortages.	95
Figure 5.6:	Depicts survey participants' level of agreement with the above statements on the risk of Labor Shortages.....	96

ABSTRACT

Kennett Square, located in Southeastern Pennsylvania, is the self-declared ‘Mushroom Capital of the World.’ More than half of U.S. mushrooms are grown in the area, making it the largest cash crop in the commonwealth. Though growers nationwide have steadily increased the efficiency of their operations over the past few decades, the price per pound of mushroom has remained stagnant and risks such as labor shortages, pests and diseases, and the implementation of strict government regulations threaten the financial stability of many of the farms. Meanwhile, imports from countries with fewer regulatory standards, such as China and Mexico, are on the rise, which may increase food safety risks throughout the country. This research examines the perceived risks of the mushroom industry as well as the ways in which its members are attempting to prevent these risks. Data was collected through twenty-seven semi-structured interviews with members of the Chester County mushroom community, as well as a survey of members of the broader U.S.-based mushroom industry. This study finds that those working in the mushroom industry perceive labor shortages, tied to a workforce dependent upon immigration policy, as the greatest risk to the sustainability of the U.S. mushroom industry. Additionally, risks unique to the industry, such as the mushroom fly, are often compounded by government policies and geographic location.

Chapter 1

INTRODUCTION

In Southeastern Pennsylvania, just about 40 miles outside of Philadelphia, sits the quiet town of Kennett Square, the self-declared ‘Mushroom Capital of the World.’ It is home to 50 growers of *Agaricus* mushrooms, accounting for more than 50% of the total volume of mushroom sales in the United States. Most are grown utilizing artificially controlled-climate environments (National Agricultural Statistics Service (NASS), 2016), which all but eliminates the threat of natural hazards and allows them to operate year-round.

Growers nationwide have steadily increased the efficiency of U.S. mushroom production over the past few decades, starting with 2.03 pounds per square foot in 1967 (NASS, 1967) to 6.59 pounds per square foot in 2017 (NASS, 2017). However, much like the farmers in California who have been forced to leave unpicked crops to rot in the field (Mohan, 2017), many growers are struggling to find enough laborers to harvest their mushrooms. The price per pound has been fairly stagnant for the last ten years (see figure 1.1), signaling that the growers’ profit margins have suffered as well. Risks such as raw material shortages, pests and diseases, and the implementation of strict government regulations further threaten the financial stability of the mushrooms farms. Converting operations to mechanical harvesting could not only reduce the needed labor but also make the farms more competitive on the global market. Unfortunately, most of the farms rely on antiquated growing rooms while many of the

smaller ones sustain their operations on very thin profit margins, giving them fewer options for mitigating the risk.

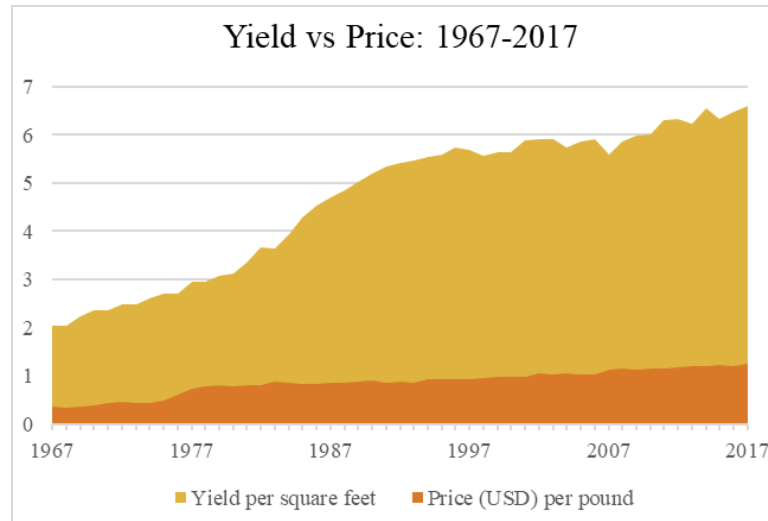


Figure 1.1: Comparison of mushroom yield per square feet of growing space to the price of U.S. dollars per pound of mushrooms (NASS, 1967-2017)

Despite being the largest cash crop in the commonwealth, providing almost 10,000 jobs in Chester County (Mushroom Farmers of Pennsylvania (MFPA), 2017), the number of mushroom farmers has dropped by almost half in the last 20 years (NASS, 2016). Growers who cannot afford to stay in business or are retiring and do not have a family member who is able/willing to succeed them, may be forced to sell or consolidate their farms. Meanwhile, the number of mushroom imports from countries such as Canada, Mexico, China, and the Netherlands are on the rise, accounting for more than 28% of market sales in 2017, up from 20% in 1997 (U.S. Census Bureau, 2018). While the United States does not have regulatory control over farmers abroad, they do conduct some food safety inspections at international

facilities. Unfortunately, a 2015 Government Accountability Office (GAO) report found that, despite the mandate from the Food Safety and Modernization Act (FSMA) requiring a certain number of inspections of foreign food facilities by the Food and Drug Administration (FDA), the FDA was not keeping pace with the mandate (GAO, 2015). In 2018, Scott Gottlieb, FDA commissioner for the Trump administration, announced that it would no longer enforce certain FSMA requirements including the Foreign Supplier Verification Programs rule, which requires importers to verify that their foreign food suppliers meet FDA safety standards (FDA, 2018).

Similar to how a political strategy may be impacted by a politician's personal ideology or bias, one's perception of risk, as well as their tactics to prevent it from occurring, are subjective. After then-presidential candidate Donald J. Trump entered the republican primary race in 2015, the political discourses surrounding issues such as trade, climate change, government regulation, and immigration shifted dramatically. As president, he has added tariffs to goods imported by our allies (Swanson, 2018), withdrawn the United States from the Paris climate agreement (Trump, 2017), and has taken an aggressive stance toward immigration by rescinding the Deferred Action for Childhood Arrivals (DACA), a policy of President Obama's administration (Kopan, 2017). The party that once championed free trade is now at the mercy of President Trump's increasingly nationalistic base, and they are not interested in what the global market has to offer.

There are several interesting political dynamics at play across the country right now. The generational gap in American politics is widening, with millennials having an progressively liberal outlook (Pew Research Center, 2018). The people in the Rust Belt, which includes parts of western Pennsylvania, have never quite recovered from

the negative impacts of globalization and are feeling increasingly disenfranchised by their government (McQuarrie, 2017). Meanwhile, the wealthier and more educated residents of traditionally republican suburban areas (like Chester County) are rejecting the ideals of President Trump’s Republican Party by voting for democrats instead (Martin & Burns, 2017).

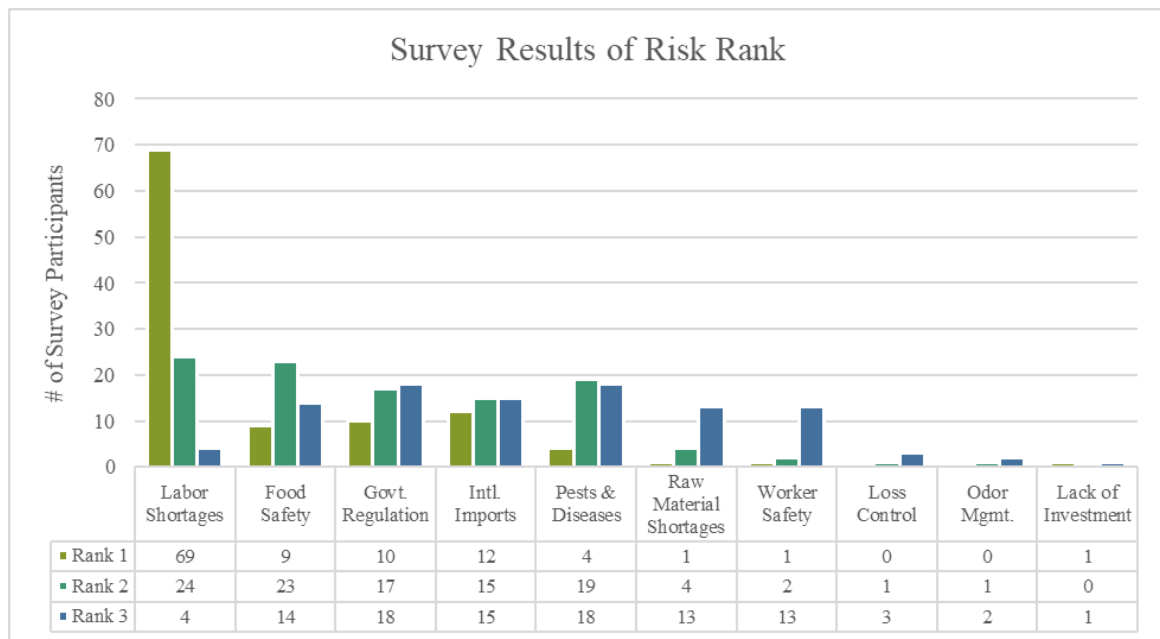


Figure 1.2: Results on the participants’ perceptions of the greatest risks to the mushroom industry. Participants were asked to select the three greatest risks facing the mushroom industry, ranking them in order of importance with Rank 1 indicating the greatest of the three.

This study identifies the various ways in which the members of the mushroom industry perceive the risks that face them. I collected data through a series of (mostly) one-on-one semi-structured interviews (n=27) as well as an electronically distributed national survey (n=107). The results of the survey indicate that the members of the

mushroom industry perceive *Labor Shortages* to be the greatest risk facing the industry, followed by *Food Safety*, *Government Regulation*, *International Imports*, and *Pests & Diseases*. As previously noted, many of these risks are related or compounding. Burdensome regulations, shortages of raw materials, and a rise in fungal pests have all placed additional financial stress on farmers who already struggle with slim profit margins. While the steady rise of imports and the failure of the FDA to meet FSMA requirements may increase the country's exposure to foodborne illnesses, the current wave of immigrant wage labor shortages, which are causing further profit losses to the U.S.-based mushroom industry, may increase our dependence on other countries to grow our mushrooms.

Chapter two of this study provides a review of the literature for Ulrich Beck's theory on *reflexive modernization*, and *the issue with risk*. Chapter three places the risk perceptions of the members of the mushroom industry into theoretical frameworks to analyze these perceptions. I also review the study area and provide an overview of the quantitative and qualitative methods that were employed to examine these frameworks. Chapter four first provides further background on risks created through (or enhanced by) the industrialization process as well as the political *side effects* that arise from the *individualization* of society. I then review the results of the data and analyze the ways in which the members of the mushroom industry perceive these risks. Chapter five dives into the process of the *destandardization of labor* and gives background on the politics currently surrounding wage labor related issues. I also explore results of the participants' perceptions by examining the current shortage of labor through these collective lenses. Finally, chapter six gives an overview of the results, limitations of the study, and directions for future research.

This research provides a context for examining the various industrial, societal, and political risks perceived by the mushroom industry participants. This study shows how their varying perceptions toward the risk, its duration and causes, and compounding risks, have informed their strategies for prevention and mitigation of the risks that threaten them. The competing opinions within the industry, coupled with current political dynamics, have made finding a cohesive and effective strategy for their continued survival as an industry all the more challenging.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

On the most basic level, ‘risk’ is understood as the exposure of someone or something to hazards. Ulrich Beck, a German sociologist, defined risk as a “systematic way of dealing with hazards and insecurities induced and introduced by modernization itself (p. 21).” However, the perception of any risk is subjective. In traditional methods of risk assessment (figure 2.1), organizational agents conceptualize and *identify* the risk, *analyze* the probability of said risk’s occurrence and the extent of negative outcomes, consider if the intended *action* is worth the risk, *model* a strategy for managing its impacts, and attempt to *control* the risk going forward.

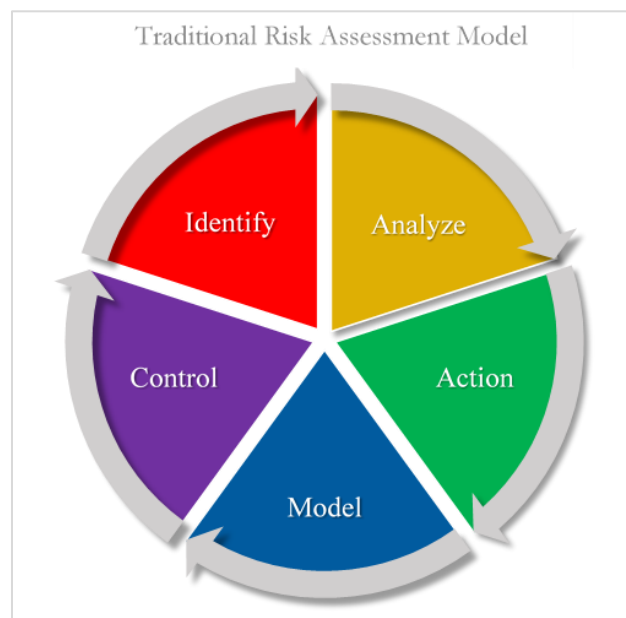


Figure 2.1: Traditional model used for organizational risk assessment.

Beck argued that the scale of the organization's agency, as well as the social structure within which it operates, is consequential at all stages of this process (1992). The way in which the mushroom industry perceives a risk, such as the risk of climate change, may differ from that of various social groups or a government entity. Consequently, the ways in which these different perceptions *identify, analyze, take action, model, and control* these risks can be in conflict with one another. The makeup of their surrounding social structure (e.g., race, class, gender, religion, sexual identity, political affiliation, economic status, etc.) influences their perception as well.

Literature surrounding risk perception in agriculture tends to focus on individual farmers' perceptions of specific risks, as determined by the researcher. Commonly studied risks focus on issues surrounding climate change and natural hazards (Smirnov, et al., 2016; Folger & Cody, 2014), GMOs (Morris, 2011), inputs (Gebrehiwot & van der Veen, 2015), food safety (Redmond & Griffith, 2004; Williams, Ebel, & Vose, 2010), worker safety (Arcury, et al., 2013), and regulation and policy (Doole & Romera, 2013; Bruckner, 2016). Much of this research examines how academic scholars and policymakers can better understand farmers' risk perceptions (Knutson, et al., 2011), communicate their own risk perceptions to farmers (Just, Wolf, & Zilberman, 2003), and develop policy to help prevent and mitigate these risks (Safi, Smith, & Liu, 2012).

A common measure taken by agricultural industries and their trade associations is to lobby politicians for legislation or policy reform. However, considering President Trump's past support of a senate bill that would have cut legal immigration in half (Baker, 2017) and the divisions within the republican controlled congress over immigration reform (Fox, 2018), it is unlikely that lobbying for an

increase in visas will produce positive results for the industry. Iain Wilkinson argued that "Beck's thesis is essentially motivated by the hypothesis that an emergent 'risk consciousness' might give rise to a new critical rationality for the political reform of industrial society (2001, p. 1)." As awareness of industrial risks and their side effects (e.g., climate change, foodborne illnesses, the outsourcing of jobs, etcetera) increases among Americans, Beck's theory on reflexive modernization may offer the mushroom industry new political strategies for prevention and mitigation.

Risk Society: Towards a New Modernity, examines the way in which modern society organizes and responds to perceived risks. At the time that it was penned, Beck was interpreting what he viewed as "a break within modernity", where a new form of society emerges from the classical industrial society and creates the 'risk society'. He believed that "we are witnessing not the end but the *beginning* of a modernity—that is, of a modernity *beyond* its classical industrial design (1992, p. 10)." Though he makes several observations throughout the book (some of which will be discussed in chapters four and five), he focuses primarily on two interrelated theses: 1). *reflexive modernization*, and 2). *the issue with risk*.

Understanding this theory is critical to analyzing the risk perceptions of the mushroom industry in a couple of ways. First, many of the risks facing the agricultural industry derive from the industrial production of crops, making them self-inflicted. For example, the risk of climate change presents several challenges to American farmers, such as the increased risk of natural disasters such as drought (Smirnov, et al., 2016; Folger, et al., 2012; Fu, et al., 2013), shifts in pest populations (Shakhramanayan, et al., 2013), and changes in crop yield distributions (McCarl, et al., 2008; Tack, et al., 2012). If we reflect on the causes of these risks, as Beck suggests, agriculture is a

major contributor to climate change, accounting for 25% of total global emissions (IPCC, 2014). For *reflexivity* to occur within the industry, its members must not only reflect on how the risk came about (as well as their potential role in its creation) but also incorporate the concerns of society into their modeling and assessment (see figure 2.1) of the risk going forward.

The second way that Beck's theory can help us understand how the mushroom industry perceives risks within modern society is to understand how they are distributed and who else is impacted. *The issue with risk* is that while the financial gains primarily go to the industrial entities who have created the risk, its harmful effects disproportionately impact society. A risk, such as mad cow disease, was not only self-inflicted (i.e., cannibalistic feeding was one of the causes of the spread of the disease) (Seguin, 2003), but it also had broader reaching impacts on the population because the risk of eating infected beef falls on individuals within society rather than the farm that produced it.

The method for analysis using the lens of *reflexive modernization* is in chapter three. However, an explanation of that theory, his theses on *the issue with risk*, and a review of the research and literature surrounding both, are in the following sections. Using these lenses to analyze the risks and the participants' perceptions of them will help to show whether (or not) the members of the mushroom community are breaking away from classic modernization and, instead, shifting toward a *reflexive modernization*.

2.2 Reflexive Modernization

Like many social theorists, Beck sees a new society emerging out of the industrial. However, unlike the post-industrialism/post-modernism concepts that claim

a departure from modernism, he envisions a *reflexive* modernization. He reasons that modernization, which coexists with the industrial society and bureaucratic state, emerged when institutions and structures of traditional societies (i.e., European and North American pre-industrial eras) were challenged by the rise of industrialization. In the traditional society, the local community, church, and family provided the social structures in a person's life. However, the prosperity and innovation of the industrial age, combined with democratic freedoms, replaced the *we* of traditional societies with the *I* of modernization. Similar to how the institutions of modernization disbanded the traditional society, Beck believes that individuals of reflexive modernization are disbanding modernity. The individual freedom provided by modernization allowed for better education, which increased individual awareness and encouraged further individualization. Rather than provide loyalty to the capitalist structures of modernization, individuals reflect on their relationships to these institutions and push against them. They no longer act in a manner that is dictated by this social structure, and instead, work as a free agent (1992).

There are several critics of his theory toward risk perception. Some argue that there is more variability in the way that people perceive and respond to risk than Beck's theory allows (Mythen, 2007; Jensen & Blok, 2008). Others argue that he neglects how risks are constructed in subjective ways by simply overlooking the perspectives of social constructionists. He has also been criticized for not considering the power dynamics that may create barriers toward *reflexive modernization* (Elliott, 2002; Higgins & Natalier, 2004; Murray, 2009). One study that examined farmers' perceptions toward climate change found that the farmers had dualistic world views

and exposure to biased information, as well as political and structural barriers, hindered their ability to perceive the risk *reflexively* (Stuart, et al., 2012).

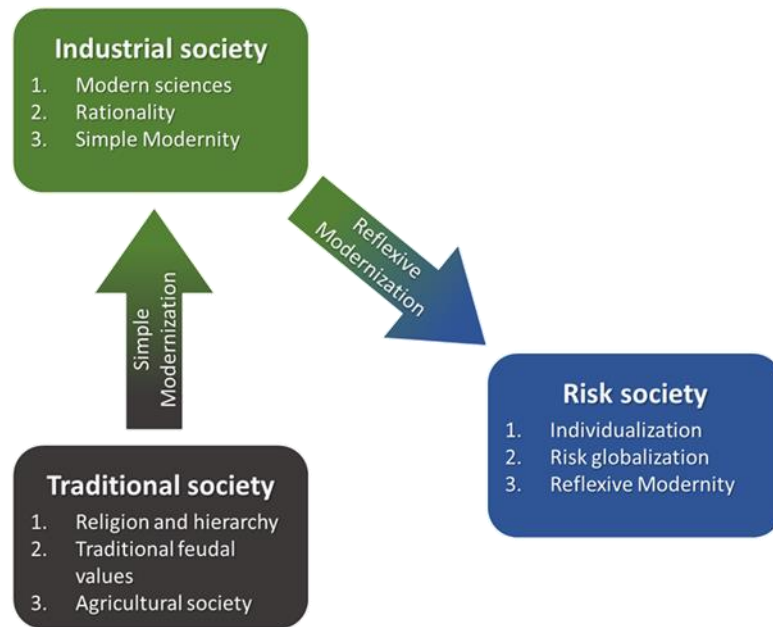


Figure 2.2: Model of the process of Reflexive Modernization. Source: He Chuanqi, *Orient Renaissance*, 2003.

By examining the risk perceptions of the mushroom industry through the lens of *reflexive modernization*, I assess the ways in which these individuals reflect on the risks that they identify. Who or what do they perceive to have caused the risk? How does their perception of the cause of that risk affect their strategies for mitigating and preventing those risks? Exploring these types of questions will provide insight on whether or not their understanding of the risks is influenced more by the social structure or, instead, by their individual agency.

2.3 The Issue with Risk

Risks are not unique to modern society. Beck argued that risks in traditional societies were at a much smaller scale, and the industrialization and globalization that has occurred in modern society has created broader reaching risks. A family in a traditional society who grows their own vegetables are responsible for their personal food safety and security, whereas families in the modern society depend on crops produced in mass quantities by corporations, exposing them to risks at the same scale. Through processes such as nuclear fission technology or industrial production, individuals are free to pursue personal wealth in exchange for large-scale risks that are dispersed, often unevenly, throughout modern society. The impacted communities (local, national, global, or otherwise) take on the risks created through individualism. The social construction and underlying political forces of modernity create unknown and unintended consequences which Beck discusses using five theses.

First, Beck remarks that “risks such as those produced in the late modernity differ essentially from wealth (p. 22).” Risks produced by industrialization, such as pollution or foodborne illnesses, are often invisible, existing only in the scientific (or sometimes anti-scientific) knowledge that has been produced by industry experts. Because of this nature, risks can be changed, reinterpreted, or even minimized within that knowledge, making them open to *social definition and construction* (Beck, Risk Society: Towards a New Modernity, 1992). Even though 97% of climate scientists believe in anthropogenic climate change, the laypersons who are unable to interpret the data for themselves have turned to the mass media, politicians, and their own social groups to define it for them.

The food distribution industry produces wealth through the farm laborers, farmers, supermarket employees, etc., but that wealth is unevenly distributed to those

at the top receiving the greatest amounts. Risks produced through this process, such as low-wages, food safety, worker safety, and- at a much larger scale- climate change, are disproportionately felt by society as a whole.

With his second thesis, Beck argues that some in society are more affected by the way in which the risk is distributed than others. The '*social risk positions*' that often follow, tend to impact people based on social and economic class structures. According to some research, family businesses tend to have higher aversion levels to risk (Mishra and McConaughy, 1999; Thomsen and Pederson, 2000; Fernandez and Nieto, 2006). One study found that, family firms perceive a greater risk when it comes to assuming activity in the global market (Claver et al., 2008). However, because of the nature of modernization, these risks will eventually strike those at the top of the hierarchy as well, creating what Beck referred to as a *boomerang effect* (1992). Critics of Beck argue that he overlooks issues surrounding class and social construction (Mythen, 2007; Curran, 2018), and although there are intermittent *boomerang effects*, existing patterns of inequality are reinforced by the dispersal of risk, rather than transformed by them (Curran, 2018).

With the mushroom industry, and agriculture more broadly, we can view the uneven distribution of risks through the consumer, the community, and the laborer. Risks surrounding food safety are commonly found in mass-produced food systems, but society disproportional shoulders the burden of the risks posed to their own health. An industrialized agricultural production can pose significant risks to the local community through their processes. For example, the mere location of animal waste produced through a concentrated animal feeding operation (CAFO) can threaten a community's water supply (Gunderson, Meat and Inequality: Environmental health

consequences of livestock agribusiness, 2015). At global scale, the risks involving CO₂ emissions produced through industrialization, threaten the livelihoods of humanity and disproportionally effect those in lower-income developing countries.

In his third thesis, Beck notes that “nevertheless, the diffusion and commercialization of risks do not break with the logic of capitalist development completely, but instead they raise the latter to a new stage. There are always losers but also winners in risk definitions. The space between them varies in relation to different issues and power differentials (p. 23).” From the point of view of the ‘winners’, these risks are big business and well worth taking. The author is speaking of *moral hazard*, which in the world of risk management implies that the person taking the risk (i.e., the winner) is not bearing the actual cost of that risk.

Fourth, Beck argues that “one can possess wealth, but one can only be afflicted by risks; they are, so to speak, ascribed by civilization (p. 23).” Beck is *inverting* this famous statement from Marx: “It is not the consciousness of men that determines their being, but, on the contrary, their social being that determines their consciousness (p. 9).” In the risk society, knowledge and awareness of a risk (i.e., *risk consciousness*) determines its existence. If the risk is not known, it is *invisible* to society.

Agricultural labor is a prime example of an invisible risk to society. The laborers, typically migrant workers, are invisible in modern society. In her book, *Beyond the Borderlands: Migration and Belonging in the United States and Mexico*, Lattanzi Shutika describes the image of the mushroom industry as one that has omitted the mention of the people who actually work in the industry, the Mexican labor. Shutika believes that this omission was an attempt to stay neutral to the consumer by avoiding the laborers that have made mushroom production possible. When the

agricultural industry purposefully hid the migrant worker out of fear of consumer retaliation, the consumer, and perhaps the industry itself, was unaware of the risks associated with labor in agricultural production (Shutika, 2011). Current rhetoric surrounding immigration policy is a consequence of society not knowing of the labor shortage risk faced by mushroom farmers and, therefore, not considering it when supporting restrictions on immigration.

Finally, in his fifth thesis Beck believes that risks that are socially recognized are politically volatile and “what *was* until now considered unpolitical becomes political- the elimination of the causes in the industrialization process itself (p. 24).” The risks of modern society are compounding. In addition to the risks to the health of humankind and the environment, risks to markets, capital, and bureaucracy (harking back to the *boomerang effect*) are seen as well. The CO₂ emissions released into the atmosphere through modernization and industrialization cause climate change. These changing climates induce atmospheric instability, making it difficult to predict natural hazards such as drought and frost. These natural hazards create significant financial burdens to farmers. Crop insurance is developed to redistribute that financial risk at a larger-scale. The social, economic, and political consequences of these compounding risks can impact markets, devalue capital, and generate bureaucratic red tape. As Beck notes, the *political potential for catastrophes* arises from these problems and the *reorganization of power and authority* are inevitably needed to prevent and mitigate these risks; the risk society becomes a *catastrophic society* (1992).

Reflexive modernization, and *the issue with risk*, are useful lenses for understanding the perceptions of the members of the mushroom industry. Personal and political bias, power dynamics, and even family business ownership may impact their

perceptions, either creating barriers toward reflexivity or causing them to be more risk averse, particularly when it comes to the global market. The following chapter outlines the methods used to employ Beck's theory to determine whether or not their perceptions of the risk and tactics for managing it, are *reflexive*.

Chapter 3

Methodology and Methods

3.1 Introduction

The purpose of this research is to understand how members of the mushroom industry perceive the risks that face them and how those perceptions impact their strategies for mitigating and/or preventing those risks. In order to explore my research questions, I used a mixed methods approach to collect and analyze data. I conducted semi-structured interviews with members of the Chester County mushroom industry and the American Mushroom Institute (AMI) assisted me by distributing a survey to its members. In the following sections, I examine the application of my theoretical lens and the research questions I developed for the project. I also look into my position as a researcher to better understand the role that bias could play in interviewing participants, and analyzing the data. This is followed by a review of the study area and the participants. Next, I explain the methods and strategies used for data collection, survey administration, and analysis. Finally, I discuss the ethical considerations for the study.

3.2 Research Questions and the Theory of Reflexive Modernization

The term ‘reflexive modernization’ or ‘re-modernization’ (Latour, 2003) refers to the shift in societal perception from the production of goods and capital to the management of risks created through simple modernization. As Beck, et al. (2003) explain, to be considered *reflexive*, society must not only become more conscious of the risks created through modernization and industrialization, but also be prepared for the possibility of new risks to be uncovered. With *reflexive modernization*, adhoc risks require adhoc solutions.

Table 3.1: Table adapted from Beck's theory for testing reflexive modernization.
Source: (Beck et al., *The Theory of Reflexive Modernization: Problematic, Hypotheses and Research Programme*, 2003)

Testing the Theory of Reflexive Modernization

Key aspects	Simple, or first modern society	Reflexive, or second modern society
<i>General Criteria: The nature of boundaries</i>	Unambiguous, institutionally guaranteed boundaries (between social spheres, between nature and society, between scientific and unscientific)	- A multiplicity of boundaries and fundamental distinctions - Recognition of this multiplicity - The necessity of institutionalizing self-consciously fictive boundaries - The new problems of institutionalized decision-making (conflicts of responsibility and boundary conflicts)
<i>General Criteria: The function, nature and position of science in society.</i>	- Ending debate through the discourse of scientific consensus - The minimization of side-effects and ineradicable residual uncertainty - The monopoly of legitimate knowledge	- Growth of contradictory scientific camps - Recognition of extra-scientific justifications - Increased account taken of unexpected side-effects - Debate ended through ad hoc institutional means of reaching a decision.
<i>Consequences of Subjectivity: Institutional and subject boundaries</i>	- Clearly assigned and indisputable subject boundaries defining all aspects of social life, including its institutional, cultural and technical aspects - Life trajectories steered within the limits set by these subject boundaries	- Multiplicity of possible subject boundaries - Recognition of the multiplicity of subject boundaries - A necessity for the subjective drawing of boundaries, and their recognition as positive fictions - Institutional, collective and individual difficulties coordinating the multiplicity of networks and subject
<i>Consequences of Subjectivity: The foundations of knowledge and rationality</i>	Unambiguous foundations for drawing institutional, cultural, physical, moral and technical boundaries.	- A multiplying of acceptable bases on which the subject can be defined - A resultant individualization of self-definition - A simultaneous orientation towards several different patterns of identity - A recognition of the unexpected consequences of individual and institutional decisions, and internalization of the resulting uncertainty. - Cooperative decision making through adhoc, subpolitical negotiations - Recognition of the fictional nature of the models underlying personal decisions and biographies.

Beck et al. (2003) go on to examine the key aspects of reflexive modernization and provide general criteria for testing for the presence of reflexive modernization by comparing it to the ideas of postmodernism. To do this, they look at four aspects for comparison: 1) the nature of boundaries, 2) the function, nature, and position of science in society, 3) institutional and subject boundaries, and 4) the foundations of knowledge and rationality.

Through my examination of their individual risk perceptions, I have attempted to understand if members of the mushroom industry have reflected on the roles that the industry, the institution, and society have in the formation of the risks that face the face their businesses today. Additionally, I have analyzed their prevention and mitigation tactics by examining if their responses to risks are reflexive (e.g., in an adhoc manner, recognizing the multiplicity of boundaries) or simple (e.g., strategies guided by the subject and institutional boundaries of simple modernization). The research questions I developed to drive data collection are as follows:

1. What do members of the Chester County Mushroom Industry, as well as the broader U.S.-based mushroom industry, perceive to be the greatest risks to the mushroom industry?
2. What do members of the Mushroom industry perceive to be the causes of those risks?
3. Based on these perceptions, how are members of the mushroom industry attempting to mitigate or prevent these risks?

Through examination of the risk perceptions of these participants, I can understand if the aspects that distinguish *reflexive modernization* from *simple modernization* are present in the mushroom industry. By asking what they view as the greatest risk, I can understand which threats the industry is primarily focusing on. How the participants view the cause of a risk informs their perceptions toward the

production of that risk (e.g., is the risk created by society, boundaries, structure, nature, the industry itself, etc.). Finally, by studying the primary prevention and mitigation techniques of the industry, I can understand how they view the role of science, technology, government policies, as well as their own agency in preventing the risk at hand. Though I expected to find some indications of reflexive modernization (or potentially a shift toward it) within their perceptions, I did not believe that a majority would perceive risks in this way. However, I did anticipate that some statistically significant demographic and geographic variations existed amongst the survey participants.

3.3 Positionality

While conducting interviews and networking with the members of the Chester County mushroom industry, I positioned myself as a person with some professional experience as a risk analyst who was now researching risk in the mushroom industry through a geographic lens. I came prepared, researching various aspects of the industrial processes involved in mushroom harvesting in order to have deeper conversations about the risks that they are facing. However, I made sure that the participants understood that I was there to learn from them and not judge. As an outsider, I have a unique privilege in my analysis of the risks. Although I am researching, collecting, and analyzing data on the risks to the industry, I am not impacted by them in the same way as my participants. Though I have provided the industry with considerations for future responses to risks, changes to mitigation and prevention tactics may be far too much of a financial gamble for many in the business.

Generational differences in job approval much wider for both Obama and Trump

% approving of president's job during first year in office

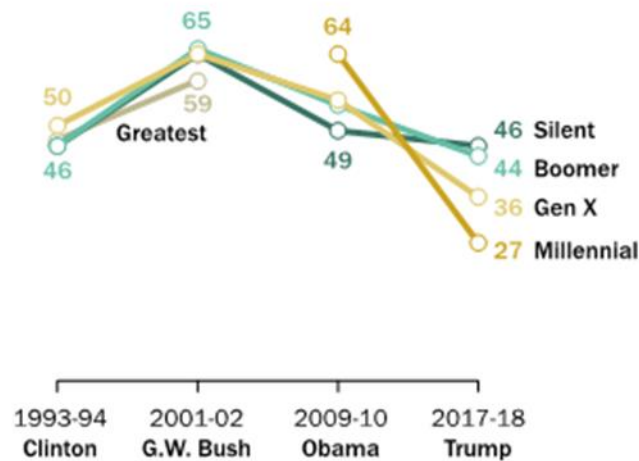


Figure 3.1: Depicts the current generational gap in American politics. Source: Pew Research Center.

Some of the participants wanted to rationalize my position by discussing their political affiliation and presuming mine. Participants occasionally used the terms “millennial” or “your generation” to describe me and people of my age. Considering that a Pew Research Center poll published on March 1, 2018 (figure 3.3) found that that the millennial generation was the most approving of President Barack Obama’s first term in office, and the least approving of President Trump’s first term in office, I understand this as coded language for “liberal.” When asked, I identified as someone who fell on the left side of the political spectrum, whereas the participants who initiated these conversations positioned themselves on the right side. I also informed them that I was not there to make personal judgements about their perceptions but to learn about their perspective on the risks.

3.4 Study Area

Kennett Square, located in Chester County, Pennsylvania is the self-declared “Mushroom Capital of the World.” More than half of all U.S. mushrooms are produced there making it the largest cash crop in the Commonwealth. The industry employs around 9,500 people (MFPA, 2017) and the vast majority of whom are Hispanic or Latino immigrants (Shutika, 2011). Chester County is not only the wealthiest county in Pennsylvania, but one of the wealthiest in the country (U.S. Census Bureau, 2016). The most common historical narrative of the Chester County mushroom industry that was discussed by interview participants was the industry’s roots with the Quakers. To maximize efficiency of their growing operations, Quaker florists grew mushrooms under the flower beds (MFPA, 2017). Their success encouraged others to grow mushrooms as well. They hired Italian immigrants at first, many of whom would later start their own mushroom farms. Most of the commercial farms in Chester County are owned and operated by their descendants (Charles, 2012). Today, these farms rely primarily on immigrant laborers from Mexico.

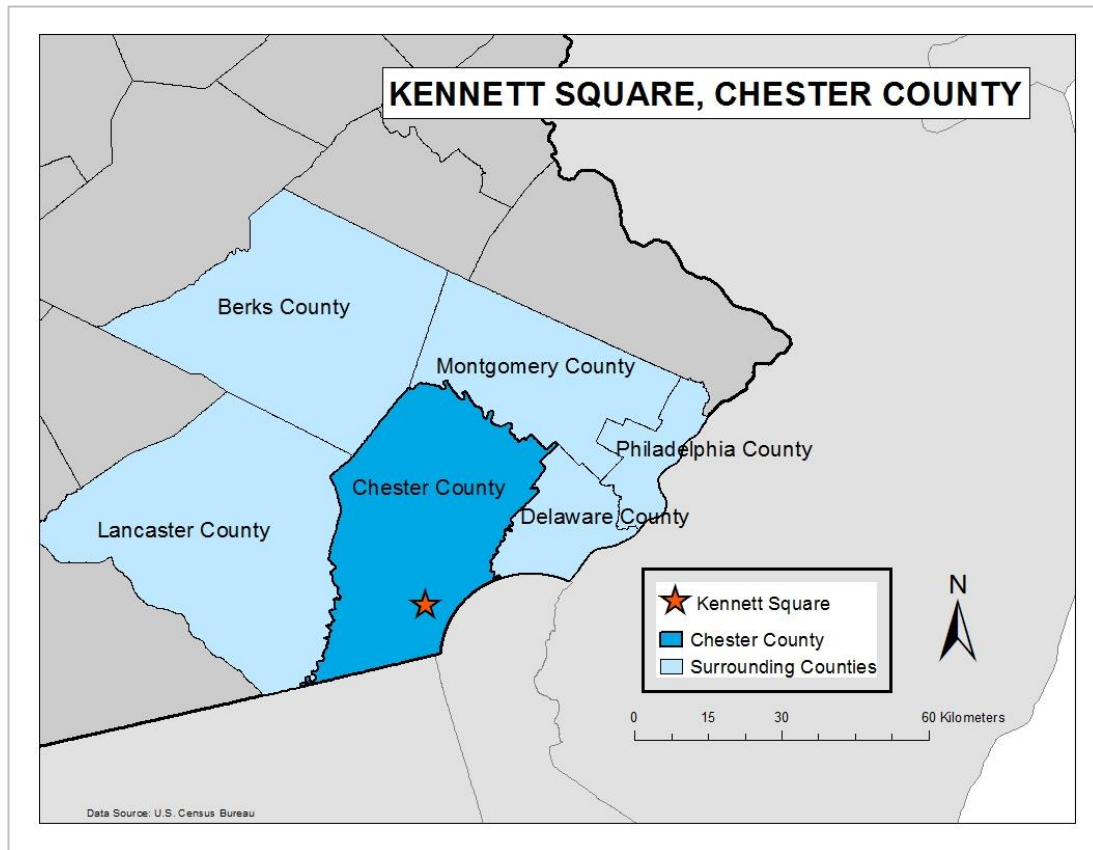


Figure 3.2: Depicts the town of Kennett Square, Chester County, and the surrounding counties.

According to the most recent report on mushrooms released by the National Agricultural Statistics Service (NASS), Pennsylvania sold 577.6 million pounds of *Agaricus* mushrooms, California sold 101.7 million pounds of mushrooms, and the remainder of states sold 223.9 million pounds of mushrooms (2017). The market is primarily made up of fresh market sales with 812.4 million pounds of fresh mushrooms being produced compared to 90.7 million pounds of processed mushrooms.

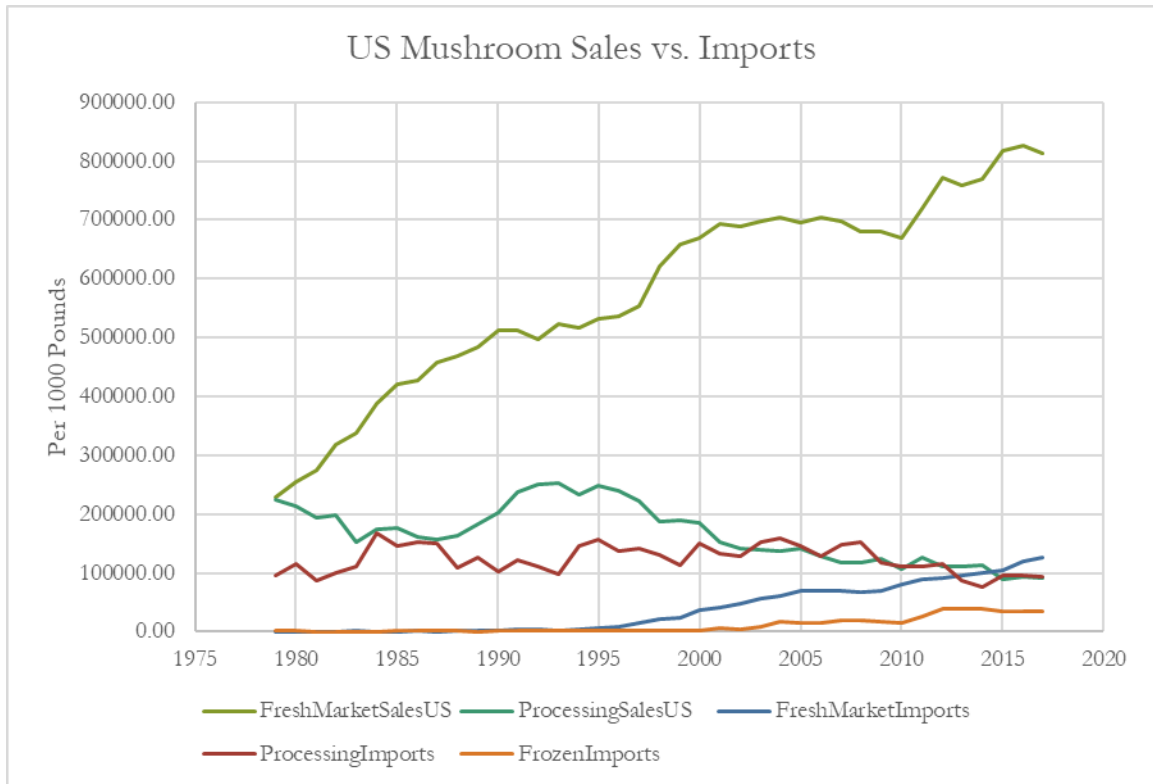


Figure 3.3: Shows the rise in fresh market sales and imports. Source: Bureau of the Census, Department of Commerce, 1979-2017.

While fresh mushroom market sales have been rising since the late 1970s, the number of fresh market imports (primarily from Canada) has risen since the mid-1990s. The number of growers has steadily declined over the last few decades. Of the ninety-six U.S. growers of *Agaricus* mushrooms in 2017, 50 of them were located in Chester County, Pennsylvania.

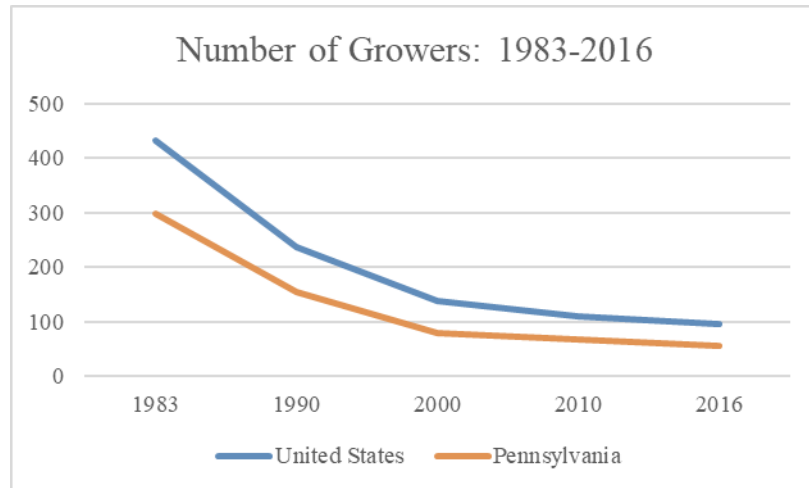


Figure 3.4: Displays the decline in mushroom growers in both Pennsylvania and the United States from 1983-2016. Source: NASS, 1983-2016.

3.5 Participants

The American Mushroom Institute (AMI) was instrumental in helping me connect with both interview participants working in the Chester County industry, as well as survey respondents across the country. As the industry's national trade organization, they represent growers, marketers, processors, and suppliers within the United States (The American Mushroom Institute (AMI), 2015). They introduced me to members of the industry, invited me to meetings and conferences, and assisted me with the distribution of my survey.

3.5.1 Interview Participants

Twenty-seven members of the Chester County, Pennsylvania mushroom industry participated in semi-structured interviews. Some were recruited through AMI while others were recruited through snowball sampling. Per AMI, the trade organization represents 95% of the industry; most of those are commercial growers. Their membership consist of owners, general managers, and other industry

stakeholders. I reached out to the majority of participants through email but a few were recruited in person and/or over the phone. The majority of the participants that I spoke with were employed at mushroom farms though some were suppliers (e.g., compost, equipment), distributors, or professional consultants. They worked in the areas of research and development, safety, quality assurance, microbiology, labor relations, human resources, marketing, communications, technical services, and daily operations. Several were owners, CEOs, presidents, or general managers. The participants' experience in the industry ranged from about one year to more than 50 years though they were fairly evenly dispersed with about half of them having fewer than 10 years experience and the other half having 10 years experience or more.

3.5.2 Survey Participants

Survey participants were recruited via email by AMI. Of the 455 members who were solicited, 130 responded in some form and 107 completed the entire survey. The survey ran for six weeks from September 28, 2017- November 10, 2017. About half of survey participants (n=51) had 30 years experience or more in the industry. Thirty-one were in Owner or Executive-level positions (CEO, President, Treasurer, etcetera) and eighteen were General or Daily Operations Managers suggesting that nearly half of those surveyed were in leadership roles. The vast majority of those surveyed worked in Pennsylvania (n=77). About 40% (n=43) produced greater than 20 million pounds of mushrooms per year and more than 76.6% (n=82) acknowledged that the farm was family owned.

Summary of Independent Survey Variables

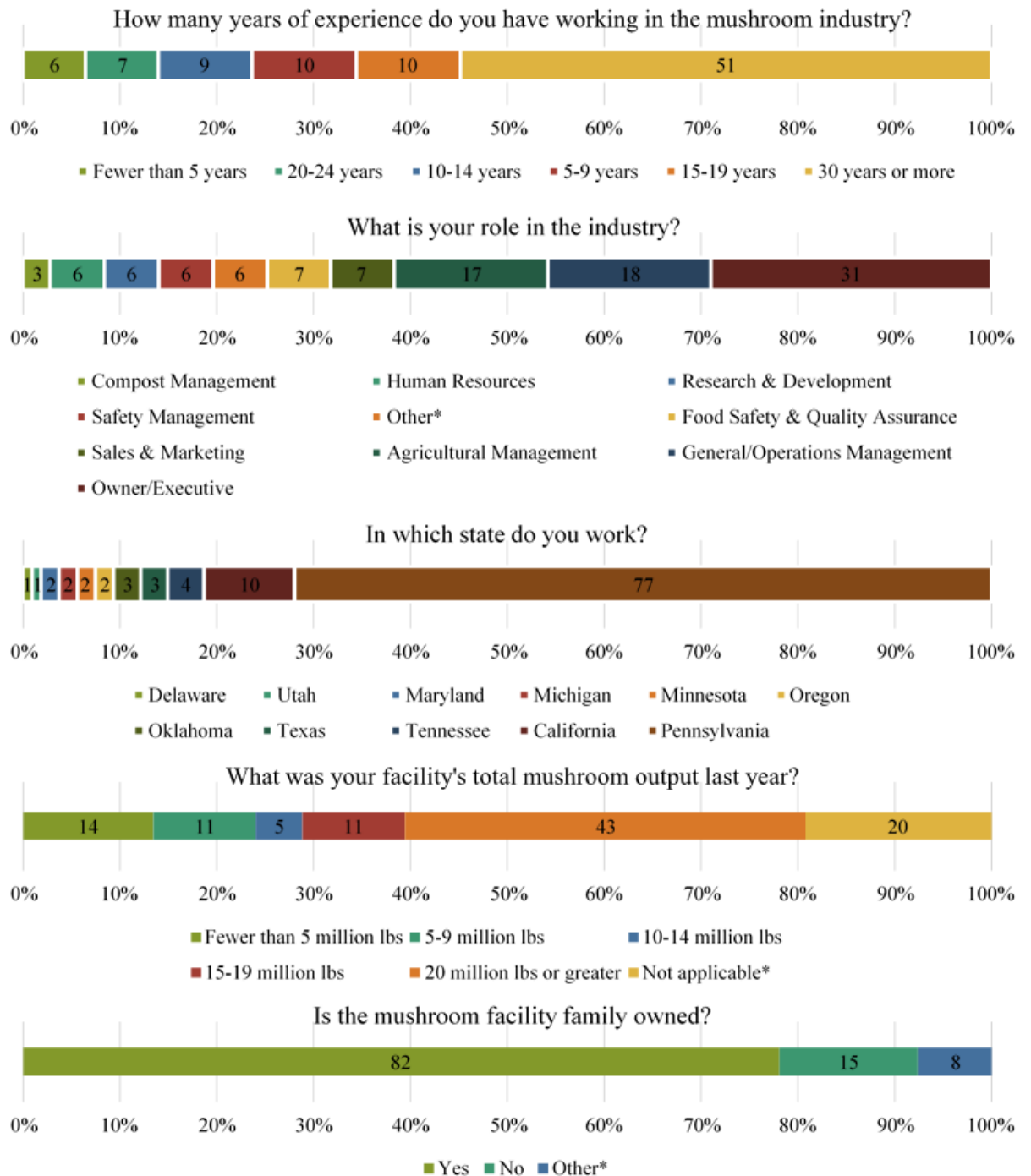


Figure 3.5: Shows the results for the independent variables of the survey.

3.6 Methods and Strategy

I collected qualitative data in both the interviews and survey for analysis. While I primarily employed qualitative methods for my analysis of the data sets, I used quantitative methods for statistical analysis of the survey data. The following section will discuss the methods and strategies used for data collection, data administration, as well as data analysis and interpretation.

3.6.1 Data Collection and Administration

I conducted the interviews first so that I could get a thorough understanding of the current risks facing the mushroom industry. After completing approximately twenty interviews, I began to develop an online survey that would ask respondents questions based on the most commonly cited risks of the Chester County, Pennsylvania interview participants. The purpose of the survey was to determine if there are geographic differences between the perspectives of mushroom industry stakeholders in Chester County and those in other areas of the country.

I conducted confidential, semi-structured interviews with members of the Chester County mushroom community from April 2017 to October 2017. In total, twenty-seven people participated in the interviews. Of the twenty interviews, fifteen were conducted with individuals, three were with two participants, and two were with three participants.

One of the primary goals of the interviews was to understand the participant's background and experience in the mushroom industry. Additionally, participants were asked to provide information on the facility in which they worked. This helped to develop the independent control variables for the survey. Another goal of the interviews was to understand the participant's perceptions of the greatest risks

currently facing the industry, strategies for preventing or mitigating against those risks, and considerations that participants would like to see in future farm bills.

In addition to connecting me with interview participants, AMI assisted in the distribution of an electronic survey. With AMI's permission, a short written explanation of the research, purpose of the survey, and direct link to the electronic version of the survey, were distributed via email by AMI to its membership. Participants were also given a chance to enter a raffle for a chance to win a \$100 gift card for Amazon. Survey questions addressed: 1) demographic variables; 2) participants' perceptions of risk to the mushroom industry; (3) cause and duration of risk; 4) participants' perceptions of prevention and mitigation measures; and 5) participants' perception of preliminary interview research data. (full survey measure will be included in the appendix).



Figure 3.6: 3.6-A (left) depicts the 'Cause' word cloud used in the survey while 3.6-B (right) depicts the 'Prevention and/or Mitigation' word cloud.

Word clouds (figures 3.7-A and 3.7-B) were used to determine both the ‘Causes’ of the risks as well as the strategies for ‘Prevention and/or Mitigation’. While the words used in the word clouds derived from interview data, the goal of the word clouds was to trigger participants to reflect on those risks and provide additional comments in the open-ended response space provided. Finally, a section based on interview responses to the perceived ‘greatest risk’ (i.e., labor shortages) was placed at the end to avoid manipulating the survey participants’ own perceptions on risk in the industry.

3.6.2 Data Analysis and Interpretation

Due to the differing methods of data administration and collection, interview and survey data were analyzed separately. However, data involving overlapping questions (e.g., greatest risk, cause, prevention/mitigation, participant background, etc.) were interpreted collectively using Ulrich Beck’s theory of reflexive modernization. After interviews were conducted and recorded, they were uploaded into Atlas TI software for coding and analysis. Codes were used to denote the name of the risk (such as labor shortages), the ‘rank’ of the risk (i.e., whether or not the participant perceived the risk to be high, low, or average), and the perceived duration of the risk. The factors that caused the risks (e.g., aging infrastructure, immigrant perception, farm concentration, etcetera), the techniques employed to prevent them (such as lobbying or research), and their opinions on policies that impact the industry (e.g., immigration, regulation) were coded as well.

Surveys were analyzed using SPSS statistical analysis software. Independent variables (role, years experience, family-owned, output, etc.) were cross-tabulated with dependent variables such as risks according to rank, duration of risk, cause of the

risk, prevention of the risk, and questions on interview participant opinions on labor shortages. With the exception of the final question on the survey, Cramer's V was utilized to determine if statistically significant relationships existed between independent and dependent variables. For the questions that utilized the Likert scale, the Mann-Whitney U was employed. Open-ended questions from the survey were coded in Atlas TI using the same coding variables as the interview data.

3.7 Ethical Considerations

Prior to conducting research, I obtained approval from the University of Delaware's Institutional Review Board (IRB). Since I met with interview participants in-person, I was unable to ensure anonymity, therefore steps were taken to provide confidentiality. Interviews were recorded and stored using an encrypted file on a password-protected computer. During the interviews, identifiable information was not requested from the participants. Additionally, participants were assured that, if they mistakenly provided this information during our conversation, it would be removed from the dataset. All of the interview participants' names were replaced with numbers. Survey participant responses were anonymously collected electronically with the assistance of the AMI. The following two chapters will employ the aforementioned methods to analyze and discuss the results of the data.

Chapter 4

GOVERNMENT REGULATION: RISKS AND THE POLITICS OF KNOWLEDGE

Farmers were viewed for centuries as the ‘peasantry’ wresting the ‘fruits’ from the soil, on which the life and survival of everyone depended, but this image is beginning to be transformed into its opposite. In this new view, agriculture becomes a distribution point for the toxins that threaten the lives of animals, plants and people. To turn aside the threatening dangers at the currently achieved high level of agricultural productivity, people demand expropriation and /or plans and controls governing every detail of work, all under the patronage of science and bureaucracy. It is not just these demands (or even the matter-of-fact way they are raised) that is the disturbing element here. Instead it is that they are part of the logic of hazard prevention, and that considering the impending hazards, it will not likely prove to be at all easy to point to political alternatives that really prevent what must be prevented under the dictatorship of dangers. (Beck, 1992. p.79)

4.1 Introduction

Agriculture and *Government Regulation* go hand-in-hand. Agricultural processes were championed at the height of the industrial era for their innovation and technological ability to provide low-cost food. However, industrialization produces risks as well, and although they are initially invisible to society, they eventually uncover their existence and demand remedies from the government. These come in the form of laws such as protections for worker safety to regulations on pesticides. Although there is incredible value in laws that protect the worker, the consumer, and the environment, from the hazards associated with agricultural production the financial burden of the regulations is primarily shouldered by the farmers.

What modern society once considered *unpolitical*, such as the use of chemical pesticides, becomes *political* in an attempt to quell the previously unrealized risks. The various regulations imposed on the private sector (or in this case, the U.S.

Mushroom Industry) are the result of the *boomerang effect* (see chapter 2) and the compounding risks that follow tend to be financial, legal, bureaucratic, and reputational in nature. Though these compounding risks are felt directly by the private entities whose industrial practices caused the original risks to begin with, threats such as collapsing or emerging markets and the devaluation of capital are broader reaching.

In this chapter, I examine how the U.S.-based Mushroom Industry perceives the threat of *Government Regulation*. First, I provide background information on the composting and mushroom growing process as well as Beck's analysis of the *politics of knowledge*. I then discuss the interview and survey results, comparing the ways in which the survey data supports my findings from the interview data. I then review my findings for industrial risks, such as *Pests & Diseases*, *Food Safety*, and *Environmental Risks/Climate Change*, which were perceived by interview and/or survey participants to be associated with the risk of *Government Regulation*. Finally, I conclude the chapter with a discussion of how the data suggests (or not) a break from a simple modernity to one that is reflexive.

4.2 Background Information

This section gives some background information for the analysis of environmental and policy related risks. I begin with a review of the composting and mushroom growing processes in order to help explain how some of the industrial risks perceived to be related to the risk of *Government Regulation*, are created through the agricultural production processes. I then review how *reflexivity* and the *politics of knowledge* uncovers the primary industrialization risks and brings about regulation, creating *side effects* for the mushroom industry in the process.

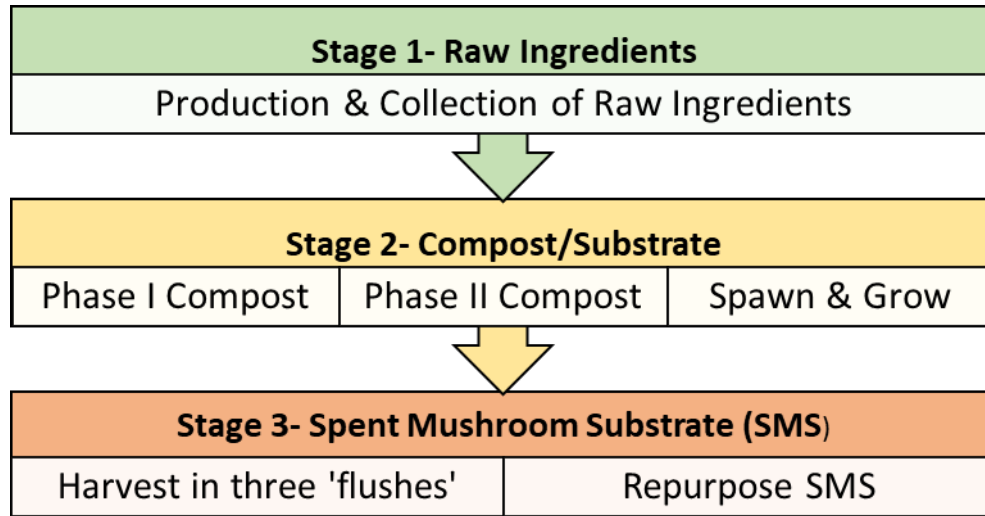


Figure 4.1: Illustrates the composting and growing process involved in mushroom production.

Understanding how the industrial processes of the mushroom industry work is necessary in order to comprehend the risks that are created through these same processes. As a crop, the mushroom has an innate ability to consume organic material. Growers often use the discarded by-products of other agricultural industries, such as poultry manure and corncobs (The Pennsylvania State University (PSU), 2003), to create their compost, which helps them live up to their nickname, the ‘original recyclers’ (MFPA, 2017). However, the large concentration of farms in the Chester County area has caused a shortage of quality raw materials and raised costs for owners. The innovative preparation of the compost, which involves two interconnected phases, has made the process much more efficient. In response to local complaints about the strong odors that permeate from the compost, the industry has implemented an Odor Management Plan (OMP). Integrated Pest Management (IPM), and Mushroom Good Agricultural Practices (MGAP) are incorporated at nearly all

stages of the composting and growing processes in order to reduce Environmental Risks, Pests and Diseases, as well as Food Safety concerns.

4.2.1 Stage 1: Raw Ingredients

The composting and growing processes begin with the collection of raw ingredients (see figure 4.1). Straw-bedded horse manure is the primary ingredient desired for the mushroom compost as it provides an excellent source of nitrogen. However, the need of the local industry is such that hay and horse bedding are being brought in from farms and stables that are often hundreds of miles away (NPR, 2012). A synthetic horse manure blend (“synthetic” meaning that the desired chemical components found in organic horse manure are instead manufactured in the lab) that consists of mulch hay or wheat straw may also be used however, it is less cost-effective to use non-manure supplements (PSU, 2008). Poultry manure is another source of nitrogen but is far more potent than others (PSU, 2008). Other non-protein or inorganic nitrogen sources such as urea or ammonia nitrate are used, but the amount differs depending on the amount of high-carbohydrate ingredients (PSU, 2003). Corncoobs, cottonseed hulls, and cocoa bean hulls may be part of the carbohydrate supplementation which both provides heat to the process and helps to balance the nitrogen rich supplements (PSU, 2003; PSU, 2008). Gypsum (calcium sulfate [CaSO₄]), is a flocculating agent that helps to minimize and prevent ‘greasiness’ (PSU, 2003; PSU, 2008). Water and high-temperatures are added at various stages of the process to encourage microbe growth and induce chemical reactions (PSU, 2008). The water that is used can be safely recycled back into the composting process provided that a proper management substrate preparation wharf is in place (PSU, 2003).

As noted earlier, the mushroom growers' reputations as the 'original recyclers' stems from their history of using the discarded organic waste of other industrial processes as the main ingredients for mushroom compost; the use of these previously harvested materials helps support other agricultural processes by keeping more than 230,000 acres of PA farmland in production (MushroomCompost.org, 2017). While the ingredients vary, the goal is the same; to have the necessary amount of moisture, oxygen, nitrogen, and carbohydrates present throughout the composting process so that the nutrients will be able to support the mushroom crop (PDEP, 2012).

4.2.2 Stage 2: Compost and Substrate

After the organic materials have been collected, Phase I of the composting process begins. This phase is a high-temperature chemical reaction process (between 160-175 °F) (Beyer, 1997), that finishes the fermentation of soluble carbohydrates (PSU, 2008). The carbohydrates are combined with nitrogen to form complex N-lignin materials that will later be used by the mushrooms (PSU, 2008). However, before the high-temperature process takes place the straw and hay are mixed with water to both de-wax the straw and remove the stems. This process, which is called pre-conditioning, usually lasts between 3-15 days (PSU, 2003) and allows moisture to enter the dry materials which encourages microbe growth (PDEP, 2012). Once the materials have been pre-conditioned, they are formed in a long pile which is typically done indoors to mitigate against odors which permeate from the ammonia in the raw materials (PDEP, 2012). The piles are then turned and watered about every two days which helps to both aerate and heat the burgeoning substrate (PDEP, 2012). Ammonia remains after this stage, and if not properly managed, can create a broad reaching stench in the local area.

Phase II composting converts the leftover ammonia from Phase I to protein, creating a particular food supply for the mushrooms (PSU, 2008). However, before this can begin, the compost is pasteurized so that unwanted insects are killed (PSU, 2017a), a process that helps to reduce the risk of pests and diseases. It is a low-temperature microbial process that is typically carried out in containers (called tunnels) that have perforated floors and no covers for aeration (PSU, 2003). Phase II takes between 7-18 days at temperatures ranging from 115 °F to 140 °F (PSU, 2003).¹

Once the composting process has been completed, spawn are evenly distributed over the surface of the substrate (PSU, 2003). ‘Spawn’ is when the mushroom mycelium is cultivated on a base of cereal grain that is usually comprised of rye or millet; a spawning machine is used to help mix the spawn over the compost (PSU, 2017b). In order to force the mushroom mycelia of the spawn to change from the vegetative phase to a reproductive or fruiting growth stage is to apply a casing layer (PSU, 2003). Although a high nitrogen content, with no ammonia, will produce greater yields, it is important to not have too much nitrogen concentration. In general, a higher nitrogen substrate will cause the mushroom itself to be dense and grow at a slower rate which can impact yields and freshness (PSU, 2017b). The freshly spawned substrate is then kept in a climate controlled high-moisture environment for 10-18 days at 75 F.

¹ Mushroom farmers in the Netherlands have incorporated an additional step to the composting process titled ‘Phase III’ (Royse & Beelman, 2017). Though this additional phase increases the efficiency of the mushroom growing process, most of the growing operations in the United States are too antiquated for it to be incorporated.

4.2.3 Stage 3: Spent Mushroom Substrate (SMS)

Stage 3 is concerned with the spent mushroom substrate (SMS) that is produced after the mushrooms have been grown and harvested from the substrate product that was created in Stage 2. The harvest typically occurs in three ‘breaks’ or ‘flushes’ which are picked at varying times (PSU, 2003). Harvestable mushrooms begin to appear in the substrate between 16-28 days after casing (PDEP, 2012). The optimal temperature of the climate-controlled environments throughout the growing stage is 75 F (PSU, 2002), which encourages the growth of the mushroom mycelium within the compost. However, these conditions are also ideal for pests, such as the phorid fly, that flourish in this moisture rich environment. Unfortunately, there is currently no available pesticide to help the industry eradicate that particular fly as the indoor use of the chemical, Diazinon, the sole chemical available for phorid fly was banned by the EPA in 2000 (EPA, 2016). A spawned mushroom compost will typically yield three flushes. A ‘flush’ refers to a 3-5 day harvest period in which the mature mushrooms are ready to be picked (PDEP, 2012). Once mature mushrooms are picked from the first flush, the next flush will begin to mature with decreasing yields each picking cycle (PDEP, 2012).

After the mushrooms have been harvested, the compost takes its final form as spent mushroom substrate or SMS. The SMS is often repurposed for other applications such as soil reclamation, storm water management, sports fields, mulching, lawns, green roofs, golf fairways, and etcetera (Laurel Valley Soils, 2017). Some in the industry have started to sell their SMS to be reused for other agricultural and ecological purposes, adding another dimension to their reputation as the ‘original recyclers’.

While the complexity of the industrial processes used to grow and cultivate mushrooms has increased the productivity of the industry, it also presents risks. Though the composting and growing processes have improved the efficiency of mushroom production, risks such as leaching, an increased population of fungal pests, compost odors, and food safety concerns, impact society as well as the industry. Beck's theses on the *politics of knowledge*, attempts to explain how society develops awareness of these risks, and responds to them with *Government Regulations*. Though regulations protect society, they are *side effects* of the aforementioned risks, creating financial burdens on the industry. Evaluating the data through this lens will provide the tools necessary to analyze the risk of *Government Regulation* in the mushroom industry.

4.2.4 The Politics of Knowledge

The promises of modernization, such as wealth, individual liberty, and the pursuit of knowledge and happiness (ideas affiliated with the American dream) help bring to light the environmental, health, and safety related risks that were previously unknown (or undisclosed). The following section will explain how society's awareness of the risk creates policy change, simultaneously altering the industrial processes; compounding risks arise from these changes, impacting the industry and society from the individual business and local scale to the broader industry and global scale.

Beck argued that since the awareness of modernization risks by society is transferred through knowledge, the individuals and groups in modern society that are afflicted by the risks are more educated and inform themselves on the risks they face. He argued that *risk consciousness* (i.e., awareness of the impacts of industrialization

and modernization risks) and *activism* are more likely to occur where the direct pressure to make a living has been relaxed or broken, that is, among the wealthier and more protected groups (and countries) (p.53).” This does not suggest that affluent people are more impacted by industrial risks because the opposite tends to be true. For instance, researchers have found that concentrated animal feeding operations (CAFO) tend to be located near marginalized communities, increasing their exposure to the many risks the CAFOs create (Gunderson, 2015). Unfortunately their muted position in society restricts their influence and the ability to avoid or mitigate this exposure. As was noted in chapter 2, Chester County is one of the more affluent counties in the United States. If being ‘comfortable’ in their lives (i.e., having financial wealth) is what encourages *risk consciousness* in society, it is possible that the economic success of Chester County has helped to foster awareness in its residents.

Important to how people come to this *risk consciousness* are their exposure to the risk (or not) and the extent to which they depend upon external knowledge sources to inform them of the risks existence; all of which inform the way that society perceives the risk. For example, society must look to experts in the industry or the government to inform them of a *Listeria* outbreak, rendering them incompetent in assessing the risks for themselves. By not being able to assess the risks, the afflicted parties ‘lose an essential part of their cognitive sovereignty (Beck, 1992, p.53).’ As more risks are exposed and the potential for threats increases, the margins for error in science become narrower. To admit a mistake, such as an error in determining the safety of pesticides, is to unleash a *political catastrophe*. Oftentimes, the threat is initially minimized by experts in an attempt to avoid harming their reputations.

However, their credibility diminishes when the risks are eventually uncovered, leading to risk awareness, social action, and the enactment of remedial policies (Beck, 1992).

In modern society, the world is divided between ‘experts’ and ‘non-experts’. The former determines the risk through science and knowledge and the latter merely perceives risk. To the experts, the non-experts are the equivalent of a freshman beginning his or her first semester in college. “They are ignorant, of course, but well intentioned; hard-working, but without a clue (Beck, 1992, p.58).” The belief that it is a problem of information (or misinformation) is wrong. They make incorrect assumptions about what may appear to be acceptable to society. Rather than judge the lack of knowledge of the population, they should incorporate their ideas into the basis of their work. He notes that the investigation of risk is dragging behind societies critiques of industrialization. With regard to the expert knowledge on the perception of risk, they are losing face in the eyes of modern society. It is not the misperception of society, but the failure of the experts to respond to the risks that threaten civilization. The risks are neglected as experts focus on increasing productivity and wealth. After decades of misjudging risks, making scientific mistakes, and minimizing the harms that face society, the experts lose credibility. Additionally, their focus on increasing productivity often trumps the concern over the effects of the risk itself.

Beck argues that, unless a risk is recognized scientifically, *it does not exist* legally, medically, technologically, or socially. Consequently, they are also not prevented, treated, or compensated for. The tobacco industry initially did not recognize the risks posed by cigarettes, however, as alternative scientific camps discovered the dangers of smoking, industry ‘experts’ lost some of their credibility. If something within the industry is deemed to be toxic, then an *acceptable level* of the

toxic substance must be determined before it can be permitted for use. Beck states that ‘a central term for ‘I don’t know either’ is ‘acceptable level’. The concept functions as *symbolic* detoxification of the perceived threat. However, he argues that individual members of society are more concerned with the holistic threat of toxic pollution. When experts talk of the *acceptable levels* of a particular toxin amid the social perception of the overall threat, they are publicly prosecuted.

Being afflicted by the hazard does not always result in *risk consciousness*, and can sometimes provoke *denial from fear*. For example, despite the overwhelming evidence supporting human-caused climate change, many in the United States are still skeptical of the facts. Right-leaning politicians and special interests groups have dismissed many of these scientific claims and have instead stoked fears over the economic impact of environmental regulations. Modern society’s dependence on ‘experts’ has deepened political divisions as contradictory scientific camps compete over the legitimacy of their knowledge (see table 3.1). However, Beck believes that reflexive modernization brings about a *speculative age* because “those who simply use things... without an inquiry into the background toxic reality are not only naïve but they also misunderstand the hazards that threaten them, and thus expose themselves to such hazards with no protection (p.73).”

Nature, Beck argues, was once understood as being separate from society, existing outside of it in a separate space. Earlier theories about the concept of nature sometimes described it as something that is given (perhaps by a higher power) to society, is in opposition to society, or that needs to be tamed by society. As we reflect on the pollutant nature of industrialization, we are forced to rethink this concept. Rather than something that is given to us, it instead is seen as an ‘historical product’

that needs to be protected from the destructive forces of modernization. Though measures such as regulations are taken to help prevent these threats, they create social, political, and economic risks, or *side effects*, for both society and the industry.

4.3 Results on the Risk of Government Regulation

The results from my data on the risk of government regulation, as well as associated risks, are presented in this section in order of my three research objectives. I begin by exploring the participants' understanding of the risk, its duration and the causes or factors that created or amplified the risk. I then review the rank, duration, and causes of the risks associated with government regulation because, while it is considered a risk in its own right, it is also a *side-effect* of several primary risks, many of which are environmental in nature. Following that order, I review the ways in which the industry is attempting to prevent or mitigate government regulation and its associated risks. Interview data and survey data are presented together using the common themes found in interviews. Results are explored using Beck's analysis of the *politics of knowledge* in the risk society as a framework for which to compare the narratives to the theory of reflexive modernization.

4.3.1 Rank and Duration of Government Regulation

Of those interviewed, eleven (n=27) perceived the risk of government regulation to be a significant risk to the industry. Most perceived the risk as government overreach in a general sense although environmental regulations, worker safety standards, food safety standards, and health care, were all specifically mentioned. The survey was designed in a similar manner to the interviews but with the purpose of examining the potential differences in risk perception across the U.S.

Survey participants were asked to select what they perceived to be the three greatest risks facing the mushroom industry. Participants then ranked the risk in order of importance with Rank 1 signifying the risk that they perceive to be the most important. Of those surveyed (n=107), 42.1% selected government regulation as one of these three risks, with 22% believing it to be the greatest risk facing the industry. Interestingly, participants in Pennsylvania were significantly less likely (95% confidence) to select government regulation as a risk compared to other states.

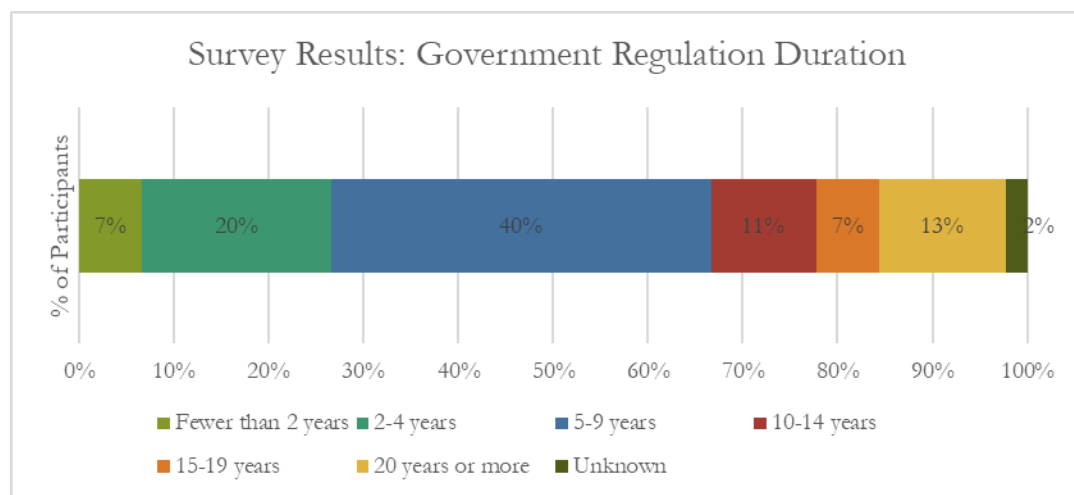


Figure 4.2: Shows the participants' perceptions of the duration of the risk of Government Regulation.

When asked to determine the duration of the risk, 40% selected between 5-9 years indicating that many perceive the risk to have either begun or increased in severity during President Obama's administration. Only 31% of all of those who answered believed the risk began or increased prior to this period. Most interview participants' perceptions of the duration of the risk is indicative of this as well as many

specifically mentioned the Affordable Care Act which became law on March 23, 2010 (Stolberg & Pear, 2010). Environmental, worker safety, and food safety were all mentioned in relation to this risk as well, albeit in a broader sense. Participants usually noted the inherent value in most of the regulations that were in place; however, they described them as being burdensome in both time and money.

4.3.2 Causes and Risks Related to Government Regulation

Interview participants perceived several factors to have caused or influenced the perceived risk of government regulation. As mentioned, the risks associated with the *politics of knowledge* arise after individuals became aware of previously unknown risks. This can happen through their own pursuit of knowledge, media coverage of a newly discovered or disclosed risk, or by being impacted by the risk in a personal way. These risks tend to impact society, animals, or even the environment. When discussing the factors that either helped create the risk of government regulation, three themes emerged from the interview narratives. First, some reflected on the *responsibility of the industry* in creating the risks through the very nature of their production processes. Second, participants noted the change in *social perception* toward environmental issues, the individual right to access healthcare, and concerns over food safety as being driving forces. Finally, interviewees believed the *ignorance and apathy of politicians* as a major factor in making the risk fiscally challenging and cumbersome.

Interview participants noted the industry's contribution to climate change and acknowledged the value in regulating the industry. One interviewee remarked on the amount of energy that is used for the process, stating that, "we [mushroom growers] are energy foolish [14]." However, many were also quick to point out the sustainability

of the industry, noting their reputation as the ‘original recyclers.’ In addition to recycling the waste-products of other agricultural industries, interviewees commonly discussed the industry’s use of recycled water in their compost production process. Risks associated with their industrial processes that were mentioned include leaching, odor management, and pests and diseases.

It was common for interview participants to acknowledge the changes in social perception that have led to increased regulation and government overreach. Some noted how local community members develop visibility of the risk, such as developing an infestation of the phorid fly in their yard (Barber, 2017). However, many seemed to understand the public’s change in perception to be based on changing attitudes toward the validity of climate change science. Though participants did not invalidate these social perceptions, they did believe that, while well intentioned, the public was uninformed on the compounding financial *side-effects* that are caused by increased regulations.

Attitudes toward a misinformed population extended to politicians as well though many expressed frustration regarding their interactions with congress. Several participants told personal anecdotes, recalling meetings with senators or representatives who dismissed many of their economic concerns. While some participants believed politicians to be apathetic to their concerns, others tried to understand where they were coming from:

I don’t think government officials understand, there’s a cost of compliance... There are a lot of things that the government does that are well-intended, they just go about it the wrong way. [I4]

When it comes to risks created through industrial production, Beck argued that it is wrong of the industry to make assumptions about the amount of risk that society and

(consequently) their elected representatives, will perceive as acceptable. The institutional boundaries established at the advent of the industrial age are beginning to blur as the focus shifts from economic policy and the distribution of goods, to eliminating the hazards and risks created through the modernization process. The sovereignty of their industrial management has been taken away as these risks are politicized. One interviewee who discussed the burden of food safety regulations noted that, “Everybody wants to push the responsibility for food safety as far up the chain as they can [I11].” The change in these boundaries creates new challenges as much of the pressure to prevent the risk falls squarely on the farmers.

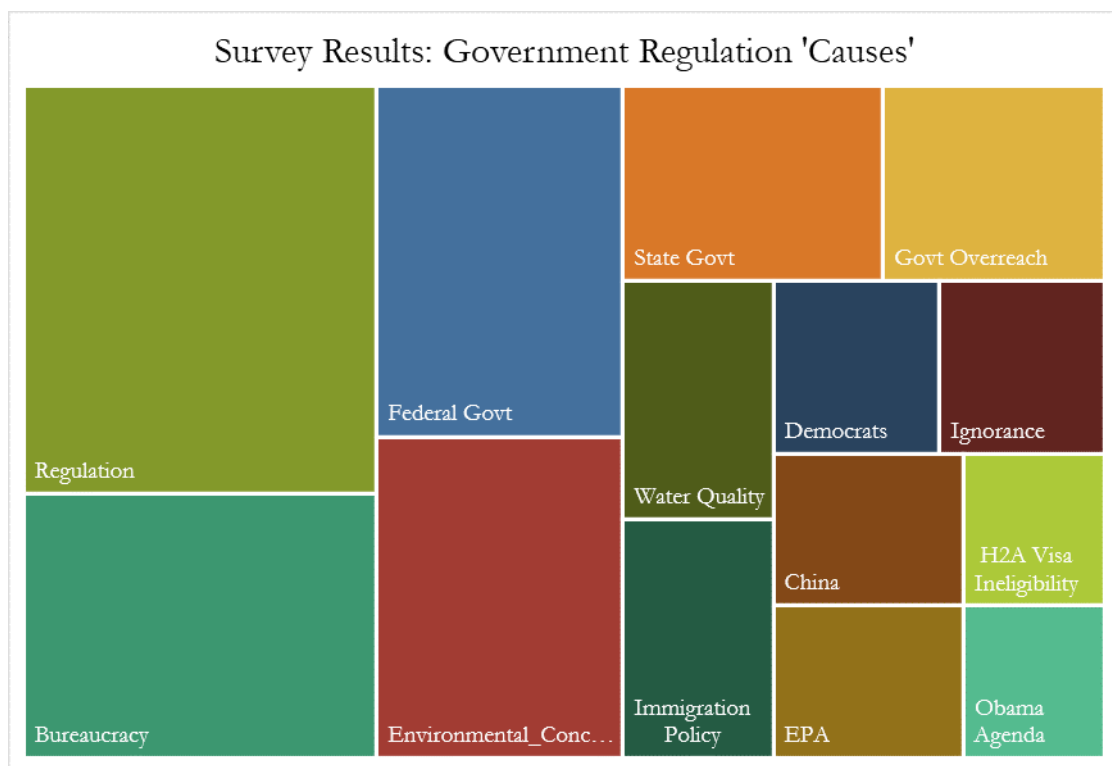


Figure 4.3: Displays the most commonly selected words from the ‘Causes’ word cloud by survey participants.

Survey participants were asked to select up to three words from a word cloud of preselected *Causes* of the government regulation risk. Though the chosen words come from the interview participants' answers, one limitation of the word cloud is that the same choices were given for each potential risk. As a result, the word *Regulation*, which was helpful in understanding subsequent risks in this chapter, was the most common selection (n=20). *Bureaucracy* (n=13) and *Federal Government* (n=12) were the next most common selections, followed by *Environmental Concerns* (n=11), *State Government* (n=7), and *Government Overreach* (n=6). This confirms many of the opinions of the interviewees who appeared to be more frustrated with the actions of the government than the changing perception of society.

4.3.3 Participants' Strategies for Prevention and Mitigation of Government Regulation

Since many of the interview and survey participants appear to broadly regard the government as the cause of the risk, it is unsurprising that lobbying was the predominant method for preventing or mitigating their effects.² The goals of their lobbying efforts diverged into three groups. First were those who wanted to deregulate by removing some of the regulations or policies that they deemed burdensome. Though not a common sentiment, one participant reflected on the challenges brought on by *deregulation*:

Changes in regulation are more problematic than, necessarily, more or less [regulation]... Once you finally adopt a set of practices around a set of regulations, changing them is timely and costly. We're not

² Though strategies for preventing or mitigating the hazards or risks that brought about the regulation in the first place were discussed in interviews, they will be reviewed in subsequent sections.

necessarily interested in less regulations [though] we certainly don't want more. [I17]

There were some who claimed to be fine with the regulations that were in place, as long as more were not added into the mix. One participant wanted smarter regulation, suggesting that new ones be introduced slowly so that the change was not a culture shock to their employees.

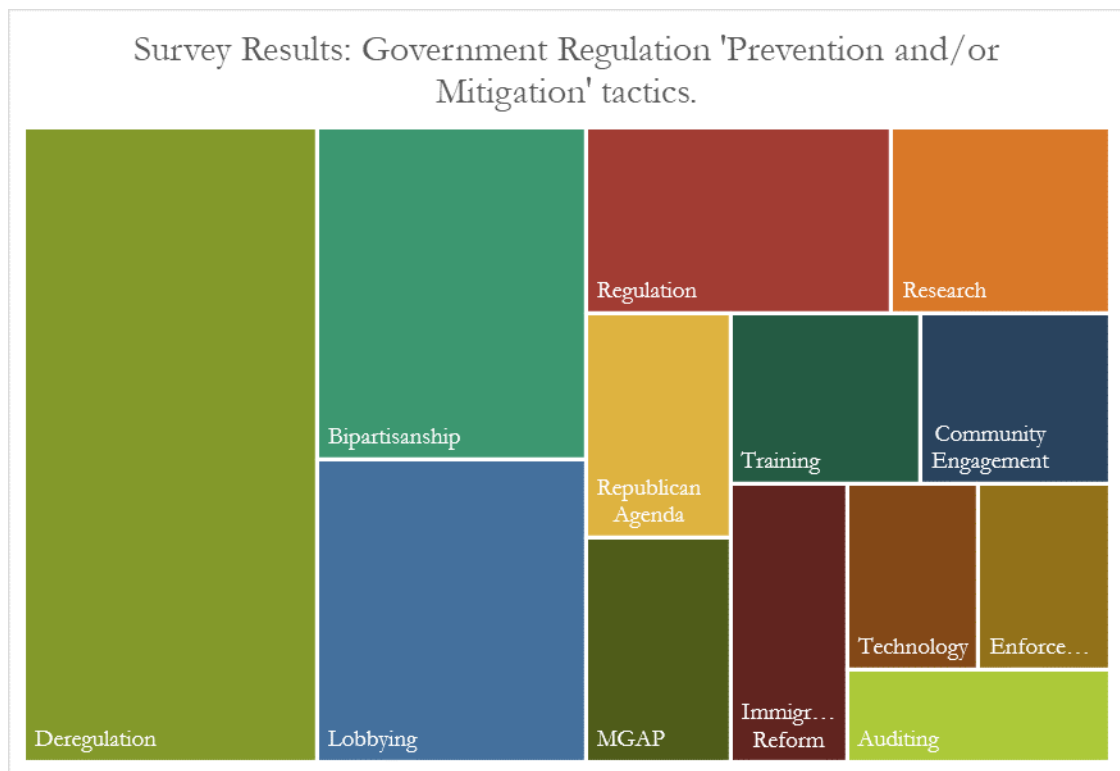


Figure 4.4: Displays the survey participants' most common word selections from the 'Prevention and/or Mitigation' word cloud

Similar to the *Cause* section of the survey, participants who selected *Government Regulation* as a top three risk were subsequently asked to choose up to three words that represented the ideal measures for *Prevention and/or Mitigation* of

the risk. The word *Deregulation* (n=23) was chosen by more than half of the participants while *Lobbying* (n=10) was the third most common response. This could suggest that many in the industry are not employing *cooperative decision making through adhoc, subpolitical negotiations* (see table 3.1) as a means of preventing risk. However, *Bipartisanship* (n=11) was the second most common selection which could indicate that some in the industry are moving toward *reflexive modernization*. *Regulation* (n=7), *Auditing* (n=3), *Enforcement* (n=3), were not common selections. As previously mentioned, Pennsylvania survey participants were less likely to select regulation as a risk. Considering that interview participants were less likely than survey participants to suggest *deregulation* as a prevention tactic and more likely to be concerned with *other farms* not complying, it is possible that the mushroom community in Chester County perceives the risk to be more of a reputational risk to the broader industry rather than a risk to their individual operations. Areas of the country facing strict state regulations, such as California, may be feeling more of the burden of the *side effects* of regulations.

The industry's perception of *Government Regulation* is complex as it results in response to the risks created through the industrialization process. It is a *side effect* of socially perceived risks to the environment, the market, employees, and society at large. In order to thoroughly understand how the mushroom industry understands this risk, I will review findings on some of these threats created by the industry itself, including *Pests and Diseases*, *Food Safety*, and *Raw Material Shortages and Climate Change*.

4.3.4 Pests and Diseases

Of the participants interviewed (n = 27), 22 identified *Pests and Diseases* as a significant risk to the mushroom industry, however none of them categorized this risk as their primary concern. Similar results were found in the survey. 38.3% of survey participants selected pests and diseases as a top three risk, with only 3.7% of all participants selecting it as the greatest risk facing the industry today.

Although technically separate risks, participants consistently grouped pests with diseases due to both the compounding nature of the creation of the risks, as well as the collective strategies for preventing or mitigating against them. While there are multiple types of pests that threaten the mushroom crop, only two were mentioned by name: the sciarid and the phorid. The sciarid is a small black insect with gray wings, long antennae, and is $\frac{1}{4}$ inch in length. At only $\frac{1}{8}$ inch in length, the phorid is even smaller making it incredibly difficult to spot. Both lay their eggs in the compost so the hatched larvae can feed on the mushroom mycelium (The Ameircan Mushroom Institute (AMI), 2015), a process that can hinder fruit body production (PSU, 2002). After the larvae develop into the adult stage, the flies move around the mushroom house to feed which increases the risk of carrying and spreading fungal diseases (PSU, 2002).

Interview participants mentioned only two diseases by name: *Trichoderma harzianum* and *Verticilium fungicola*. More commonly known as ‘green mold’, *Trichoderma harzianum* is a relatively new disease which was first encountered in Chester County, Pennsylvania in 1994 (PSU, 2002). It is recognized by the mycelium’s color, which starts out gray, before changing to white and increasing in density; the spores then turn to a dark green color after fruiting (AMI, 2015). *Verticilium fungicola*, also known as ‘dry bubble’, appears first as small spots on the

surface of the mushroom cap before enlarging and conjoining (PSU, 2002).
Pasteurizing an infected mushroom house can help to eliminate the disease before the next crop cycle begins, however the financial loss brought on by the disease can be devastating to the smaller operations whose profit margins are already razor thin.

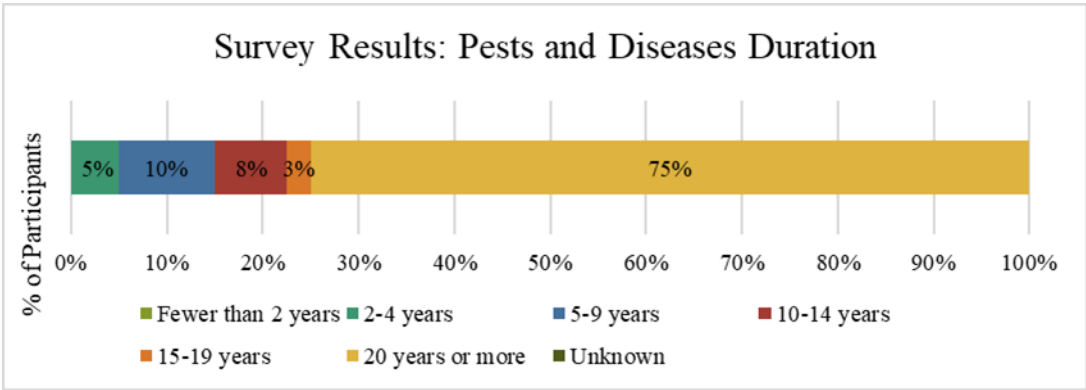


Figure 4.5: Shows the survey results for the participants’ perceptions of the duration of the risk.

As financially devastating as these types of crop losses can be, only four of those interviewed ($n = 27$) argued that the number of pests, and therefore the risk, had increased over the last few years. The survey showed similar results with 75% of participants selecting the duration of the risk to be *20 years or more*. This could suggest that most in the industry do not perceive a recent increase in the risk. However, since fungal pests and diseases are an inherent threat to mushrooms, it is possible that the question was misinterpreted and those who responded did not consider if the risk had increased when answering the question.

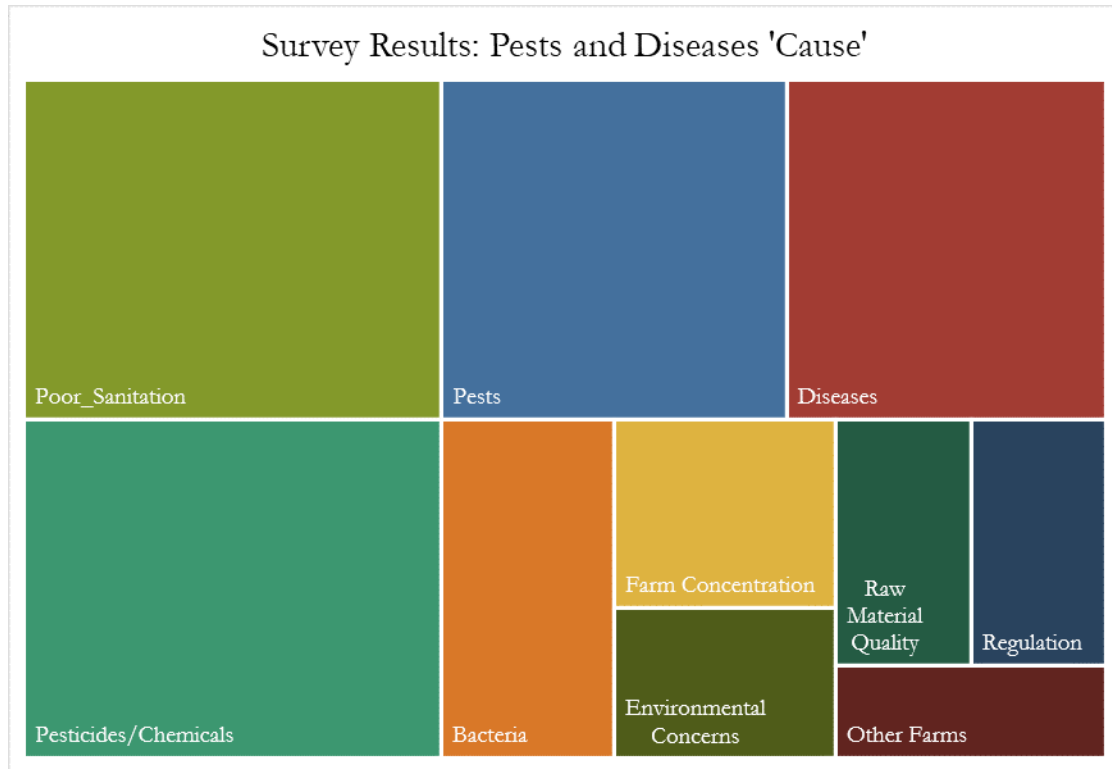


Figure 4.6: Illustrates the survey results for the participants' perceptions of the causes of the risk of Pests and Diseases.

A multitude of elements were identified by interview participants as either causing or influencing the risk of *Pests and Diseases* in Chester County. Although their responses varied in several ways, four consistent themes emerged from the narratives. First, participants identified *negligence* as a cause, specifically remarking on the laxity of other farms in the area as a contributing factor.³ Though many noted their personal responsibility in preventing the risk at their farm, they expressed

³ I am using the term *negligence* to mean the poor practices of farm ownership, management, employees, or etcetera, in taking proper measures to prevent or mitigate against pests and diseases.

concern that some of the *other farms* in the area were not doing their part to reduce the fly population. Second, several interviewees reflected on the industry's role in creating a *farm concentration* in the area.⁴ Third, participants argued that physical geographic elements such as the area's proximity to nearby wetlands, mild winters (due to climate change), was a primary cause of the risk's perceived rise. Finally, the *regulation of pesticides*, specifically the ban of the chemical Diazinon, was believed by some to have influenced the spread of the phorid fly in recent years. Though not discussed as commonly as regulation, pesticide resistance was also cited as an influential factor.

Same as the causes for government regulation, participants were asked to choose up to three words from a word cloud of preselected *Causes*. *Poor Sanitation* and *Pesticides/Chemicals* were tied for the most selected at (n=17). The former supports the interview data which suggests that *negligence* is perceived to be a cause of this risk. The latter, *Pesticides/Chemicals*, could refer to the *regulation of pesticides* or simply the general unavailability of an effective pesticide. Next, participants answered literally by choosing *Pests* (n=14), *Diseases* (n=13), and *Bacteria* (n=7), as the next three most common *Causes*, which could simply suggest the perceived inherent nature of these risks. Following those are *Farm Concentration* (n=5), *Environmental Concerns* (n=4), *Raw Material Quality* (n=4), *Regulation* (n=4), and *Other Farms* (n=3).

Interview participants identified several tactics or techniques for preventing or mitigating pests and diseases. Of the 27 participants, 12 either made broad references

⁴ While *farm concentration* could potentially be categorized as a local geographic element, the participants seemed to understand it as being created by the industry itself, whereas the wetlands and community yards were not.

to Integrated Pest Management (IPM) or specific references to its various control options. IPM is primarily based on the Economic-Injury Level, a concept that the *Pennsylvania Integrated Pest Management Handbook* defines as “the time to intervene with a pesticide is when the expected gain from using the pesticide equals the costs associated with its use (p. 7).” Several participants referenced steam-pasteurization and sanitation of growing rooms and equipment. Some believed that pesticides were an effective tool as well, however, as was noted in the previous section, many also argued that the regulation of certain chemicals had hindered their ability to effectively manage the phorid fly while only one participant believed that the regulations had encouraged them to move toward organic options.

Over the years, farmers have gone to pesticides as their go-to... They've focused there because it's easy. And let's face it. If you go back in time, the farmers of this country were not educated. They didn't get the college degrees where they could think through bigger issues and earn those skills.... Now we've had to look more into exclusion, trying to keep them out of the rooms. [I1]

Exclusion techniques such as filtering the air, sealing walls and cracks, and converting to aluminum beds (IPM, 2002) were cited by many as primary method for preventing flies.⁵ Aside from IPM, supporting or encouraging research through Pennsylvania State University on pests, diseases, and pesticides, was noted by six of the participants as a way in which the industry is attempting to mitigate against this risk as well. Finally, interview participants mentioned the need to hold other farms in

⁵ Many of the mushroom operations in Chester County grow their mushrooms on wood beds, which have porous surfaces. These surfaces provide hiding places for pathogenic organisms. The utilization of smooth surfaces, such as plastic and aluminum, makes them easier to pasteurize (The Pennsylvania State University, 2002).

the area accountable through the *enforcement* of practices, and *auditing* of facilities through government regulations.

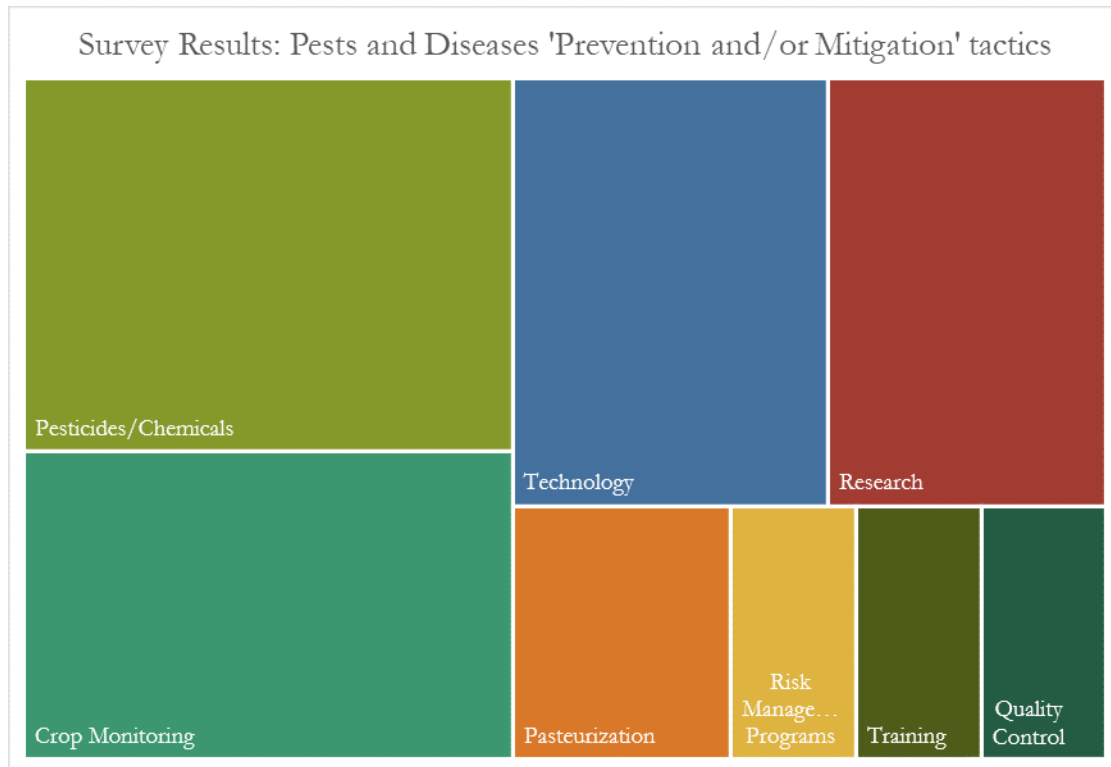


Figure 4.7: Shows the survey participants' most common selections for the prevention and mitigation of Pests and Diseases.

Of those surveyed, the most common word cloud selection for prevention and mitigation techniques was *Pesticides/Chemicals* (n=23). Since there is not currently a pesticide available that works for the phorid fly, perhaps suggesting that many of the survey participants, much like the interview participants, have seen the impact of the Diazinon chemical ban in the form of an increased pest population. *Crop Monitoring* (n=19) and *Technology* (n=17) were next, followed by *Research* (n=15), and

Pasteurization (n=7), all of which were mentioned by interview participants as a piece of IPM or as the investment in university research.

4.3.5 Food Safety

Of the participants interviewed (n=27), nineteen identified Food Safety as a risk to the industry. Of those surveyed, 42.9% selected it as a top 3 risk with only 8.4% of all respondents selecting it as the greatest risk to the industry. Survey respondents working in Pennsylvania were less likely (95% confidence) to perceive Food Safety as a top risk. However, participants working at farms growing more than 20 million lbs. or greater, were more likely (95% confidence) to perceive Food Safety as a risk to the industry.

Individual interview participants' perceptions of how the risk impacted them differed. For example, some participants' primary concern was that of the burdensome regulations that food safety inflicted upon them. Others understood the risk to be reputational in the sense that a negligent farm could cause a listeria outbreak, ultimately harming the entire national mushroom industry. It was also common for participants cite the increase in imports from countries such as China as a reason for their concern; several of these participants went as far as to call the unregulated spawn as a risk to national security. The fourth narrative provided by participants, was the understanding that the population is afflicted with the risk rather than the industry, with one interviewee stating that, "Food Security is a risk, not really for the industry, but it's a risk for the country [I13]." Importantly, it was also common for a participant to describe the risk using more than one of the above listed narratives simultaneously.

Their understandings of the likelihood of the risk occurring varied as well. Many argued that mushrooms are naturally resilient to human pathogens, a sentiment

that is reflected in AMI resources (The Ameircan Mushroom Institute (AMI), 2015). Some participants believed that the processing level posed the greatest risk via the potential for foreign objects such as metal or glass to get inside the packaging, while others were concerned about the potential for human pathogens to infect the mushrooms as they are being handled by the employees who pick, slice, and package them.

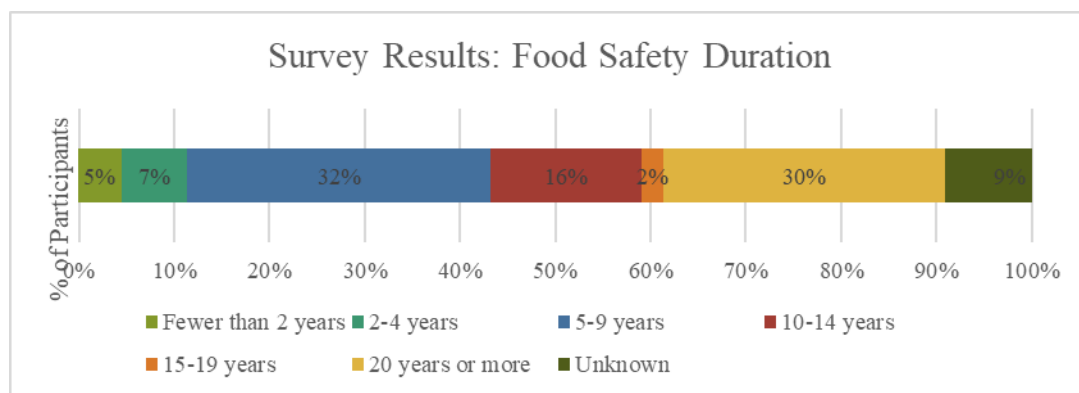


Figure 4.8: Displays the survey participants' perceptions of the duration of the Food Safety risk.

Interview participants' perception of the duration of the risk varied. Many of the participants' whose primary concern was with food safety regulations specifically mentioned the Food Safety Modernization Act which was into law by President Obama in 2011 (111th Congress, 2011); 32% of those surveyed believed that the duration of the risk fell in this timeframe as well (5-9 years). One interviewee reflected on the shift in the market in the 1980s from primarily processed mushrooms to fresh, remarking that the process to prevent pathogens with the latter is far more intensive and costly. Though the survey did not capture that time frame, the 30% who selected

the duration of the risk as 20 years or more may have reflected on this market change as well.

When considering the *causes* of the food safety risk, interview participants cited multiple factors. Similar to findings on pests and diseases, *negligence* on the part of management, employees, or other farms was believed to be a factor with several participants indicating that the risk was more reputational in nature. Concerns over the bureaucratic processes involved in food safety *regulations* were seen as being burdensome in both time and money. Interestingly, several participants linked the risk of *international imports*, specifically that of shiitake logs from China inoculated with mushroom spawn, to the risk of food safety. They argue that no part of the process is regulated prior to being imported into the country, which not only threatens the national food security of our country, but also gives China a financial advantage in the market.

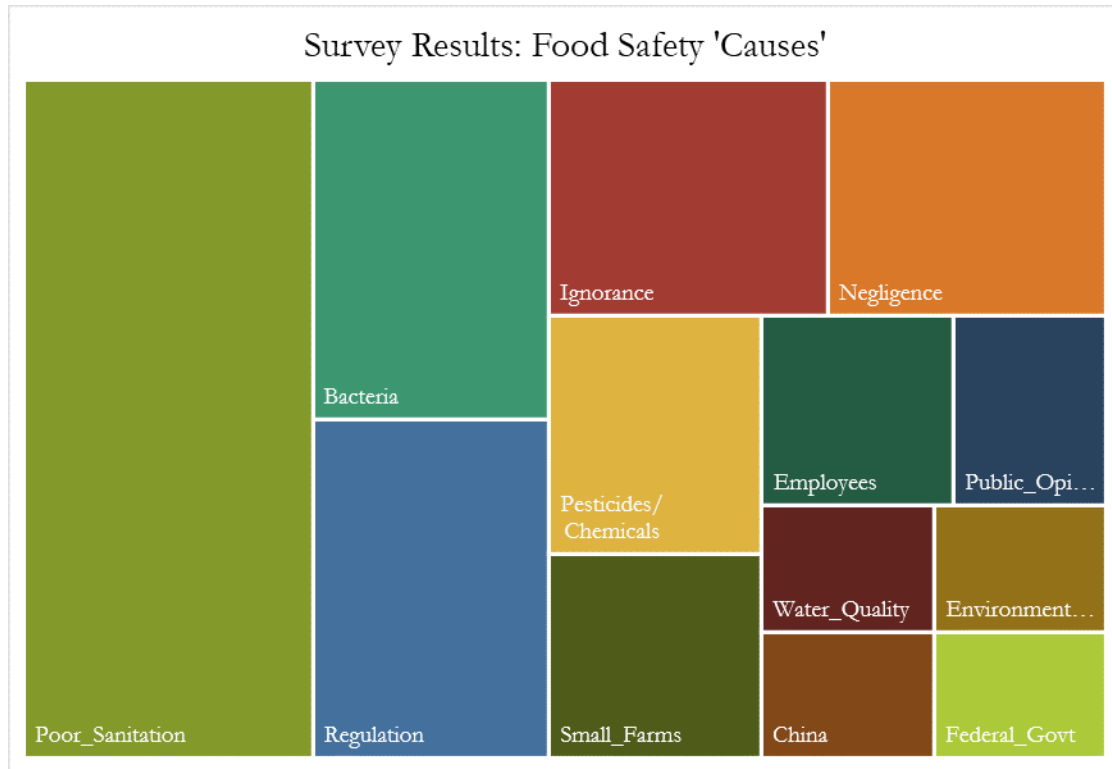


Figure 4.9: Shows the survey participants' perception of the 'Causes' of the risk of Food Safety.

Poor Sanitation (n=27) was the most common selection by survey participants as a *cause* of risk. I would put this in the same category as *Negligence* (n=9), both of which support the findings of the interviews that the cause of the risk is carelessness on the part of someone in the industry. *Bacteria* and *Regulation* were tied for the next two selections (n=11). While the former signals the perception of the literal threat, the latter suggests that the risk of *Food Safety* is being conflated by some in the industry with the risk of *Government Regulation*. Interestingly, *Pesticides/Chemicals* (n=7) was also selected. Some of the farms in Chester County have gone organic with one participant remarking that it was what their customers wanted. This could suggest a

shift in their perception of how society perceives the *acceptable levels* of pesticide and chemical use on food products. However, *Ignorance* (n=9) was selected by more participants, supporting the interview participants' views that society and/or politicians are simply misinformed about the risk. Survey participants with 20 years' experience or greater, as well as those based at larger farms were more likely (95% confidence) to select *Small Farms* (n=6) as a cause of Food Safety risks. One survey participant commented on what they believed to be the cause.

Food Safety risks are primarily related to aging facilities and antiquated technology not suitable or easily upgraded to modern food plant requirements. [S90]

In addition to being difficult to upgrade antiquated technology, many interview participants working at these farms noted the significant financial impediments facing small farms.

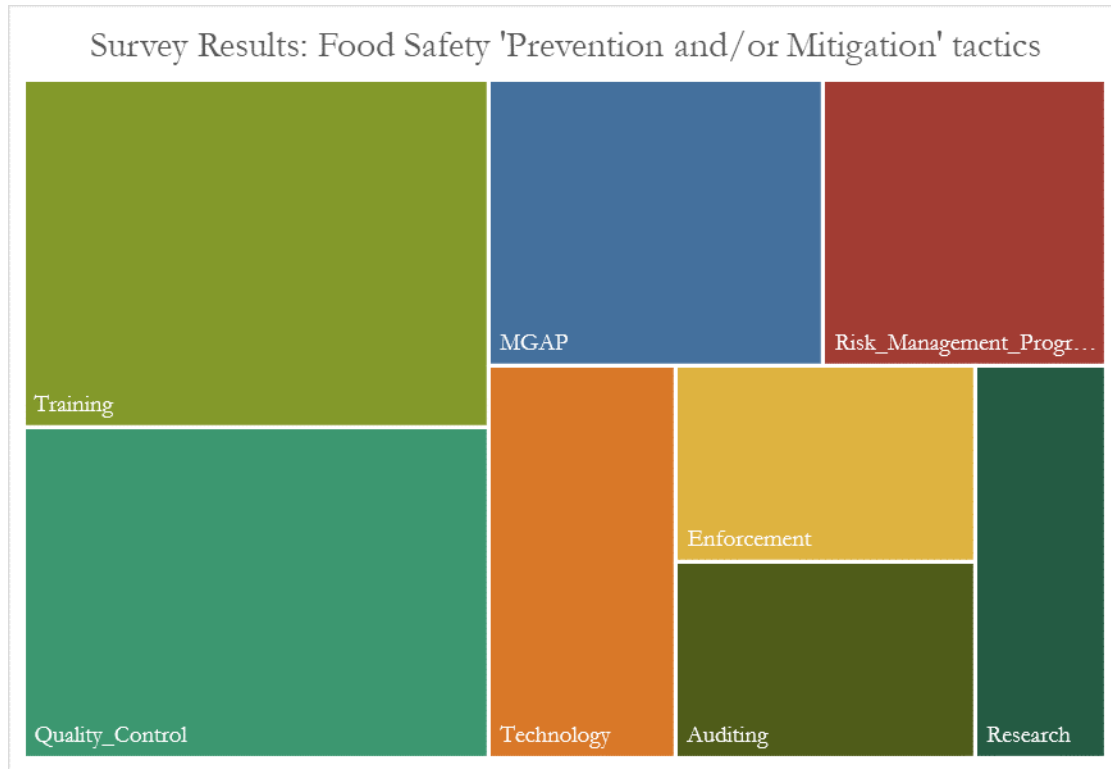


Figure 4.10: Depicts the participants' perceptions of the 'Prevention and/or Mitigation' tactics for the risk of Food Safety.

Of the three words chosen by survey participants to describe the *Prevention and/or Mitigation* techniques that they are using, *Training* (n=22), followed by *Quality Control* (n=21) were the most commonly selected. Next was *Mushroom Good Agricultural Practices (MGAP)* (n=13), *Risk Management Programs* (n=11), and *Technology* (n=10). These five selections suggest that many of those who selected *Food Safety* as one of the greatest risks to the industry are taking multiple measures at their operations to mitigate its impact. *Auditing* (n=8) and *Enforcement* (n=8) were also common choices, supporting the interview narrative that the *negligence of other*

farms can be prevented by enforcing regulations and policies for prevention as well as auditing farms.

4.3.6 Raw Material Shortages and Climate Change

Raw material shortages and quality was seen as a risk by thirteen of the interview participants (n = 27), with both the quality and quantity of straw appearing to be of the most concern to participants. Interestingly, survey results did not suggest that this was a significant risk to the industry with only 16.8% of participants selected it as a top three risk to the industry. Interview participants associated the rising cost of production, coupled with the stagnate price per pound of mushrooms, as a contributing factor. Some also believed that the concentration of farms in the area had driven up the demand for materials.

There was not much in the way of preventing and mitigating against the risk of raw material shortages. Some interview participants noted the growing need to reach further and further for raw materials. While this may not be a problem for the entire U.S.-based mushroom industry, it is certainly weighing on the minds of those in and around Chester County. The solutions to the shortages revolves around paying more for materials, extending their reach for obtaining raw ingredients, and relocating their facilities. None of which are ideal options for farmers with very little capital to spare.

Risks associated with natural hazards and climate change were identified by nine interview participants though few considered the risk to be significant. Some described how specific natural hazards such as snowstorms, thunderstorms, and abnormally hot weather, could potentially cause financial risk by either damaging antiquated mushroom houses (i.e., collapsed roofs), or increasing production costs (e.g., rising energy use and power outages). Only five participants named climate

change as a contributing factor, relating it to the rise in pest problems and the varied quality of raw materials. Some in the industry discusses their role in climate change, but not many. This does not mean that the participants do not recognize the part that the mushroom industry or agriculture in general, has played in climate change. However, by not bringing it up as a risk, the industry does not recognize the impact that it may inevitably have on their own operations (pests and diseases, raw material quality, increased energy bills etc.)

There were several interesting similarities and differences amongst the perceptions of interview and survey participants toward *Government Regulation*. The most commonly selected duration of the risk by survey participants was 5-9 years, which aligns with the interview participants who commonly cited Obama Administration regulations (such as the Affordable Care Act and the banning of the pesticide Diazinon) as being particularly burdensome to their operations. Though survey participants from Pennsylvania were less likely to select *Government Regulation* and *Food Safety* as risks than the rest of the country, those with more years of experience in the industry, as well as those working at farms producing 20 million lbs. or greater, were more likely to select *Food Safety*. While this could suggest that, similar the interview participants who acknowledged the value of regulations, others in Pennsylvania see it as the responsibility of the industry to protect society from the risk of *Food Safety*. If this is the case, it could indicate *reflexivity* in the survey participants working there. However, it is also possible that those in Pennsylvania simply feel more threatened by other risks.

4.4 Discussion and Conclusion

My research shows that the varied perceptions of interview and survey participants' toward *Government Regulation* demands reconsideration of some of the measures being taken to prevent and mitigate against the risk. The conflation of *Food Safety* with *Government Regulation* signals that many in the industry are primarily concerned with the financial and temporal obligations that come with stringent regulations. Many are struggling financially and the risk of *Labor Shortages*, which will be discussed in the following chapter, is a compounding economic threat. I would encourage members of the industry who are championing *deregulation* to consider the extent to which this could strengthen the public's perception of food safety and environmental risks. As was noted in my results, Pennsylvania survey participants were less likely to regard both *Food Safety* and *Government Regulation* as a primary risk to the industry, supporting Beck's argument that *adhoc* solutions are necessary for mitigating risks in a *reflexive modernity*.

While the effects of climate change on raw material shortages, pests and diseases, and electricity bills, are already beginning to be felt by the participants, many did not identify it as a significant risk. Some in the industry discussed their role in climate change, but not many, potentially indicating a lack of concern for *nature*. In addition to the risk of natural hazards, climate change may bring warmer winters to Chester County, encouraging the spread of both the phorid and the sciarid flies. According to one participant, the CO² content in the atmosphere, which has breached 410 ppm (Mooney, 2018), poses financial risks to the industry as more energy is needed to pump additional air into each mushroom house.

To help reduce the pest population, Chester County mushroom farmers have engaged the help of members of the local community who have been impacted by the

risk as well. When the phorid fly invaded their homes, some of the residents developed *risk consciousness*, deciding to conduct their own research on the flies. While many had previously believed that the flies bred in the nearby mushroom houses, their study observed the flies coming out of their own yards with colonies as far as six feet deep in the ground (Barber, 2017). Though the fly problem persists in the area, the *activism* of the local community to mitigate against the risk is *reflexive* by means of ‘cooperative decision making through adhoc, subpolitical negotiations (table 3.1).’ As the industry continues to work with the community, they should consider expanding on this tactic by reaching out to more local groups and community members.

While many participants favored *Deregulation* and *Lobbying* as the preferred approach, it is important to remember that society is already attuned to the risks created through industrial processes. While there may be a president in the oval office who has committed to (and followed through with) deregulation in several areas (Popovich, et al., 2018), these regulations are bound to return once the political tide shifts in the opposite direction and farmers will, once again, have to expend their limited resources to make the adjustment. Rather than fight against inevitable regulations through lobbying, the industry should consider working cooperatively with the (progressive) political and social forces that are pushing for them. However, many of the *Causes* depicted in the word cloud were incredibly literal which may have hindered the ways in which survey participants reflected on the risk.

There are some indications that the industry in Chester County is beginning to shift toward a *reflexive* approach when it comes to mitigating regulations and the preceding primary risks. Though they are personally impacted by the *side effects* of

government regulation, many perceive the value in preventing industrial risks that negatively impact society. Additionally, the enforcement of regulations on other farms was seen as a tactic for preventing risks to the reputation of the mushroom industry that may arise from *Food Safety* concerns, a rise in *Pests and Diseases*, and improper *Odor Management*. The mushroom industry in Chester County has already worked with the local community to help resolve some of these risks. If they continue to incorporate the concerns of society by involving them in the process, it could signal a transition toward a *risk society*.

Chapter 5

LABOR SHORTAGES: THE DESTANDARDIZATION OF LABOR IN THE MUSHROOM INDUSTRY

5.1 Introduction

The first objective of this research was to identify the chief risks facing the mushroom industry within the United States. I began the study by meeting with members of the local Chester County mushroom industry to uncover the threats to both their individual operations as well as the industry as a whole. At the start of each interview, I asked participants some variation of this simple question, “What do you believe are the greatest risks to the mushroom industry?” I am a former risk management analyst which means my background is in insurance coverage, claim management, loss control, and analysis. As was mentioned earlier (see chapter 2) one’s perception of risk is subjective. Due to my practical background in risk, I had originally anticipated that my research would take me down the path of crop insurance and commodity indexing. Instead, what concerned participants most was the increasing risk of labor shortages. In this chapter, I provide a brief history of labor in the Chester County mushroom industry; I then explore Beck’s analysis of the *destandardization of labor*, a consequential process resulting from simple modernization and industrialization that increases labor related risks (Beck, 1992).

One of the more appealing aspects of the industrial era is that it offered society some (seemingly) reliable assumptions about wage labor. These assumptions, or *standardizations* as Beck called them, provided laborers with various benefits involving the work site, the working hours, and the labor contract. However, through the process of reflexive modernization (see chapter 2), social and political debate switches from the production and distribution of wealth to the production and

distribution of risks. Simultaneously, the demographics of the labor force shifts, prompting employers to adjust practices in order to recruit enough laborers. The change in discourse and demographics cause the *standardizations* of labor to become ‘questionable’ (Beck, 1992). The labor contract, which once promised the full employment of the modern society, is replaced by labor laws intended to overcome the underemployment that plagues the risk society. The work site, which was once centralized, is now decentralized. The working hours become flexible as wage laborers demand fairer treatment and considerations for changing family dynamics. Beck’s theory on the *destandardization of labor* provides a narrative to examine the participants’ perceptions of the risk of labor shortages.

As I mentioned in chapter 2, I designed the survey around some of the more common themes revealed in the semi-structured interviews. Therefore, interview and survey results are presented together in subsections that follow the order of my original research questions. In these sections, I explore the participants’ understandings of the risk and the factors that led to its creation. I then examine how the participants, and the industry, are attempting to mitigate or prevent the loss of their workforce. Their thoughts on potential federal legislation that could help the situation are discussed as well. Using the process of the *destandardization of labor* as the framework, and table 3.1 to identify reflexive modernization, I conclude the chapter with a discussion on whether the data suggests (or not) if the mushroom industry’s perceptions break from a simple modernity to one that is reflexive.

5.2 Background

This section provides the necessary background information for the analysis of labor related risks. I begin with a brief history of the labor industry in Chester County

before reviewing some of the relevant demographic information of the county in comparison to both California and the country. I then detail the process of the *destandardization of labor* and give examples of how these changes are visible in our society today.

5.2.1 Kennett Square and the History of the Mushroom Industry in Chester County

Mushroom farming in Kennett Square began in the late 1800s when William Swayne, a Quaker and already successful florist, wanted to utilize the empty space beneath his greenhouse benches. As his new business venture became more fruitful, he decided to build the first mushroom house in the area. His son, J.B. Swayne, took over the business after returning from college, and turned it into a commercial achievement. Inspired by their success, other residents of Kennett Square started their own mushroom growing operations. Today, the self-declared “Mushroom Capital of the World” produces close to 50% of all fresh mushrooms within the United States (MFPA, 2017). The annual Mushroom Festival, which is ‘always the first weekend after labor day’, is held downtown (The Mushroom Festival, 2018). While there, you can stop in the Mushroom Cap, a local gift shop dedicated to the beloved fungi. Unwilling to make the trip to New York City for New Year’s Eve? Well you are in luck! Residents of Kennett Square can ring in the New Year at the annual Mushroom Drop. Though the words ‘Pennsylvania’ and ‘mushrooms’ are not nearly as analogous as, say ‘Florida’ is to ‘oranges’, ‘Idaho’ is to ‘potatoes’, or ‘Iowa’ is to ‘corn’, the local community is acutely aware of the industry’s presence.

The long history of the mushroom industry in Kennett Square has fostered a precedent for agricultural laborers in the small town (Shutika 2011). The process of

harvesting mushrooms, particularly of those intended for the fresh market, is labor-intensive. A person must stand on his/her feet for hours at a time picking mushrooms of the proper grade, slicing off the stems, and arranging and packaging the mushrooms. Similar to other agricultural industries, the workforce has historically comprised of immigrants and low-income groups (Shutika 2011). Italians began harvesting for the Quakers before eventually starting their own farms; relatives of the Italian immigrants took their lead and began running family-owned farms of their own. Many of the Italian farms, and a few of the Quaker farms, are still in business (NPR, 2012). Subsequent harvesting positions went to African Americans, low-income Caucasians from Appalachia, and then Puerto Ricans (Shutika, 2011). Today, the labor force is predominately made up of Mexican immigrants, some of whom have followed in the footsteps of the early Italian harvesters by starting their own mushroom growing operations (NPR, 2012).

Table 5.1: Shows the demographic comparisons for the primary areas of study for this research, Chester County, Pennsylvania, California, and the broader United States.

Demographic Comparisons for Study Areas

Fact	Chester County	Pennsylvania	California	United States
Population estimates, 7/1/2016	516,312	12,784,227	39,250,017	323,127,513
Population, Census, 4/1/2010	498,886	12,702,379	37,253,956	308,745,538
Persons 65 years and over, %	15.4%	17.4%	13.60%	15.2%
Female persons, %	50.8%	51%	50.3%	50.8%
Hispanic or Latino, %	7.30%	7.00%	38.90%	17.80%
White alone, not Hispanic or Latino, %	80.00%	77.00%	37.70%	61.30%
Foreign born persons, %, 2012-2016	9.20%	6.40%	27.00%	13.20%
High school graduate or higher, % age 25+, 2012-2016	93.00%	89.50%	82.10%	87.00%
Bachelor's degree or higher, % age 25+, 2012-2016	50.20%	29.30%	32.00%	30.30%
In civilian labor force, total, % age 16+, 2012-2016	68.80%	62.60%	63.00%	63.10%
Median household income (in 2016 \$), 2012-2016	\$88,995	\$54,895	\$63,783	\$55,322
Per capita income in past 12 months (in 2016 \$), 2012-2016	\$44,299	\$30,137	\$31,458	\$29,829
Persons in poverty, %	7.00%	12.90%	14.30%	12.70%
Total employment, 2016	248,421	5,354,964	14,600,349	126,752,238
Population per square mile, 2010	664.7	283.9	239.1	87.4

Table 5.1 displays the official 2016 U.S. Census population estimates for notable locations in this study. Despite the large presence of the mushroom industry in Chester County, the percentage of ‘Hispanic or Latino’ persons living in Chester County is well below the national average at only 7.3% (compared to 17.8%). While the number of ‘Foreign born persons’ is also below the national average, the percentage living in Chester County is almost 3% higher than the commonwealth of

Pennsylvania. As one of the wealthiest counties in the country, the average household income is more than \$88,000 annually, which is drastically higher than the averages for Pennsylvania, California, and the overall United States. The county is also highly educated with about 50% of persons over the age of 25 holding a bachelor's degree. The populations of Chester County, as well as Pennsylvania as a whole, are marginally older and with a slightly higher percentage of women residents than both California and the United States.

As noted in chapter three, *risk consciousness* and *activism* are more likely to occur among higher educated and more affluent populations such as the residents of Chester County. The *visibility* of the industry that has been fostered by the historical narrative of the Quaker growers, local engagement with the mushroom industry, and the concentration of mushroom farms (see chapter three), can also create awareness of modernization risks. While the percentage of 'Hispanic or Latino' persons residing there is dwarfed by that of California (38.9%) and the United States (17.8%), the population density per square mile is more than twice that of either Pennsylvania or California, and more than seven times the national average, which could create an increased *visibility* of the immigrant labor community as well in the local population. The participants' awareness (or not) of these factors, and their understandings of the perceptions of the local community, may (or may not) indicate a shift toward *reflexivity* within the members of the mushroom industry.

5.2.2 The Destandardization of Labor

This section investigates the risk of labor shortages using Beck's analysis of what he called the *destandardization of labor*, a consequence of simple modernization that produces labor related risks. In simple modernization (i.e., the industrial age)

wage labor and one's occupation are what Beck describes as, the *axis of living* (Beck, 1992). In combination with the nuclear family, the axis acts as an instructional guide for the modern American man or woman: eat your vegetables, study hard and get into a good school, find a decent job and climb the career ladder, marry a nice man or woman (usually of the opposite gender), have a bunch of babies, lather, rinse, repeat.

When the 'modern' American man or woman enters the workforce, they operate under certain assumptions involving a *standardization* of labor; this includes a centralized work site, standard working hours (e.g., 9AM-5PM, 40 hours, inflexible), and a labor contract (e.g., union contracts, labor laws) which provides some worker protections. People are no longer defined by their family, community, or religion, but instead by their occupation. As Beck puts it:

Adult existence is held completely under the sway of wage labor, not merely because of the demands work itself makes on time, but also because of the time spent outside work, beforehand and afterwards, in pondering over it and planning for it. Even 'old age' is defined by non-occupation. Old age begins where the world of work discharges people – no matter if they feel old or not. (p. 139)

The occupation now serves as a way to identify a person. This is easy in the industrial society when 'life is strung along the thread of the occupation (p.140),' we can assess a person's income, status, linguistic abilities, social contacts, etcetera (Beck, 1992).

Individualization is the gradual shift in the perceptions of society. As people identify more with their occupation (and as the world becomes more connected through technology) different forms of settlement occur. The adult children of (typically) affluent families flee their hometowns for careers in urban areas that require degrees: an act that exposes them to diverse cultures and incentivizes them to be more educated. As a result, 'traditional forms of community (p. 97)' outside of the

family are less common.⁶ The socioeconomic structure of the society begins to change, and with it, the demographics of wage the laborer. Consequently, the needs of the workforce developed simultaneously with the shifting population.

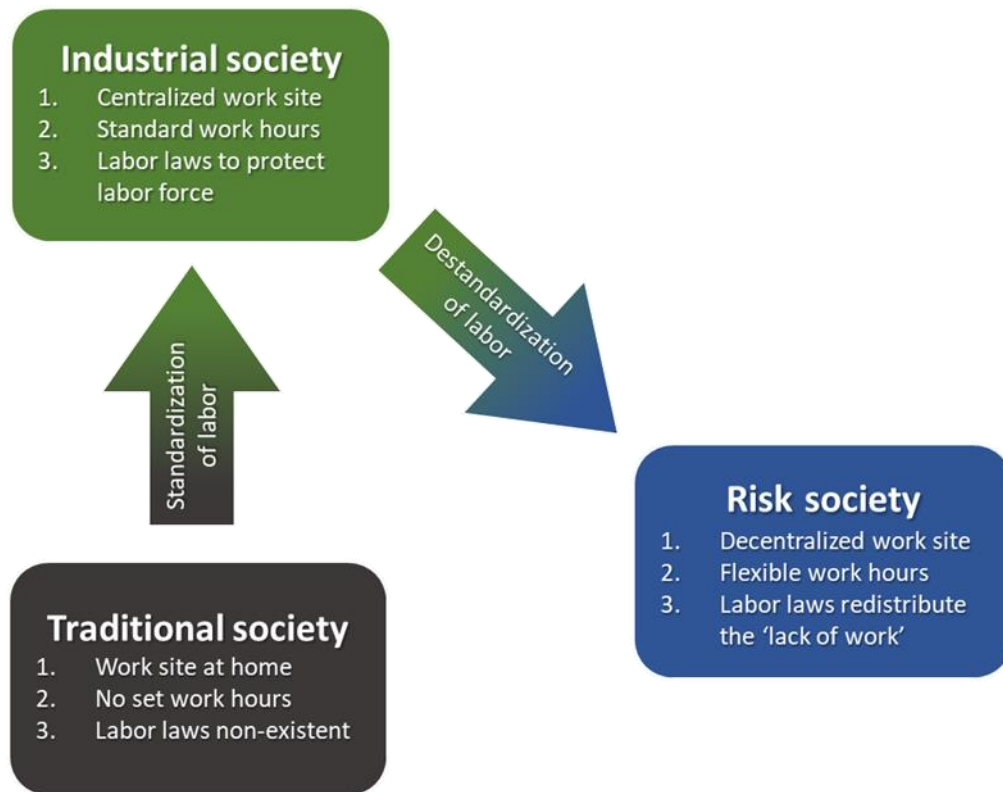


Figure 5.1: Displays the process of the destandardization of labor using the same diagram style from chapter two.

⁶ Refers to the ways in which traditional societies formed around your family, church, and local community. Modernity has encouraged the pivot from 'traditional forms of community' to social relationships and networks that are chosen. In the age of the internet, these networks are becoming more decentralized.

Through modernization and *individualization*, the original norms of wage labor (i.e., work site, working hours, and labor laws) become *flexible*; the standardizations of labor dissipate. The centralized work site becomes decentralized, the standard working hours are malleable, and the focus of labor policy shifts from protecting workers to, instead, redistributing the results of that labor. The assumptions of wage labor in the industrial society are no longer reliable; instead, reflexive modernization instigates the *destandardization of labor* in the risk society. These changes signify an important shift in the peoples' perceptions of the risks of industrialization and, ultimately, the ways in which society manages these risks through policy.

Wage labor in the industrial era provided the worker with the assumption of 'lifelong full-time work', however, the protection of labor norms is not guaranteed nor publicly enforced when the *destandardization of labor* occurs. In fact, the costs to shield the laborer and society from modernization risks are often pushed onto society and the workers themselves. An example of this can be found in the Affordable Care Act which was created in response to both the growing perception that health care is a right, and the risks posed to those unable to access health care due to *unemployment and underemployment*. In a speech to Prince George's Community College in Largo, Maryland, then President Barack Obama made the following remarks:

For a long time, America was the only advanced economy in the world where health care was not a right, but a privilege. We spent more, we got less. We left tens of millions of Americans without the security of health insurance. By the time the financial crisis hit, most folks' premiums had more than doubled in about a decade. About one in 10 Americans who got their health care through their employer lost that coverage. So the health care system was not working. And the rising costs of health care burdened businesses and became the biggest driver of our long-term deficits (The White House: Office of the Press Secretary, 2016).

Changes in perception toward civil liberties and individual rights (such as the right to health care) are not simply the result of the *individualization* of modern society. Visible changes, such as the incorporation of automation to reduce the labor force, are far less subtle. Beck argues that an economic recovery of a business, or even economic recovery at the scale of a national or global market, does not necessarily lead to a reduction of unemployment as many assume; the two are ‘mutually independent variables’. Unfortunately, political discourse in the United States often conflates the two by claiming that prosperity will return once the needed ‘transitional measures’ are put into effect. This takes pressure off the policy-makers while simultaneously calming the fear of those affected by this destandardization (Beck, 1992). During his campaign, then candidate, Donald Trump, talked about bringing back the economy (specifically for working class white-America) by easing regulations, eliminating the Affordable Care Act, renegotiating trade agreements, and cutting taxes as a way to stimulate job growth in businesses. However, the Tax Cuts and Jobs Act that he signed into law in 2017 may have the opposite effect. Critics of the bill have mockingly called it the ‘Tax Cut and Robots Act’ because according to some experts, purchasing machinery to replace labor may be cheaper for businesses while firing employees could save them money (Arnold, 2017).

Although the ‘unemployment’ rate in the United States as of June 2018 is only 4%, this number is misleading. Per the Bureau of Labor Statistics (BLS), a person is considered to be employed if they did any work for profit or pay at the time that the survey was conducted. This not only includes regular full-time and year-round employment, but also part-time and temporary work (2018). Underemployment, which

Beck describes as “the synthesis of full employment and unemployment” is being assimilated into the employment system (1992).

Part-time employment peaked in the United States in 2010 at 20.1% (BLS, 2018) When the labor department began collecting data in 1968, the percentage of part-time workers made up 13.5% of the labor force. The latest numbers indicate that the current percentage of part-time employees is at 17.9%. Though the peak of part-time employment followed the passage of the Affordable Care Act in December 2009, it steadily rose after the crash of the housing market, an event that triggered the great recession.

Another assumption of wage labor in simple modernity is the centralized work site but, as noted in the previous section, the work site becomes decentralized. The large factories, manufacturing sites, and tall buildings that generated visibility for the wage laborer have slowly diminished with many of the subordinate functions being outsourced to immigrant laborers (harvesters in the U.S.-based mushroom industry), foreign labor (customer service representatives in call centers in developing countries), and technological innovations (robotics in manufacturing). “The *visible* character of work... is taken by an invisible organization of the firm (p. 142).” Beck argues that this reflects a ‘displacement of the invisibility of the interlocking of capital’ and gives those situated at the top more possibilities to hide the interworking details of the organization. However, the abandoned buildings that formerly exemplified a bustling economy now serve as historical ruins, reminding us of a ‘dying epoch (Beck, 1992).’

In addition to outsourcing labor, the work site has become ‘geographically diffused’ through advancements in communication. While there are some benefits to this geographic independence such as increased flexibility for the worker, the

perception that cooperation in the workplace means ‘working together at the same place’ is no longer valid (Beck, 1992). This is evident in the age of the internet where attendance rules are being relaxed in favor of teleworking. Interestingly, on March 8th 2018, it was announced that President Trump’s Secretary of Agriculture Sonny Perdue (no relation to the owners of Perdue Farms) reversed the previous administration’s decision to allow employees to telecommute to the federal agency. In a statement to the Washington Post, a spokesperson indicated that part of the Secretary’s philosophy aims to promote the “USDA as one family, working together as a single team to serve the American people (Aratani, 2018).” In suggesting this change in the workplace, Secretary Perdue is recalling a time when both the work site and labor force were more visible. It is not surprising that the slogan ‘Make American Great Again’ appeals to some of those who are the most disenfranchised by this invisibility. In Pennsylvania, the hope of returning to a more prosperous age springs eternal for the Trump supporters of the Rust Belt.

Michael McQuarrie argued that the election of Donald Trump was the product of historical and geographic factors and not the appeal of the candidate himself. The dismantling of the mass production system of the Fordist social order diverted the economic path of the Rust Belt region from other areas of the country. The upper Midwest was ‘the heart of American industrial capitalism,’ with manufacturing, wealth, and population being concentrated in the region. Those living in the area have experienced a withdrawal of financial investments from both private and public institutions, leading to the dramatic economic decline of the Midwest. He argues that many of these voters felt abandoned by the Democratic party due to their focus on minority and social issues rather than the dwindling economy. They were pushing

back on the system that created such a wide range of income inequality in which working class whites were marginalized. Though many still picture the Democratic party as the party of the people and the Republicans as the party of Christian fundamentalist and the elite class, McQuarrie believes that the differences between the two parties today are organized around the Old Economy of Fordism and mass production, and the New Economy of free trade and the global market (2017).

Both the Rust Belt and Appalachia (which voted in the same fashion as the former) Pennsylvania. While the state ultimately voted for Donald Trump in the 2016 election, Chester County went in the opposite direction. In 2012, Republican presidential candidate Mitt Romney narrowly beat President Barak Obama by garnering 0.21% more of the vote in the county. More Republicans that year had ‘Straight Party Votes’ (i.e., voted strictly for their party on the ballot) than Democrats. In 2016, significantly fewer Republicans voted for only their party. Meanwhile, the ‘Straight Party Vote’ for Democrats increased from 2012 to 2016. Chester County overwhelmingly chose Hillary Clinton in 2016, giving her an eight-point lead over then presidential candidate, Donald Trump, a noteworthy result for a historically conservative county.

Chester County’s congressional voting results for 6th and 7th district did not show drastic shifts though voters in the 16th district swung in the opposite direction. Pennsylvania, and in particular the southeastern region, was considered to be one of the most gerrymandered areas of the country. However, a 2017 ruling by the Supreme Court of Pennsylvania, which was upheld in 2018 when the U.S. Supreme Court declined to get involved in the case, reconfigured the state’s congressional map (Liptak, 2018). Rather than having three separate representatives, all of Chester

County will fall under the purview of the 6th district. Following the May 2018 primary elections, the democratic candidate, Chrissy Houlahan, is favored to win in the recently redrawn district (Pramuk, 2018). If (as predicted) the impending Democratic ‘Blue Wave’ sweeps elections around the country, Chester County could be on the verge of a political shift.

Table 5.2: Compares the Chester County official election results for 2012 and 2016.
Source: County of Chester, 2018

Chester County Election Results for 2012 and 2016

	2012			2016	
	Votes	Percent		Votes	Percent
Straight Party Vote			Straight Party Vote		
Democrat (DEM)	63,259	45.86	Democrat (DEM)	66,810	49.27
Republican (REP)	73,359	53.19	Republican (REP)	67,333	49.65
Green (GRN)	232	0.17	Green (GRN)	399	0.29
Libertarian (LIB)	669	0.49	Libertarian (LIB)	823	0.61
Total	137,519		Total	135,365	
President			President		
Barack Obama (DEM)	124,311	49.22	Hillary Clinton (DEM)	141,682	51.9
Mitt Romney (REP)	124,840	49.43	Donald J Trump (REP)	116,114	42.53
Jill Stein (GRN)	740	0.29	Jill Stein (GRN)	2,247	0.82
Gary Johnson (LIB)	2,082	0.82	Gary Johnson (LIB)	7,930	2.9
Write-in	603	0.24	Write-in	4,198	1.54
Total	252,576		Total	272,171	
Representatives in Congress			Representatives in Congress		
6th District			6th District		
Manan M Trivedi (DEM)	69,745	44.04	Mike Parrish (DEM)	77,483	45.52
Jim Gerlach (REP)	88,435	55.84	Ryan Costello (REP)	92,513	54.35
Total	158,180		Total	169,996	
7th District			7th District		
George Badey (DEM)	18,098	37.77	Mary Ellen Balchunis (DEM)	19,863	37.81
Patrick L Meehan (REP)	29,766	62.11	Patrick L Meehan (REP)	32,597	62.05
Total	47,864		Total	52,460	
16th District			16th District		
Aryanna C Strader (DEM)	19,377	46.99	Christina Hartman (DEM)	23,315	51.74
Joseph R Pitts (REP)	19,662	47.68	Lloyd K Smucker (REP)	19,920	44.21
Total	39,039		Total	43,235	

The history of the local mushroom industry, its *visibility* within the community, and the affluence and education level of Chester County residents, could be influencing the perception (i.e., *risk consciousness*) of the people living there. As society's awareness of modernization risks grows, they become more vocal in their opposition to industrial processes (such as the residents vocal concerns about odor discussed in chapter four). If McQuarrie is correct in arguing that the two parties are organized around the Old Economy (Republicans) and the New Economy (Democrats), the change in political allegiance of the residents of Chester County could be attributed to *risk consciousness* within the community. By using the *destandardization of labor* as a lens for which to examine the risk of labor shortages, I review how the participants have reflected on the creation of the risk as well as whether or not their response to the risk is *reflexive*.

5.3 Results on the Risk of Labor Shortages

The results from my data on the risk of labor shortages are presented in this section in the order of my three research objectives. I begin by exploring the participants' understanding of the risk and its duration. I then review their perceptions of the causes, the risks associated with it, and their tactics for prevention and mitigation through the common themes that were uncovered in my interviews. Interview data and survey data are presented back-to-back and by theme. Results are explored using the *destandardization of labor* as the framework for which to compare the narratives to the theory of reflexive modernization.

5.3.1 Rank and Duration of Labor Shortages

Of those interviewed, 26 (n=27) perceived the risk of labor shortages to be a significant risk with the majority identifying it as the greatest risk facing the mushroom industry. The risk itself was predominately understood as being tied to a reliance on an immigrant workforce. However, a few in the industry also described some difficulty in procuring educated, managerial, and other similarly skilled labor. The purpose of the survey, while similar to the interview, was to not only understand how members of the mushroom industry perceived these risks, causes, and techniques for prevention or mitigation, but also to examine the potential differences in risk perception around the country. Survey participants overwhelmingly chose *Labor Shortages* as the greatest risk to the mushroom industry with 90.7% selecting it as a top three risk and 64.5% ranking it as the greatest risk to the industry. Participants living in

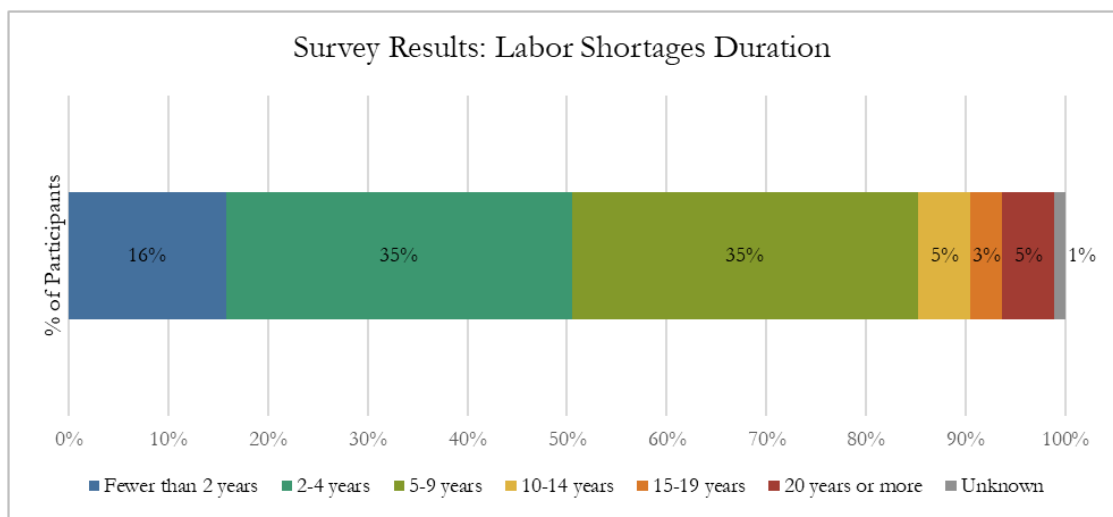


Figure 5.2: Depicts the participants' perception of the duration of the Labor Shortages risk.

Pennsylvania were more likely (95% confidence) than other states to perceive the threat of labor shortages as the greatest risk, possibly suggesting that the concentration of farms has hindered their ability to recruit and maintain wage labor. One possible explanation for this geographic difference is the recent news that the Philadelphia ICE office is the most aggressive in the country, making more arrests of immigrants without criminal convictions than any of the other 23 ICE offices in the United States (Philadelphia Inquirer, 2018). This could also suggest that the risk to the Pennsylvania mushroom industry has grown in the months following the collection of data.

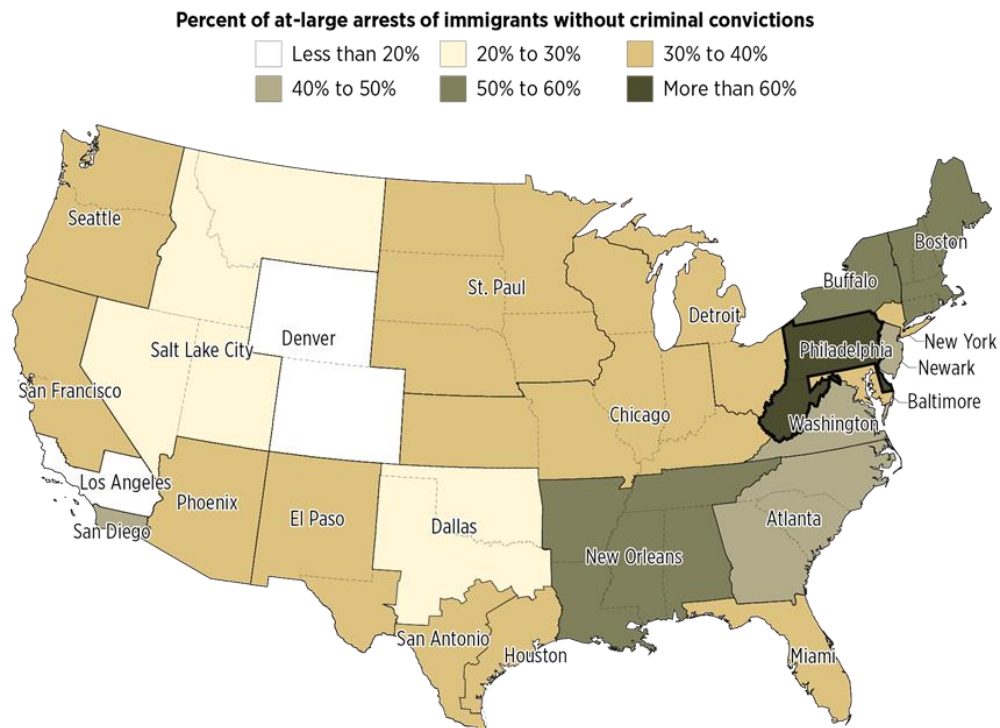


Figure 5.3: Source: U.S. Immigration and Customs Enforcement, Jared Whalen, Staff Artist at the Philadelphia Inquirer. The Philadelphia ICE office overseas Pennsylvania, West Virginia, and Delaware

Most of those surveyed (84%) selected the duration of the risk as being fewer than nine years, suggesting that many perceive the risk to have grown in the last decade. This appears to align with the interview data where the participants' perception of the duration of the risk varied greatly. While some believed that the political rhetoric of President Donald Trump had exacerbated labor shortages over the past year and a half, a few of the more experienced interviewees argued that the risk has always existed in the industry to some degree or another. One participant believed that the September 11 terrorist attack not only brought about changes in the law, but also changes in the perceptions of Americans. In 2002, President George W. Bush helped to pass the Homeland Security Act, which created the Department of Homeland Security, an entity charged with preventing and mitigating future terrorist attacks. The department oversees several agencies including the U.S. Immigration and Customs Enforcement (ICE), United States Citizenship and Immigration Services (USCIS), and U.S. Customs and Border Protection (107th Congress, 2002). Due to an increase in federal funding afforded by the new law and the growth in the undocumented population, the number of deportations from in the United States from 2001-2011 nearly doubled (Hesson, 2012).

However, some of the interview participants perceived that they only began having issues in procuring labor during the last couple of years of President Barack Obama's second term. While the organizational shift and increase in federal funding that occurred during President Bush's years in office may have contributed to some of the shortages, criminal deportations increased at a much higher rate under President Obama. Critically, many of those deported in this manner had never been convicted of a crime, only charged. The Secure Communities program, which began under the

Bush administration in 2008, requires local police officers to provide the fingerprints of anyone arrested to the Department of Homeland Security (Hesson, 2012). This has the effect of turning local law enforcement officers into immigration agents.

Consequently, a victim of a crime who happens to be undocumented may be less likely to turn to the police in their time of need out of a fear of deportation (Hesson, 2012). This extends to the employment of immigrant labor as even a documented person may be less willing to show up to work or report work injuries if it means an undocumented relative may be revealed.

It is clear that the risk of labor shortages is perceived by interview and survey participants to be the greatest risk currently facing the U.S.-based mushroom industry. The threat has steadily risen over the past few decades due to policies and actions taken by previous administrations. However, it appears that under the Trump administration, the threat of arrest (and possible) deportation is greater for the Pennsylvanian immigrant community than in other parts of the country.

5.3.2 Causes and Related Risks

Interview participants perceived several factors to have caused or influenced the recent shortage of labor. As was noted in the previous section, risks associated with the *destandardization of labor* stem from education, *individualization*, and the processes of industrialization and modernization. As individuals reflect on the causes and compounding or associated risks they begin to take action. When discussing the factors that either led up to the creation of this risk, three themes emerged from the interview narratives. First, some believed that society's *perception of immigrants*, the mushroom industry, and agriculture in general, were the primary factors that caused the labor shortages risk. Second, participants spoke about the various financial

impediments that stood in their way, including already *slim profit margins* and *aging infrastructure*. Finally, interviewees perceived failed *immigration policy*, *political rhetoric*, and the apathy of politicians as a major factor.

For the purposes of this research, ‘social perception’ refers predominately to the broad (and often inaccurate) perception that American society has of immigrants, the mushroom industry and agriculture more generally. Agricultural jobs are often seen as undesirable work, making it difficult to recruit domestic labor. Many appeared to agree with that perception noting that the work itself was ‘undesirable’ and ‘difficult’. Mornings at some farms start as early as 4:00AM; the shifts are long and can quickly stretch into the evening. The work is repetitive and those who lack the dexterity necessary to harvest the crop struggle to earn a meaningful wage. When prompted, interview participants often lamented that they had tried on several occasions to recruit domestic workers but often had difficulty getting them to stay for more than a few months; many believed that social perception of agricultural work was at fault. However, participants commonly noted that harvesters who have the skills (or are able to develop them) have found the job to be quite profitable, with some earning more than 40,000 USD per year.

The general *perception of immigrants* in this country was cited as another cause with many referencing both the current political discourse as well as the rhetoric of the Trump administration. A few participants recalled some unpleasant conversations that they had with friends and members of the local community about the Mexican laborers who live in the town. From their perspective, the people in the area are mostly accepting of the immigrant community, though they admit that some still harbor ‘ignorant’ ideas about immigrants collecting welfare. A study that

examined the regional migration of U.S. agricultural labor looked at the extent to which geographic clustering of undocumented immigrant laborers is correlated with their use of welfare or public aid. They argue that while there is evidence to suggest that workers were clustered in specific states around the country (such as California), they did not find that these geographic patterns were related to participation in public welfare. One explanation is that many are less likely to settle in one area for a long time and less likely to integrate with the local community. They also suggest that those who are able to establish in communities and agricultural work for the long-term may decrease the need for public aid (Pena, 2014).

In addition to social perception, it was common for participants to express frustrations over how their own financial limitations had contributed to the situation. The stagnant price per pound of mushrooms has severely limited their profit margins, making it difficult (and sometimes impossible) to attract labor with higher wages. For some, the aging infrastructure on their farms was seen as an obstruction to technological advancement. Farming operations who use the Pennsylvania ‘double’ (see chapter 4), a windowless and chilly building in which many Pennsylvania mushrooms are grown, are not able to adapt their farms to Dutch technologies, forcing them to depend on an immigrant workforce.

Immigration policy is another key site for concerns over labor shortages. The H-2A Temporary Agricultural Workers visa program allows eligible U.S. employers to bring foreign nationals to the United States as laborers (U.S. Citizenship and Immigration Services, 2018). ‘Eligible’ being the operative word. Frustrations over immigration policy mostly stemmed from their inability to procure labor for mushrooms; the non-seasonal nature of their work disqualifies them for the H-2A

program. *Labor Competition* between farms and across multiple industries was noted as an obstacle, as well as the failure of congress to act. Several recounted how their own past meetings and lobbying efforts with state and federal officials had not helped and that the labor issue only seemed to be getting worse.

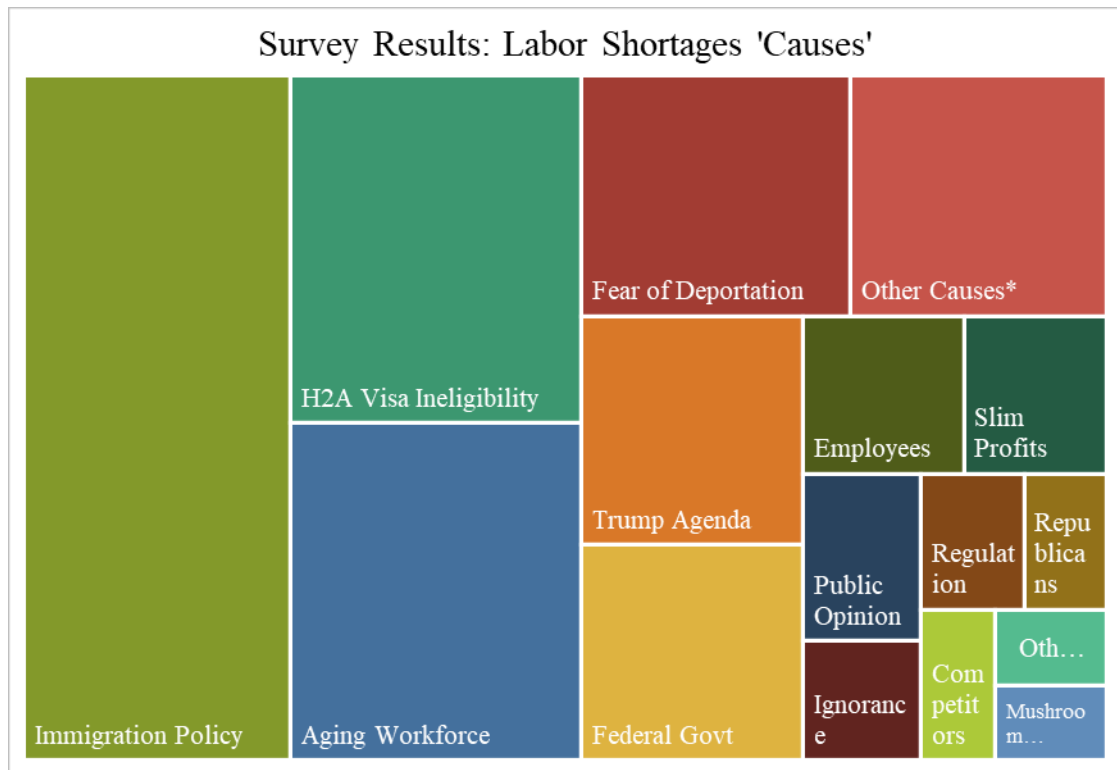


Figure 5.4: Shows the participants' perceptions of the perceived 'Causes' of the Labor Shortages risk.

For the survey, participants across the country were asked to choose up to three words from a word cloud of preselected *Causes*, all of which derive from answers provided by interview participants. Similar to those interviewed, survey participants chose words related to policy such as *Immigration Policy* (n= 65), *H2A Visa*

Ineligibility (n=36), *Federal Govt* (n=17) and the *Trump Agenda* (n=18) suggesting that many perceive the risk to be out of their control. Unsurprisingly, the *Fear of Deportation* (n=23), which was usually believed by many interviewees as being associated with current political rhetoric, was a common selection as well. The selection of an *Aging Workforce* (n=35) as a cause of labor shortages may suggest a concern that was shared by interview participants. Their long-term employees (both in labor and management positions) are retiring and their simply are not enough people in the workforce to replace them. Interestingly, survey participants working in Pennsylvania were more likely (95% confidence) to select *Aging Workforce* as well as *H2A Visa Ineligibility* as causes, which could suggest demographic and geographic differences in the Pennsylvania's immigrant labor pool. This aligns with my findings from local interviews in which participants suggested that the immigrant population in Chester County is aging, and although many of their employees have settled in the area and had families, they want better careers for their children. This indicates that the perceptions of that generation toward agricultural labor have conformed to the views of the American population. In order to meet the demand of the industry, it is likely that more immigrants will need to be allowed into the country as the children of those who have remained in the agricultural workforce are not following their example.

5.3.3 Participants' Strategies for Prevention and Mitigation

Interview participants discussed several strategies for the prevention and mitigation of labor shortages. To prevent this risk, most discussed the ways in which they were personally trying to attract labor to their farms. Three predominate themes concerning labor shortage prevention and mitigation tactics developed from the

interview narratives: offering benefits to employees, reduce labor by incorporating technology, and lobby for immigration policy reform.

Some participants offered competitive wages, flexible working hours, retirement benefits, childcare, and healthcare (although some listed this as a risk in the form of government regulation). However, those working at smaller operations did not perceive higher wages and increased benefits as a financially viable option. It was also common for interview participants to discuss the ways in which they helped their employees feel more at home in the community by offering English and citizenship classes. Second, some were beginning to incorporate various technological advancements into their operations in an effort to reduce their dependence on labor altogether. Some were moving in this direction in subtle ways or small increments while others were investing more heavily. However, as was mentioned previously, the antiquated infrastructure found on most farms makes it too expensive to convert to the currently available mechanical harvesting technologies. Finally, while the majority of interview participants believed that some change in immigration policy is needed, and while the American Mushroom Institute is actively lobbying for the industry, most were not optimistic that the current administration would produce the type of reform that the industry needs such as an increase and change in the H2A visa program.

Most of those interviewed or surveyed favored prevention and mitigation strategies that depend on federal government intervention. This includes increasing the number of visas, changing the H-2A visa program (or creating a longer-term visa for mushrooms and other non-seasonal agricultural industries), and providing a path to legal citizenship. However, many interviewees recognized the challenges associated with accomplishing these goals in a post-trump political climate.

I really don't believe that Washington knows, really, what is going on at the business level. They have no clue. If they did they would have fixed... the labor issue and the immigration issue years and years ago... It's just a growing problem, is what it is right now, and it's getting worse and worse because, you know we've got a president in there who thinks everybody south of the border is a terrorist. You know? And-it's-that's not true. [I26]

Those in the industry are acutely aware of the consequences of the (arguably toxic) political discourse that is seeping out of the federal government. Although many favor a path to legal status for undocumented immigrants who have not committed any crimes, their expectations are grounded in current realities with one participant noting the unlikelihood that any steps toward amnesty would be feasible. “The whole tone of this country has become so anti-immigration, anti-immigrant... The word amnesty has become a four-letter word. [I7]” Almost none of the interview participants appeared optimistic that politicians in Washington would pass any helpful legislation. Some have reflected on the potential outcomes of an immigration policy that is ‘favorable’ to the industry and fear that solving the labor shortage issue will only flood the market with fresh product, causing the price per pound to drop.

If the Industry gets more labor, the supply problem will only get worse... [Some farms] are steaming [the third break] off because they're not getting to them. If they were able to get to them, imagine the pounds that would be on the market [I23].

Unfortunately, they also believed that they were unable to compete financially for the local Chester County labor market, fearing that when it comes to prevention and mitigation strategies, they have few alternatives to lobbying for immigration reform. Due to aging infrastructure and slim profit-margins of the business (which is especially felt by smaller operations), technological innovation is not a viable option.

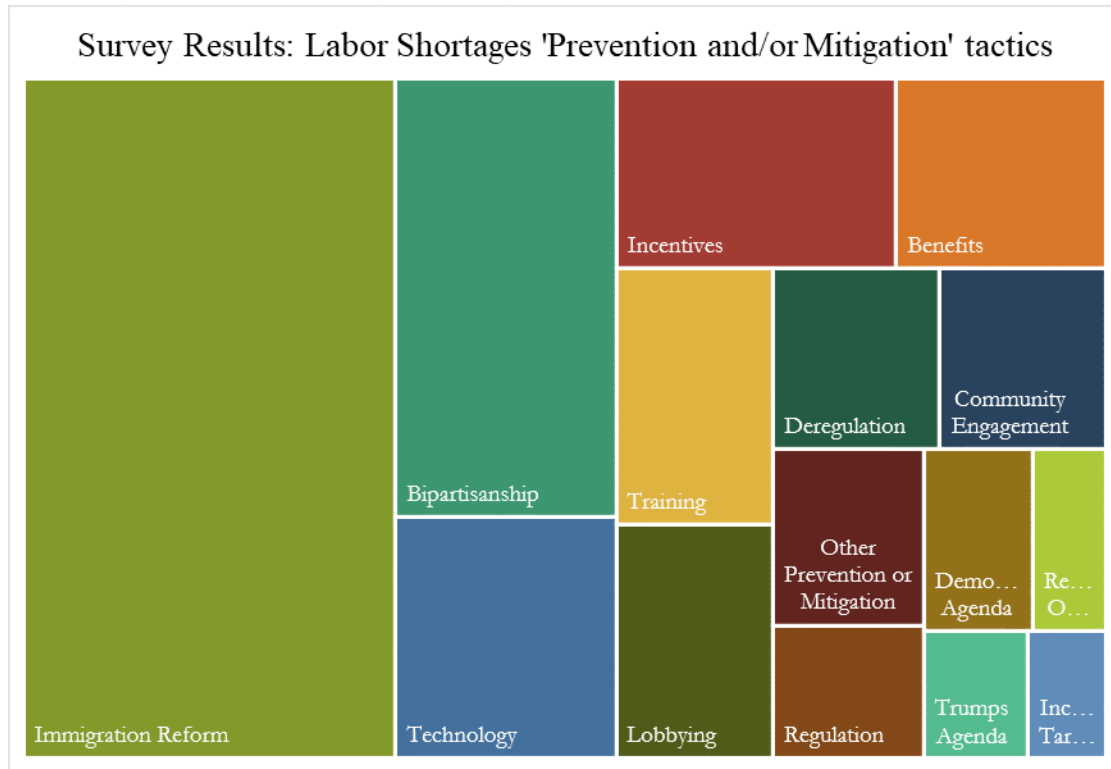


Figure 5.5: Displays the survey participants' perceptions of the strategies for 'Preventing and/or Mitigating' against the risk of Labor Shortages.

Similar to the *Cause* portion of the survey, participants were asked to choose up to three words from a word cloud of preselected *Prevention and/or Mitigation* techniques that originated from the answers I received from interview participants. (N=76) of participants chose *Immigration Reform* as a strategy. *Bipartisanship*, came in a distant second (n=29). These top two selections suggest that many in the industry perceives the risk of labor shortages to be the responsibility of congress. However, it should also be noted that the next four most common selections, *Technology* (n=16), *Incentives* (n=16), *Benefits* (n=12), and *Training* (n=12), are all measures that can be taken at the individual farm level.

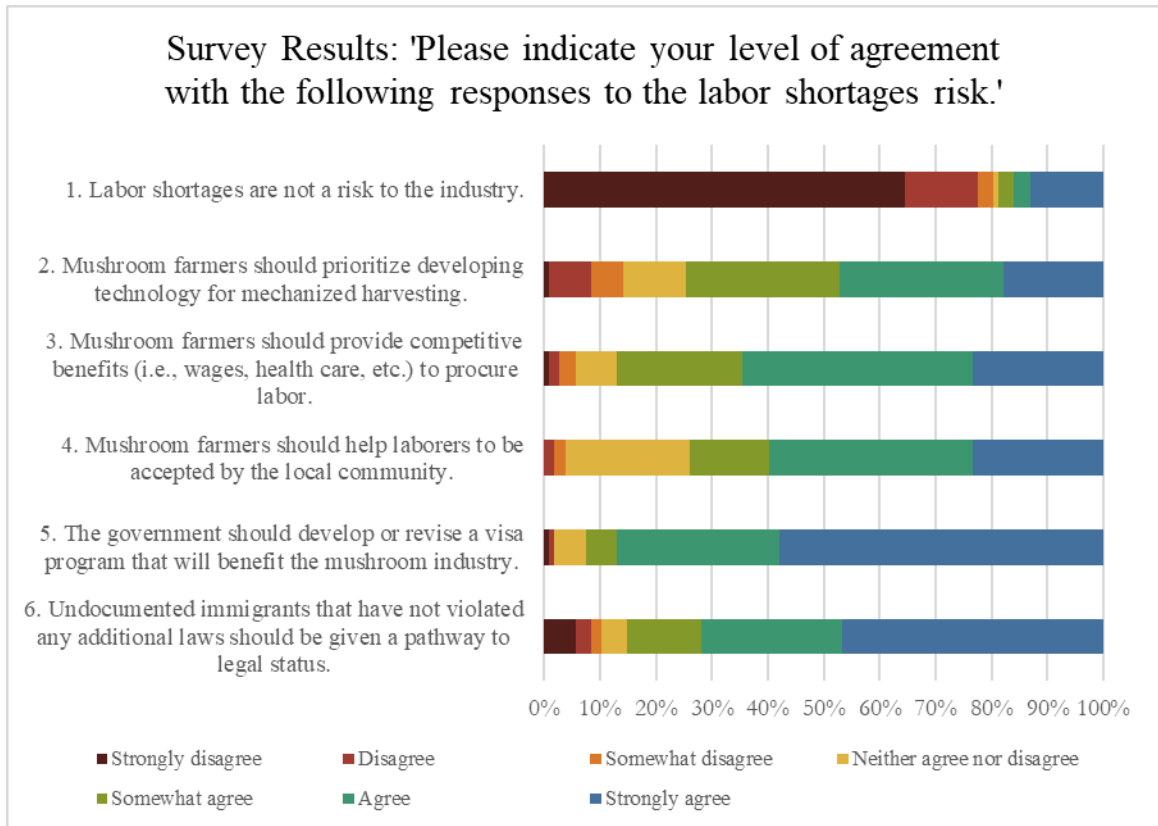


Figure 5.6: Depicts survey participants' level of agreement with the above statements on the risk of Labor Shortages.

Due to the interview participants overwhelming concern for this particular risk, all survey participants were asked to measure their level of agreement with the more commonly discussed ideas for preventing or mitigating the risk that were offered by the interviewees. Of those surveyed on this group of questions (n=107), 64.5% strongly disagreed with the statement, "Labor Shortages are not a risk to the industry", while only 13% strongly agreed. The majority of participants agreed or strongly agreed with the remaining six questions. Participants working at facilities producing 20 million lbs. or greater were significantly more likely (95% confidence) to agree or

strongly agree with the statement, “Mushroom farmers should prioritize developing technology for mechanized harvesting.” Though participants from these same facilities were more likely (99% confidence) to agree with the statement, “Mushroom farmers should provide competitive benefits (i.e., wages, healthcare, etc.) to procure labor,” while ‘Owners and/or Executives’ were less likely to agree with the same statement. Those with 30 years’ experience or more (99% confidence), as well as ‘Owners and/or Executives’ (99% confidence) and participants working in the state of Pennsylvania (95% confidence), were all more likely to agree that “The government should develop or revise a visa program that will benefit the mushroom industry.” These same participants were also more likely to agree with the statement, “Undocumented immigrants that have not violated any additional laws should be given a pathway to legal status.”

Table 5.3: Displays the survey results for the Mann-Whitney U test that was conducted on the participants' level of agreement with the questions on Labor Shortages and Immigration Policy

Grouping Variable		Labor Shortages are not a risk to the industry.	Mushroom farmers should prioritize developing technology for mechanized	Mushroom farmers should provide competitive benefits (i.e., wages, healthcare, etc.) to	Mushroom farmers should help laborers to be accepted by the local community.	The government should develop or revise a visa program that will benefit the	Undocumented immigrants that have not violated any additional laws should be
Years Experience- Fewer than 30 years vs. 30 years or greater	Mann-Whitney U	1388	1395	1389	1233	993	1021.5
	Z	-0.293	-0.049	-0.256	-1.265	-3.07	-2.704
	Asymp. Sig. (2-tailed)	0.77	0.961	0.798	0.206	0.002**	0.007**
Family Owned- Yes vs. All other	Mann-Whitney U	964.5	796.5	963	865	940	797
	Z	-0.522	-1.652	-0.48	-1.225	-0.708	-1.79
	Asymp. Sig. (2-tailed)	0.601	0.099	0.632	0.221	0.479	0.073
Facility Output- Fewer than 20 million lbs. vs. 20 million lbs. or greater	Mann-Whitney U	1339.5	1020	900	1048.5	1257	1316
	Z	-0.272	-2.212	-3.177	-2.164	-0.856	-0.407
	Asymp. Sig. (2-tailed)	0.786	0.027*	0.001**	0.03*	0.392	0.684
Participant Role- Owner and/or Executive vs. All other	Mann-Whitney U	1021	967.5	776	1057	778	720.5
	Z	-1.264	-1.392	-2.9	-0.864	-3.109	-3.35
	Asymp. Sig. (2-tailed)	0.206	0.164	0.004**	0.388	0.002**	0.001**
State- Pennsylvania vs. All other	Mann-Whitney U	1133	922.5	1105	1136	860.5	885.5
	Z	-0.179	-1.568	-0.364	-0.137	-2.311	-1.993
	Asymp. Sig. (2-tailed)	0.858	0.117	0.716	0.891	0.021*	0.046*

In a 2002 study, Tran and Perloff found that despite predictions that granting people amnesty through the 1986 Immigration Reform and Control Act would cause a labor shortage, the opposite was true. The results suggested that when an undocumented worker received amnesty, “the probability that this worker would be in agriculture in any given month in the long run rose from 51.9 to 65.1% across genders (p. 436).” However, they also found that the probability for men to continue to work in agriculture increased (48.9 to 67.8%) while the probability for women decreased (67.2 to 52%). Though the mushroom industry’s labor force is dominated by men, some interview participants believed that they had seen an increase in women entering the labor force over the past few years. If amnesty is granted to some of the undocumented immigrants, which the majority of those surveyed agreed with, the industry could develop a more reliable workforce once again, although the demographics of their employees may change as well.

5.4 Discussion and Conclusion

My research shows the risk perceptions in the mushroom industry vary in several ways, signaling that the methods for prevention and mitigation of the labor shortages risk demands a more complex and dynamic understanding and approach. Those who still view immigration policy as their primary method in mitigating the labor shortages risk might consider Beck’s analysis of risk and reflexivity. Per table 3.1 , it is important for members of the risk society to both recognize the ‘unexpected consequences of individual and institutional decisions’ as well as internalize the uncertainty that results from those consequences. Decisions are then made cooperatively through ‘ad hoc, subpolitical negotiations’. Finally, if those in the industry reflect on the scale of their agency, which in this case refers to their actions

(or inactions) on the global market, they could create additional opportunities for their survival as an industry.

As was noted in the brief overview of the history of the mushroom industry in Chester County, dependence on an immigrant workforce is inherent to this industry. The current makeup of the immigrant workforce is predominately Mexican, although as Debra Lattanzi Shutika noted in her study of the Mexican community in Chester County, much of this workforce is invisible. She notes that, like most other producers of American consumer products, the mushroom growers, “strategically marketed mushrooms to prospective consumers so that their production was apparently ideologically neutral and independent of the social, economic, and political circumstances that facilitated production and profit.” She also notes that when the Mexican workers were mentioned in their relation to the local mushroom industry, it usually had to do with labor problems (p. 99). More recently, this same attention toward mushroom harvesters has been demonstrated through local coverage of ICE raids. However, the political shift of the county suggests that Chester County residents are not aligned with the anti-immigration policies of the Trump administration.

Another challenge facing the industry is the unusually high standards of the American consumer when it comes to the fresh mushroom market. Upon reflecting on the expectations of the American Mushroom Market, one participant acknowledged the role that the industry had in creating the risk.

The mushroom growers have trained their market to like the look of a beautiful, fresh, hand-picked mushroom... it’s a big problem because it takes a lot of labor to produce those mushrooms. [I4]

Concerns over the demand for the fresh product was echoed by several other interview participants. This suggests that many have reflected on the industry’s role in marketing

a product that requires a significant labor force to maintain. Equally important to Beck's theory is the internalization of this fact, which helps inform future strategies for prevention, mitigation, and even marketing.

There is some effort by the American Mushroom Institute, the industry's trade association, to increase the demand for mushrooms by marketing The Blend, a process that combines ground beef with chopped mushrooms to create more nutritious and sustainable meat (The Mushroom Council, 2018). However, there is concern that the initiative could have a negative impact on the market. One participant pointed out that 'blending' ground beef with chopped mushrooms does not require fresh product, his primary concern being that the marketing initiative will increase demand for processed or frozen mushrooms instead. The industry's dependence on labor for fresh mushrooms ultimately increases the production costs of processed mushrooms as well. In addition to problems such as aging infrastructure and slim profit margins, a common argument of interview participants against technological innovation is that the technology is not yet developed well enough to be able to provide the equivalent of a handpicked fresh mushroom, though some acknowledged that suppliers have indicated that this technology may be in development. Some of the more profitable farms have already begun to incorporate mechanical harvesting and technological innovation in some form, perhaps as a way to prepare for the inevitable reality of conflicting government priorities and an increasingly globalizing market. One interview participant thought of the problem in this way:

The US mushroom industry has lacked awareness of international technology developments and now is at least 10, and possibly 20 years, behind in technology investment. This lack of vision and technology investment has created many of the risks listed. [I27]

Though many participants argued that the technology to pick fresh mushrooms was not yet available, this interview participant believed that these members are “rationalizing they’re lack of investment in their own company.” This could indicate that, although some in the industry are reflecting on their role in the creation of the risk, their unchanged methods of production suggests that many are not thinking reflexively because they have not internalized the risk. If they had, their actions for prevention and mitigation would change.

Most participants seemed primarily concerned with the American consumer with few considering their role in the global market. Unfortunately, countries such as Canada, the Netherlands, and China are proving formidable opponents in fresh, processed, and specialty mushroom markets. Canada’s immigration laws are much more accommodating to the labor needs of the agricultural industries by continuously reforming their immigration needs, altering the number of visas based on the economic needs of the country (Sweetman, 2017). These laws, combined with a favorable exchange rate and geographic proximity, give Canada’s fresh mushroom produce an advantage in the American Mushroom Industry. Importantly, the perishable nature of mushrooms, which used to be a deterrent for more distant countries, has become less of a concern since the advent of Individually Quick Frozen (IQF) process, an innovative technique used by the Netherlands to transport mushrooms. Market data trends show that both fresh market imports Canada and frozen imports from the Netherlands have risen. Since 1995, fresh mushroom imports have increasingly taken up a larger portion of the mushroom product sold in the United States. The amount of mushroom product exported to other countries is miniscule in comparison. If political trends continue to favor Democrats, national

focus may once again turn toward the New Economy and globalization. The industry should reconsider how they perceive the scale of their own agency in regards to the market. Expanding their reach in to the global economy could help some to stay afloat. Many also believed that China had circumvented the perishability issue by pre-inoculating spawn into mushroom logs. Concerns over both the fairness and safety of this practice, were expressed.

The Chinese are importing shiitake logs that have been pre-inoculated with spawn. What that means is they're bringing in these frozen logs...we don't know what water is inside of those log, and the safety of that water. We don't know, really, very much about the logs themselves. So they bring them in... and then they grow the mushrooms off of them. And the mushrooms are a product of the USA, and yet every single input [that went] into that mushroom, bar the last watering cycle, is foreign product [I4].

The common narrative surrounding concerns about China is that their imports are an issue of U.S. 'National Security' as well as food safety. In the U.S. the mushroom industry is held to high standards when it comes to food safety. As one survey participant wrote, China should be held to the same standards.

Chinese manufactured logs are being brought into the United States under the false labeling of "Spawn", when in fact the boxes are filled with mature logs ready to fruit. Federal government turns a blind eye and does not properly regulate. Diseases are being brought in on those logs that will risk our domestic timber industry, as well as others.[S107]

Though not the solution that many are searching for, the industry could have more luck with the Trump administration if they focused on issues surrounding trade and tariffs rather than immigration policy.

The politics of the United States, as well as Chester County are changing. The wealth and education level of the county fits many of the demographics that Beck

indicated were necessary for reflexivity. The shift in voting records suggests that the local views are in favor of the New Economy of globalization rather than the Old Economy of mass production and Fordism. Though my general impression of the interviewees was that they were more conservative in nature, the anti-immigrant sentiment that has infected the Republican party was noticeably absent. Through the use of ‘ad hoc sub-political negotiations’, such as engaging more openly in politics with the community as well as the country at large, the industry may have more luck in swaying the opinion of the people instead of the politicians who have ignored their lobbying efforts for decades.

The risk of labor shortages in the mushroom industry is incredibly complex. Many of the factors that led to this crisis, such as social perception, failed immigration policy, are outside of the control of the members of the industry. However, the industry has played a part in creating this issue. The infrastructure of most of the farms is far too antiquated to adapt to mechanical harvesting technologies. Additionally, the high standards of the fresh market that the industry has imposed on itself creates additional challenges in incorporating technological advancements. Though many of the interview participants appeared to acknowledge the industry’s role in the creation of the risk, it does not appear to be reflected in their preferred strategies for mitigating against it. As the industry comes up with new ways to tackle the labor issue, I suggest that they adopt a reflexive approach to prevention and mitigation. Just as some are considering the consequences of marketing strategies like The Blend, the broader industry should reflect on the effectiveness of the strategies that they have tried toward immigration policy thus far. The current administration is unlikely to endorse the type of immigration reform needed by the mushroom industry. Their lobbying efforts have

been ineffective so a new political strategy, perhaps one that appeals to the community and society rather than politicians, should be employed.

Chapter 6

CONCLUSION

6.1 Introduction

The purpose of the study was to identify the various ways in which the mushroom industry both perceives and responds to the risks that face them. The results show that the *Labor Shortages* risk is the most significant risk facing the mushroom industry today. Though risks such as *Food Safety*, *Government Regulation*, *International Imports*, and *Pests & Diseases*, may not threaten the industry as gravely as the risks related to the *destandardization of labor*, all threaten the sustainability of mushroom farming operations.

Findings support other studies which found that, while there are some signs of *reflexivity* within some participants, the industry does not universally perceive risk in this manner. However, there is some evidence to suggest that the perceptions of the participants vary both geographically and demographically. The following section will provide an overview of the conclusions of the paper.

6.2 Overview of Results

Government Regulations, and the preceding risks that brought forth this modernization *side-effect*, are formed by many of the innovative processes that have been developed by the industry. The raw materials developed for the composting processes have become increasingly more expensive to obtain with many of the mushroom farms being forced to reach further across the country (and sometimes Canada) to get these increasingly expensive inputs. Due to the indoor style of production, the risk of *climate change* has escaped the concerns of most industry members. However, some fear that their heavy reliance on energy will one day put

them at risk, harking back to the *boomerang effect*. Other in the industry argued that the warmer winters brought on by this change have already allowed the local pests to thrive. The risk of *Food Safety*, appears to weigh heavily on interview and survey participants as well. *Government Regulations* meant to protect the consumer (*society*), or the environment (*nature*) from these broader reaching risks, instead place the industry at risk. Strict environmental regulations, healthcare (i.e., Obamacare), and food safety requirements creates both financial and bureaucratic burdens on the members of the industry.

In addition to uncovering the perceived risks that face the members of the industry, the findings also suggest that there are some interesting demographic and geographic differences towards perception in the industry. *Government Regulation* and *Food Safety* were found to be less of a concern in the state of Pennsylvania than other states. However, Pennsylvanians were more likely to perceive the risk of labor shortages in Pennsylvania, which could indicate that they are more threatened by the risk than other areas of the country.

The process of the *destandardization of labor* helps to explain the labor related risks that currently threaten the industry. *Geographic diffusion*, a change in *working hours*, and the *labor contract* all contribute to the unemployment and *underemployment*. Compounding risks can stem from or be exacerbated by these changes as well. Risks to *worker safety* occur when fewer employees are on the job, making mitigation more challenging. *International imports* compounds the threats of both *labor shortages* and *food safety* through lower costs, higher subsidies, and inadequate regulation. Interestingly, the study also showed that shortages in the

workforce were perceived by Pennsylvanians to be a greater threat, indicating some geographic differences in risk perception among the participants.

Prevention and Mitigation tactics for both *Government Regulation* and *Labor Shortages* predominately involve lobbying the government. Conflicting viewpoints amongst interview participants, calling for deregulation, smart(er) regulation, and the enforcement of existing regulations, indicate that the industry is not in agreement on the best strategies. Survey respondents differing views toward preventing and mitigating against *labor shortages* through immigration reform, visa programs, and amnesty, varied as well, supporting the findings from the interview data.

6.3 Arguments from study

To prevent and/or mitigate against risk in *reflexive modernization*, Beck suggests *ad hoc, subpolitical negotiations*. He argues that *ad hoc* risks need *ad hoc* solutions. The risk of Pests and Diseases, seems to be managed in this way as members of the local community have developed *risk consciousness* of the phorid fly. Through activism and their own, empirically conducted research, the community is engaged with the mushroom industry in the prevention of broader risks. *Government Regulations* could be managed similarly but on a larger scale by bringing in a greater number of stakeholder social groups.

Efforts to prevent *Labor Shortages* appear to have been far less successful. It is unlikely that any relief for the industry will come in the form of immigration policy reform by the Trump administration. Though many would like to see an increase in the number of visas, industry members may have more luck by broadening their perceptions toward the scale of their own agency. Expanding into the global market, as well as incorporating technologies into their operations to reduce labor, are a couple of

ways that industry members can compete in an increasingly global market. Additionally, the ‘national security’ argument toward international imports may benefit members of the industry as food sovereignty and security are the more predominate reasons that the European Union has enacted the CAP program. The industry may have more success lobbying democrats for subsidies than republicans for immigration reform.

6.4 Limitations

While the findings indicate that there is some level of *reflexivity modernization* occurring within the industry, there are limitations to the study. Interview participants were recruited using snowball sampling which can create a bias in the variety of people interviews. Though 19/27 participants worked at 12/50 different mushroom farms. The other eight participants worked in the industry as suppliers, distributors, or consultants. The survey had limitations as well. The word clouds utilized in the study did not necessarily provide the same level of options for each selected risk, limiting the effectiveness of the survey. Additionally, the analysis of the survey did not provide the same level of clarity toward *reflexivity as the interview narratives*.

6.5 Summary

This study adds to research on the risk perceptions of the agricultural industry. Further research on the perceptions in the California mushroom industry (second largest in the country) may bring some clarity to the differences found between Pennsylvania and other geographies around the country. Also, there are opportunities to study how other agricultural industries have been positively or negatively impacted by these Trump administration policies.

Preventing the financial repercussions induced through labor shortages is the greatest challenge facing the industry today. Unfortunately, the current options available for those who are already struggling financially are not promising. The political ideologies of the country, and Chester County, are transforming as the Trump administration rejects policies and agreements that encourage globalization, increasingly isolating the country from the rest of the world.

As the Trump administration cracks down on both legal and illegal immigration, it is likely that the risk of labor shortages will increase along with the United States dependence upon countries such as China and Mexico for mushrooms; and the administration's recent deregulation of the FSMA requirements ensures that food safety concerns will also rise.

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Appendix

IRB DETERMINATION OF EXEMPT STATUS



RESEARCH OFFICE

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Ph: 302/831-2136
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DATE: March 30, 2017

TO: Samantha Speck, BA
FROM: University of Delaware IRB

STUDY TITLE: [1040001-2] Risk Perceptions and Insurance Needs of Members of the Mushroom Industry

SUBMISSION TYPE: Amendment/Modification

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: March 30, 2017

REVIEW CATEGORY: Exemption category # (2)

Thank you for your submission of Amendment/Modification materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Nicole Famese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.

cc: