Impact of Demographics on Supply Chain Risk Management Attitudes: Prevention Vs Response

By

Nuno Miguel Mendes Toste Dinis

Executive MBA in Management
EGP - University of Porto Business School, Portugal, 2004

B.S., Business Management and Administration
Instituto Superior de Ciências do Trabalho e da Empresa, Portugal, 1996

Submitted to the Engineering Systems Division in Partial Fulfillment of the Requirements for the Degree of

Master of Engineering in Logistics

at the

Massachusetts Institute of Technology
June 2010

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
JUL 28 2010
LIBRARIES

ARCHIVES

© 2010 Nuno Dinis. All rights reserved.

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this document in whole or in part.

Signature of Author.....
Master of Engineering in Logistics Program, Engineering Systems Division
May 7, 2010

Certified by.....
Dr. Bruce Arntzen
Senior Research Director, Center for Transportation and Logistics
Thesis Supervisor

Accepted by.....
Prof. Yossi Sheffi
Professor, Engineering Systems Division
Professor, Civil and Environmental Engineering Department
Director, Center for Transportation and Logistics
Director, Engineering Systems Division

Impact of Demographics on Supply Chain Risk Management Attitudes: Prevention Vs Response

By

Nuno Dinis

Submitted to the Engineering Systems Division
on 07 May 2010 in partial fulfillment of the
requirements for the degree of
Master of Engineering in Logistics

ABSTRACT

There is no doubt that the 21st century is the century of globalization. The great majority of companies' supply chains span multiple countries, cultures, and industries. However people in different parts of the globe perceive supply chain risks differently. Is it possible to predict the way people manage their supply chain in terms of prevention versus response, based on demographics?

Using a large-scale worldwide, online survey as a base, conducted by the MIT Global SCALE Initiative, this research project analyzes the relationship between a dependent variable (Prevention vs. Response) and independent variables (demographics).

The analysis shows that there are indeed demographic factors that can help predict how people manage supply chain risk. The following demographic factors need to be known: country of origin, gender, primary field of study, and job function.

Thesis Supervisor: Bruce Arntzen

Title: Senior Research Director, Center for Transportation and Logistics

ACKNOWLEDGEMENTS

There were many people without whose help this thesis would not have been possible.

I am grateful to my thesis advisor Professor Bruce Arntzen. He was very helpful and inspirational. His guidance throughout the project was pivotal. Despite his busy schedule he was always available to help and challenge me.

Although this thesis is a solo project, I consider Ken Kanyagui as my thesis partner. Because both our theses were based on the global survey that the MIT Global SCALE initiative developed, we worked as a team. Thank you. I also want to thank Francisco 'Paco' Alonso for all his help and support during the entire project.

I also want to thank my friends who despite being far way managed to motivate me to "drink from the fire hose" and never feel discouraged despite the hard work.

I think the MLOG10 was a great year, and I'm sure it is going to become a vintage year. Thank you all for the great experience, it was a privilege to be part of the "gang". I know that some of you will be friends for life.

A special thank you to my parents. Despite being far away and not always fully agreeing with my decisions, they have always supported me. They taught me the foundational values of life and the importance of education. I will never be able to thank them enough.

Last but not least, a special thank you to my wife Tini. Without her help and inspiration I would never have come to MIT. Since I met her in 2004, she always has been my number one supporter and also the person that has challenged me to try harder and never give up. She is not only my wife, but also my best friend.

Nuno Dinis

Cambridge, Ma

TO MY WIFE

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF EXHIBITS

NOMENCLATURE

MIT – Massachusetts Institute of Technology

ESD – Engineering Systems Division

CTL – Center for Transportation & Logistics

MLOG – Master of Engineering in Logistics

APICS – The Association for Operations Management

ISM – The Institute for Supply Management

COUHES – MIT's Committee on the Use of Humans as Experimental Subjects

CITI – Collaborative Institutional Training Initiative

Demographics – Includes age, gender, educational level, field of study, job function, years of professional experience, country of residence, language(s) spoken, company's industry, company size and number of people working in the company

IV – Independent Variables

DV – Dependent Variable

SPSS – Statistical Package for the Social Sciences

Survey Monkey – A provider of web-based survey solutions

LR – Linear Regression

OLR – Ordinal Logistic Regression

SCRM – Supply Chain Risk Management

BCP – Business Continuity Planning

1 INTRODUCTION

This thesis analyses the results of a worldwide online survey conducted by the MIT's Global SCALE Risk Initiative to study the effect of regional experiences and cultural differences on people's attitudes and behaviors toward supply chain risks and risk management. A team was assembled to analyze the results of the survey. I am a member of that team.

The survey asked responders about their risk management experiences, the supply chain disruptions they had seen, their opinion on risk management approaches, and their backgrounds: age, gender, languages spoken, country, industry, and size of company. This thesis we will look for explanatory correlations (if any) between the respondents' attitudes about or opinions on supply chain risks and their regional and cultural information.

The survey gathered information about the responders' risk management experience, attitudes and opinions regarding risk management approaches, disruptions, and supply chain practices. It also surveys supply chain attitudes toward prevention versus response, and also where should a company focus their efforts to mitigate supply chain risks, at the headquarters or locally. There were questions on their backgrounds: age, gender, education, country, experience, and size of company.

Sample questions included:

1. What supply chain disruptions have you experienced?
2. Which risks do you consider most important and least important?
3. Is headquarters the best place to coordinate recovery efforts?

1.1 MOTIVATION

In the 21st century, the great majority of companies' supply chains span through multiple countries, cultures, and industries. However there are significant differences in supply chain management practices and how supply chain risks are perceived.

In the last few decades, companies have become increasingly global. Companies have locations spread all over the world and their suppliers are also present in different parts of the globe. It is key for companies to be able to predict how people's experiences and attitudes toward supply chain risks and risk management influence the way people act toward supply chain risks.

In order to be a 21st century effective supply chain manager, it is important to know what people perceive as the best way to mitigate supply chain risks. Is it investing toward more in prevention, or toward response mechanisms? Knowing what people believe the best approach is in different parts of the world, impacts greatly how a company allocates their resources, as well as the supply chain strategy the company will follow. Having this understanding will also enable a supply chain manager to decide what the most effective way to do business is with certain regions of the globe.

1.2 PROJECT BACKGROUND

The MIT Global SCALE Risk Initiative is a project carried out by the MIT Center for Transportation & Logistics (CTL). The CTL is part of the Engineering Systems Division (ESD) of the MIT School of Engineering.

1.2.1 MIT GLOBAL SCALE RISK INITIATIVE

"The MIT Global SCALE (Supply Chain and Logistics Excellence) Network is an international alliance of leading research, education, and corporate outreach initiatives dedicated to the development and dissemination of supply chain and logistics excellence through innovation.

The MIT Global SCALE Network spans North America, Latin America, and Europe, with plans to expand into Asia and Africa. The network currently includes: MIT CTL in Cambridge, MA; the Zaragoza Logistics Center (ZLC) in Zaragoza, Spain; and the Center for Latin-American Logistics Innovation (CLI) in Bogotá, Colombia.

This unique Network will allow faculty, researchers, students, and affiliated companies from all three centers to pool their expertise and collaborate on projects that will create supply chain and logistics innovations with global applications.

The MIT Global SCALE Network also enhances supply chain and logistics education at each center. Graduate students at MIT CTL, ZLC, and CLI will participate in the network's global research projects and take part in an educational exchange, traveling to other network centers and learning alongside other network students." (CTL, 2010)

Dr. Bruce Arntzen is the overall project and North America coordinator of the MIT Global SCALE Risk Initiative. Prof. María Jesus Saenz is the European coordinator, and Ms. Isabel Agudelo is the Latin American coordinator. There were several teams located across the world that translated the survey into eight languages or dialects and then distributed it to the target audience.

1.2.2 THE SURVEY

The survey's objective is to study supply chain risk management on a global scale. The survey was launched in three phases.

The survey helped the team understand the regional and cultural differences in supply chain risk management. It also helped the team understand the challenge that supply chain risk managers and business continuity planning managers have in identifying the weakest links in their far flung global supply chains and then rallying management's attention to address these weaknesses. Once the survey data analysis is completed, the next step will be to create the Supply Risk Research Forum (SuRRF), a team of interested companies who will work with MIT to create a method and tools to efficiently identify and display the weakest links in a supply chain.

1.3 PROBLEM STATEMENT

Although the survey has several questions regarding supply chain management practices, this thesis will analyze the responders' response to the question:

How should your company spend its efforts? (Prevention Vs Response)

The problem statement is: Do demographic variables such as age, gender, educational level, field of study, job function, years of professional experience, country of residence, language(s) spoken, company's industry, company size and number of people working in the company, help to predict the answer to the question "How should your company spend its efforts? (Prevention versus Response).

The question that this thesis intends to answer is the following: Is it possible to predict the way people manage their supply chains in terms of prevention versus response, based on demographics?

2 LITERATURE REVIEW

The literature review was restricted to global supply chain surveys,

With the increasing globalization of the supply chains, it is this important for companies to find the right balance between prevention versus response.

In the city of Albuquerque, New Mexico in March 17, 2000 a 10minute fire at the plant of the semiconductor Philips NV had distinct consequences for its two main clients (Nokia & Ericsson) (Sheffi, 2005). Due to the fact that Nokia reacted quickly and found an alternative manufacturer, "Nokia was able to avoid disrupting its customers" (Sheffi, 2005). While because Ericsson's response was slow and there was no plan B in place, the consequences were tremendous and Ericsson mobile phones almost went out of business. Ericsson eventually had to form a joint venture with Sony (in October 2001) in order to remain in the mobile phone business.

The next section presents a brief overview of the of global supply chain surveys that were reviewed.

2.1 GLOBAL SUPPLY CHAIN SURVEYS

There are several supply chain surveys that have been conducted by various organizations, however there are no surveys that focus solely on prevention versus response. Additionally, none try to predict the way people will manage their supply chains based on demographics.

Two of the most well known supply chain surveys available to the public are the surveys conducted by McKinsey. The first survey was conducted in September 2006 titled "Understanding supply chain risk". This was a truly global survey with 3,172 responses. One of the main conclusions of the survey was that "a significant number of executives say their company doesn't spend enough time or resources on

mitigating risk" (McKinsey, 2006). The same survey also concludes that "nearly two out of three executives … say they face increasing risks to their ability to supply their customers with goods and services cost effectively" (McKinsey, 2006). Despite these conclusions, the survey does not address supply chain risk management practices in terms of prevention versus response.

The most recent survey by McKinsey was conducted in July 2008 titled "Managing global supply chains". Although this survey was also conducted world-wide, it only had 273 responses. The survey concludes "that supply chain risk is rising sharply" (McKinsey, 2008). But again, the survey does not address supply chain risk management practices in terms of prevention versus response.

3 SURVEY

The large-scale worldwide survey was conducted online using the SurveyMonkey platform. To ensure that the responder correctly understood the questions and that therefore the data was reliable, the survey was translated into eight languages or dialects.

The survey work can be divided into three different phases: survey development, data collection and data analysis.

3.1 SURVEY PHASES

3.1.1 PHASE ONE: SURVEY DEVELOPMENT

The MIT Global SCALE Risk Initiative team developed the survey (exhibit 1), led by Dr. Bruce Arntzen. The average time required to complete the survey was twelve minutes.

The survey type was a questionnaire. The majority of the questions in the survey were short closed-ended questions, and very few were open-ended questions. Closed-ended questions were selected because firstly they are easier to code and record. Secondly, the results of surveys with closed-ended questions can be analyzed quantitatively.

3.1.2 PHASE TWO: DATA COLLECTION

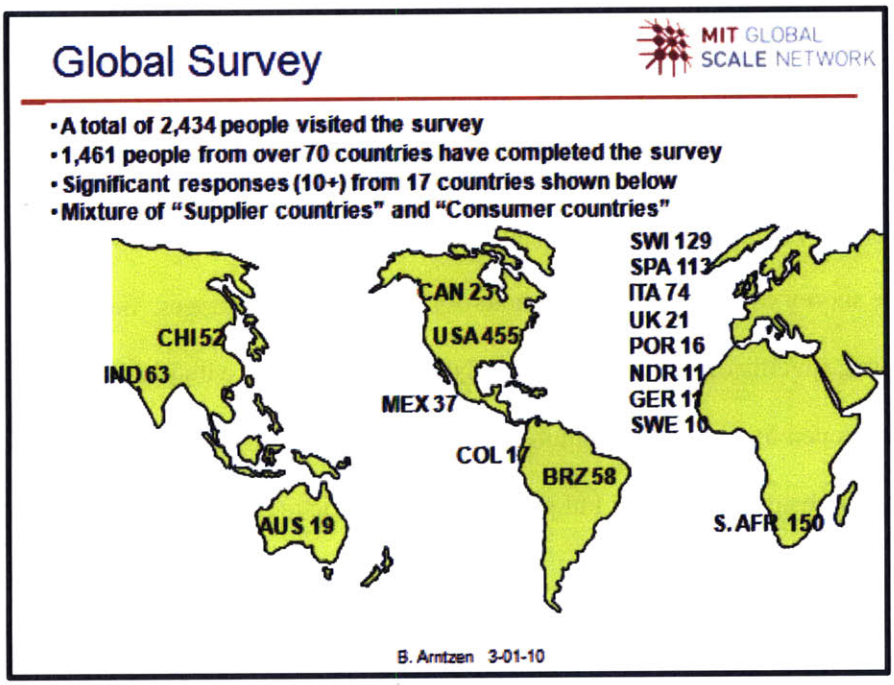
The survey target audiences were supply chain, finance, and business professionals from different cultures, countries and industries. The industries we expected to have more responses from were retailing, manufacturing and distribution because these industries are typically most involved with Supply Chains issues.

In order to ensure a larger number of participants, eighteen versions of the survey were developed (exhibit 2), all carrying the identical content. Firstly, the survey was translated into eight languages or dialects (Portuguese, Brazilian Portuguese, Spanish from Mexico, Spanish from Spain, German, Greek, Italian and Chinese (Mandarin)). Careful and rigorous translating was employed to ensure that the survey content was consistent across the different languages. Secondly, in some cases, specific organizations received the English survey with a unique identifier developed for their organization only. There were nine organizations that received the English survey with a unique identifier specific to their organization. In total there were eighteen surveys.

Teams around the world ensured that the survey was distributed to the largest number of target people possible. Relevant logistics and supply chain councils, journals and organizations were contacted in each country in order to ensure that the survey reached the largest number of target people possible. APICS (The Association for Operations Management – American Production and Inventory Control Society), CSCMP (Council of Supply Chain Management Professionals) in the United States of America and also in other countries, and ISM (The Institute for Supply Management) were key in reaching a larger number of supply chain professionals. They sent out email communications to their members to ask them to participate in the survey.

The surveys went online on November 4th 2009, and were closed on March 1st 2010. In total the surveys were online for 117 days. On average, the responder took twelve minutes to answer eighty three questions split into seventeen sections.

Figure 1 – Global survey map



The survey targeted supply chain, finance, and business professionals (89% of the survey responses come from the target audience) from "Supplier countries" and from "Consumer countries". 2,434 people in over 70 countries visited and began to take the survey. After screening out spurious and incomplete responses (where less than half of the questions answered) there were 1,461 valid complete survey responses for analysis. The above image shows that the majority of the responses came from the USA.

Table 1 – What is your main job function?

Description	Number of responses	%
TOTAL	1461	100%
Risk Management or Business Continuity Planning	60	4%
Supply Chain, Logistics, or Operations Management	781	53%
Sourcing, Purchasing, or Supplier Management	303	21%
Financial Management	34	2%
General or Administrative Management	115	8%
Engineering, Marketing or Sales	90	6%
Other	76	5%
No Answer	2	0%

This thesis will analyze the impact of demographic factors have on supply chain attitudes regarding prevention vs response. It will try to establish a correlation between demographics factors (Independent Variables - IV) and Prevention Vs Response (Dependent Variable – DV).

3.1.3 PHASE THREE: DATA ANALYSIS

The survey was reviewed and approved by MIT's Committee on the Use of Humans as Experimental Subjects (COUHES Protocol # 0909003434). All the facets of this project adhered to COUHES regulations and protocols.

Before analyzing the data, every member of the team that would have contact with the survey results, had to follow an online training course and pass an exam in Social & Behavioral Research Investigators, Basic Course. This course was provided by the "Collaborative Institutional Training Initiative (CITI) Program for the Protection of Human Research Subjects". Each member of the team also had to sign a data-sharing agreement that states the terms and conditions under which they are allowed to obtain, handle, and analyze the data.

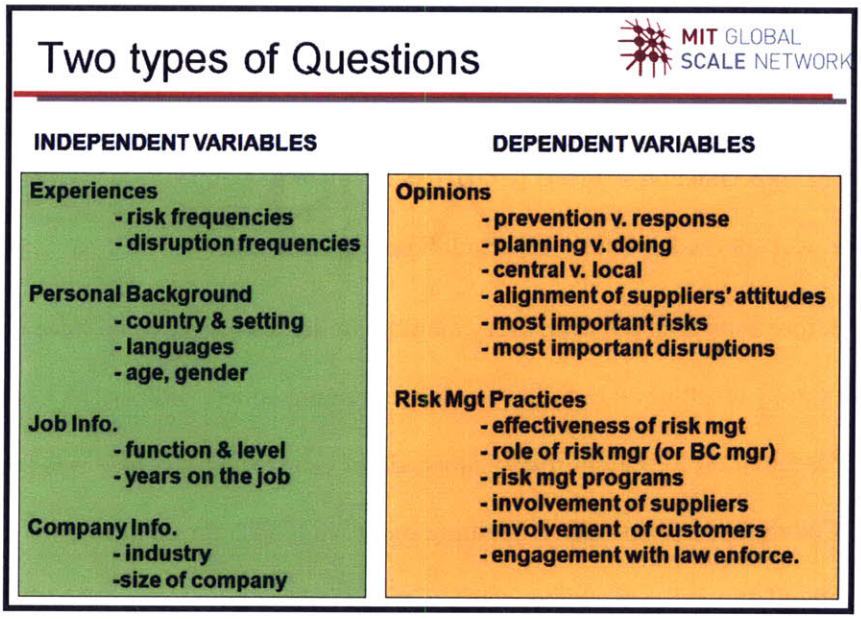
The data analysis is the phase that this thesis will focus on.

3.2 SURVEY CONTENT

The eighty three questions of the survey were divided into two types. Firstly, the Dependent Variables (DV) ask the responder about their Supply Chain practices and opinions. Secondly, the Independent Variables (IV) try to characterize the responder demographically asking him about his/her age, gender, educational level, field of study, job function, years of professional experience, country of residence, language(s) spoken, company's industry, company size and number of people

working in the company. The majority of the questions are closed questions, where the responder has to select an option of a drop-down menu. This thesis only analyzes the responders' answers to the closed questions.

Figure 2 – Two types of variables



Source: Dr. Bruce Arntzen - MIT Global SCALE Risk Initiative2.ppt 01/13/2010

The survey is divided into seven sections:

1) Introduction;
2) Opinions on Risks;
3) Supply Chain Risks (Internal and External Events);
4) Failure Modes;
5) Supply Chain Risk Management;
6) Background Information;
7) See the study results.

The responders that wished to receive a summary of the survey results could provide their email address. Additionally, if they wanted to be contacted by the research staff they were asked to provide their email address.

3.2.1 DEPENDENT VARIABLES (DV)

The sections two to five cover the dependent variables.

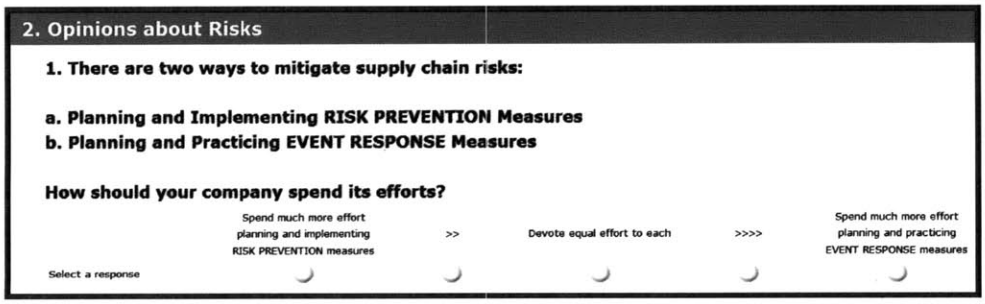
2) Opinions about Risks:
    a. How should your company spend its efforts? (Prevention vs. Response)
    b. Where in your company is the best position to do the following (Centrally managed Vs Locally managed)
    c. How closely does your company share the same sense of urgency around on-time delivery with the most important suppliers and customers?
3) Supply Chain Risks (Internal and External Events):
    a. Internal Events:
        i. How often has your supply chain (at your site) been disrupted by these events? (consider only major disruptions)
    b. External Events:
        i. How often has your supply chain (at your site) been disrupted by these events? (consider only major disruptions)
    c. Considering everything, what are the three most important risks to your supply chain? (first, second and third most important)
4) Failure Modes:

a. How frequently have you experienced the following types of supply chain disruption? (consider major disruptions only)
b. What types of disruptions are the most important for your company at your site to be prepared for? (first, second and third most important)

5) Supply Chain Risk Management:
   a. Tell us about Supply Chain Risk Management at your company
   b. Which supply chain risks do you think are UNIQUE or MORE PREVALENT in your region than in other parts of the world?

This thesis will analyze one of these dependent variables; the one from the section on opinions about risks: "How should your company spend its efforts?" The responder had 5 response options.

Figure 3 – Screenshot of the survey - How should your company spend its efforts?



The response options ranged from spending much more effort planning and implementing risk prevention measures, devoting equal effort to each and, on the other extreme, spending much more effort planning and practicing event response measures. In total there were 5 response options.

3.2.2 INDEPENDENT VARIABLES (IV)

Sections one (Introduction) and six (Background Information) cover the independent variables (IV).

This section is divided into six subsections:

1) Introduction:
    a. What is your main job function?
6) Background Information:
    a. Tell us about yourself:
        i. Age;
        ii. Gender;
        iii. Education;
        iv. Primary field of study.
    b. What countries and settings have you lived in and worked in?
        i. Country you grew up in?
        ii. Setting where you grew up?
        iii. Country you work in now?
        iv. Setting where you work now?
    c. What languages do you speak?
        i. Primary language spoken as a child;
        ii. Primary language spoken at work;
        iii. Secondary language spoken at work;
    d. What industry is your company in?
        i. What industry?
    e. Tell us about your company:
        i. Size of annual revenues (globally) in USD?

ii. Number of people at your site?

iii. Number of people worldwide?

f. Tell us about your job (please select the closest match):

i. How long have you worked for this company?

ii. What is your job level?

iii. What function are you in?

iv. How long have you worked in this industry?

v. How long have you worked in this function?

All the above mentioned IV will be analyzed in order to understand if demographic variables can help to predict the answer to the dependent variable question regarding supply chain management practice of prevention vs. response.

The demographic variables can be divided into four main groups: Personal, Regional & Cultural, Job info and Company info.

Table 2 – Personal, Regional & Cultural, Job and Company IV

Personal	Regional & Cultural
Age	Country growing up
Gender	Country work now
Country	Language as a child
Setting	Language at work
Languages	Second language at work
Education	Setting you grew up in
Field of study	Setting you work in now
Job	**Company**
Function	Industry
Level	Company size
Years in this company	No. People locally
Years in this function	No. People worldwide
Years in this industry	

4 DATA PREPARATION

This chapter covers in detail the preparation of the survey data that was conducted prior to the data analysis. The preparation included: aggregation of databases, data cleaning, and reclassification of responses based on comments and survey structure, and transformation of nominal variables in scalar variables. Additionally, this chapter covers the different types of data that will be used in the data analysis.

4.1 DATA

The survey output from the SurveyMonkey platform was extracted to a Microsoft Excel file for each one of the eighteen surveys. Each Excel file was combined into a single dataset Excel sheet. In total 2,434 people from seventy-three countries began to take the survey. After cleaning the data 1,461 surveys remained.

4.1.1 AGGREGATION OF DATABASES

The first step was the aggregation of the output of the eighteen surveys into a single Excel file. An extra column was added to the file in order to identify the survey name. Each question was identified with a short name. Each one of the survey answers was assigned a unique identification number.

4.1.2 DATA CLEANING

The team that worked in the data cleaning decided to only consider as valid surveys the surveys that had at least 50% of the questions answered. The surveys were also checked one by one for flippant or non-serious responses. Additionally, a check was conducted by IP address and date of survey completion to ensure that the same person did not answer the survey more than once. Thirteen surveys from West

Africa (SN09) were removed from the data file because they carried the same non-African IP address.

Table 3 – Total number of surveys started

Survey Label	Country	Number of responses
ALL SN	ALL	2,434
SN01	North America	665
SN14	APICS	333
SN06	Germany Swiss	293
SN10	South Africa	268
SN05	Spain	211
SN08	Italy	134
SN11	India	94
SN02	Brazil	87
SN15	Europe	80
SN12	China	53
SN04	Mexico	45
SN03	Colombia	40
SN09	West Africa	35
SN17	China English	28
SN18	Portugal	25
SN16	SC Council	19
SN13	CTL Visitor	17
SN07	Greece	7

The initial number of survey responses was 2,434. The above table shows the number of survey responses by survey type. North America, APICS and Germany & Swiss accounted for half of the survey visitors.

After the previously mentioned cleaning process, almost one thousand surveys were set aside. Note that almost all of the rejected responses were due to their being incomplete (less than half of the questions answered). Even though the survey only required twelve minutes to complete, many people abandoned the survey after answering the first few questions. We believe many of these responders were just

curious to see what the questionnaire was about. The set of surveys that were used for this thesis was 1,461 surveys.

Table 4 – Total valid surveys

Survey Label	Country	Number of responses
ALL SN	ALL	1,461
SN01	North America	438
SN14	APICS	225
SN10	South Africa	180
SN06	Germany Swiss	142
SN05	Spain	113
SN08	Italy	68
SN11	India	59
SN02	Brazil	56
SN15	Europe	40
SN12	China	33
SN04	Mexico	29
SN17	China English	20
SN03	Colombia	19
SN18	Portugal	15
SN09	West Africa	10
SN13	CTL Visitor	6
SN16	SC Council	6
SN07	Greece	2

4.1.3 RECLASSIFICATION OF RESPONSES BASED ON COMMENTS

After the data cleaning the next step in the data preparation was the reclassification of the responses. There were two key tasks. Firstly, the responses to the questions where the responder had the option of writing a comment were reclassified if needed. An example of this was the question "What industry is your company in?". The responder had a drop-down menu of fifty answers. In many cases the responder selected "other industry" and wrote in the comment box the industry they worked in even though that industry was one of the options in the drop-down

menu. These answers were reclassified. Secondly, based on the responses to the same question, it was decided to create two new industry categories:

- Choice 51 = Supply Chain Service Provider (carriers, 3PL's, warehousing, expediters, UPS, Fedex, etc);
- Choice 52 = Utilities (phone & telecom companies, utilities – gas, electric, water).

4.1.4 RECLASSIFICATION OF RESPONSES BASED ON SURVEY STRUCTURE

The answers to the dependent variable (DV) question "There are two ways to mitigate supply chain risks: a. Planning and Implementing RISK PREVENTION Measures b. Planning and Practicing EVENT RESPONSE Measures. How should your company spend its efforts?" were renumbered. The responder had five possible answers. The SurveyMonkey platform assigned a value to each question, ranging from 1-5. The team converted the responses to a new scale, ranging from 0-4. For example, one became zero, consequently two became one, three became two and so forth. The blank responses continued to be treated as blank.

Although the question is an ordinal variable, in order to analyze it deeply versus the IV, the Survey team decided to treat it as a scalar variable.

The independent variable (IV) regarding job level (What is your job level?) was reclassified. Due to the fact that the job level ID is a nominal variable, the IV of the answers was changed in order for the answers to be listed from lowest ranking position to the highest. The performed changes can be seen is the below table:

Table 5 – Job Level – IV – Reclassification

Original Choice		Reclassified Choice	
1	President/CEO	1	Worker
2	Vice President	2	Team Leader
3	Senior Manager	3	Supervisor
4	Middle Manager	4	Middle Manager
5	Supervisor	5	Senior Manager
6	Team Leader	6	Vice President
7	Worker	7	President/CEO

4.1.5 TRANSFORMATION OF NOMINAL VARIABLES IN SCALAR VARIABLES

The answers to some of the independent variables (IV) were also reclassified to be transformed from nominal variables to scalar variables. This change was made in order for it to be possible to analyze the responses using linear regression and logit analysis. The performed changes can be seen in the below tables:

Table 6 – Age – IV – Transformation from nominal to scalar

Original Choice		Reclassified Choice	
1	Under 20 years	1	18
2	20-29 years	2	25
3	30-39 years	3	35
4	40-49 years	4	45
5	50-59 years	5	55
6	60-69 years	6	65
7	70+ years	7	75

Table 7– Size of company revenues (million dollars) – IV – Transformation from nominal to scalar

Original Choice		Reclassified Choice	
1	Under 1 Mill	1	$500k
2	1M - 10M	2	$5M
3	11M - 100M	3	$55M
4	101M - 500M	4	$300M
5	501M - 1B	5	$750M
6	1B - 5B	6	$3,000M
7	5B - 20B	7	$12,500M
8	20B - 50B	8	$35,000M
9	over 50B	9	$70,000M

Table 8 – Your company Number of people locally – IV – Transformation from nominal to scalar

Original Choice		Reclassified Choice	
1	1-10	1	5
2	11-100	2	55
3	101-500	3	300
4	501-1000	4	750
5	1001-2000	5	1,500
6	over 2000	6	2,500

Table 9 – Your company number of people worldwide – IV – Transformation from nominal to scalar

Original Choice		Reclassified Choice	
1	1-10	1	5
2	11-100	2	55
3	101-500	3	300
4	501-1K	4	750
5	1K-2K	5	1,500
6	2K-10K	6	6,000
7	10K-50K	7	30,000
8	50K-100K	8	75,000
9	over 100K	9	125,000

Table 10 – Number of years working for this company – IV - Transformation from nominal to scalar

Original Choice		Reclassified Choice	
1	under 1 year	1	0.5
2	1-3 years	2	2
3	4-10 years	3	7
4	11-15 years	4	13
5	16 - 20 years	5	18
6	over 20 years	6	25

Table 11 - Number of years working in this industry – IV - Transformation from nominal to scalar

Original Choice		Reclassified Choice	
1	under 1 year	1	0.5
2	1-3 years	2	2
3	4-10 years	3	7
4	11-15 years	4	13
5	16 - 20 years	5	18
6	over 20 years	6	25

Table 12 – Number of years working in this function – IV - Transformation from nominal to scalar

Original Choice		Reclassified Choice	
1	under 1 year	1	0.5
2	1-3 years	2	2
3	4-10 years	3	7
4	11-15 years	4	13
5	16 - 20 years	5	18
6	over 20 years	6	25

4.2 DATA TYPES

After the transformation process described in the previous section, the set of data that will be used in the data analysis is divided in four different types: Scalar, Nominal, Ordinal and Binary. The next chapter will analyze in detail the different types of data.

5 DATA ANALYSIS AND RESULTS

The data analysis was conducted in order to establish a correlation between demographics factors (Independent Variables - IV) and Prevention Vs Response (Dependent Variable – DV). In this section, the methodology followed for the data analysis is explained. Secondly, an analysis of the total survey results, type of country (supplier or consumer), and the main job function is presented. Thirdly, an analysis of each one of the twenty IV is presented. Finally, following the ordinal logistic regression (OLR) method, a model is created to predict the DV.

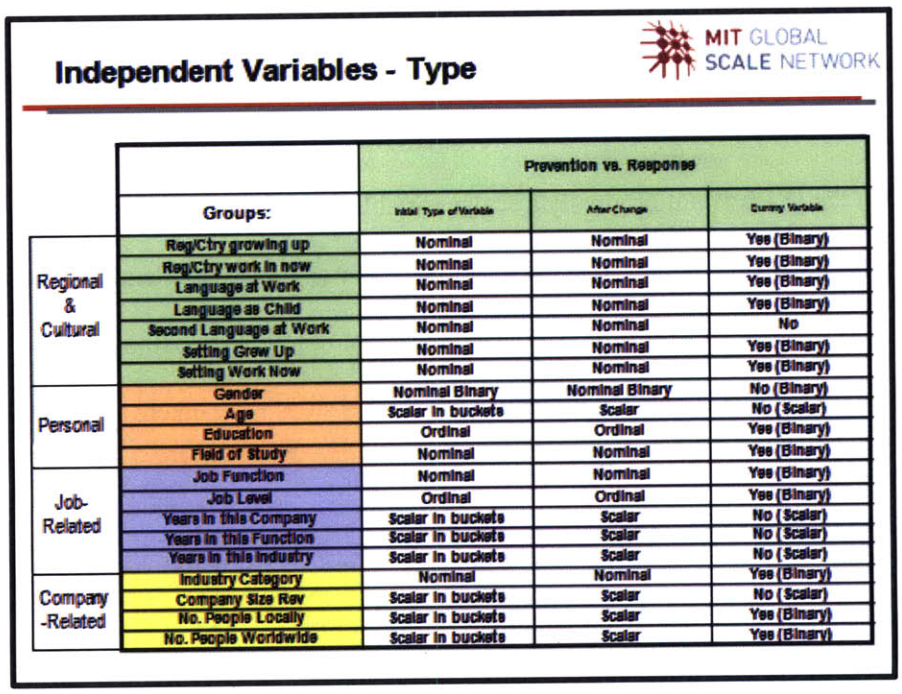
5.1 METHODOLOGY

Bivariate analysis was done for the DV and each IV. Due to the fact that a bivariate analysis analyses the relationships between pairs of variables (X, Y) in a data set this method was chosen. Two types of analysis of the IV were conducted, a shorter and a more in depth analysis. If the different cohorts of the IV did not show any type of pattern, a short analysis was conducted, with a column or bar graph analyzing the average response and a short explanation of the observed patterns. In the case where a clear pattern was observed between the different cohorts, a more in-depth analysis was conducted. This included analyzing the percentage response of each answer choice, the shape of the distribution, the tails and their size and location, as well as any trends, skews, or interesting differences that existed between the cohorts.

Any trends or differences between cohorts that showed up visually were then tested for significance with a correlation or regression analysis. This included both linear regression (LR) and discrete choice analysis. Based on these observations I created dummy (binary) variables. The following table shows the broad categories of IV, the IV that were modified and the dummy variables that were created. Then OLR

analysis was performed among the different IV that showed a significant level of significance.

Figure 4 – Independent variables - Type



		Prevention vs. Response		
	Groups:	Initial Type of Variable	After Change	Dummy Variable
Regional & Cultural	Reg/Ctry growing up	Nominal	Nominal	Yes (Binary)
	Reg/Ctry work in now	Nominal	Nominal	Yes (Binary)
	Language at Work	Nominal	Nominal	Yes (Binary)
	Language as Child	Nominal	Nominal	Yes (Binary)
	Second Language at Work	Nominal	Nominal	No
	Setting Grew Up	Nominal	Nominal	Yes (Binary)
	Setting Work Now	Nominal	Nominal	Yes (Binary)
Personal	Gender	Nominal Binary	Nominal Binary	No (Binary)
	Age	Scalar in buckets	Scalar	No (Scalar)
	Education	Ordinal	Ordinal	Yes (Binary)
	Field of Study	Nominal	Nominal	Yes (Binary)
Job-Related	Job Function	Nominal	Nominal	Yes (Binary)
	Job Level	Ordinal	Ordinal	Yes (Binary)
	Years in this Company	Scalar in buckets	Scalar	No (Scalar)
	Years in this Function	Scalar in buckets	Scalar	No (Scalar)
	Years in this Industry	Scalar in buckets	Scalar	No (Scalar)
Company -Related	Industry Category	Nominal	Nominal	Yes (Binary)
	Company Size Rev	Scalar in buckets	Scalar	No (Scalar)
	No. People Locally	Scalar in buckets	Scalar	Yes (Binary)
	No. People Worldwide	Scalar in buckets	Scalar	Yes (Binary)

For the dependent variable, respondents were asked "How should your company spend its efforts?" and the responses ranged from "Spend much more effort planning and implementing Risk Prevention measures", which had a value of 0 to "Spend much more effort planning and practicing EVENT RESPONSE measures" which had a value of 4. The below table shows the answers.

Table 13 – DV question, answers range, and value

Question: How should your company spend its efforts?
Choices:
0 = Spend much more effort planning and implementing RISK PREVENTION measures
1 = Spend more effort planning and implementing RISK PREVENTION measures
2 = Devote equal effort to each
3 = Spend more effort planning and practicing EVENT RESPONSE measures
4 = Spend much more effort planning and practicing EVENT RESPONSE measures

As discussed in section 4.1.4 (Reclassification of responses based on survey structure), although the DV is an ordinal nominal variables, the survey team decided to initially treat it as a scalar variable ranging from 0 to 4 in order to be able to run a LR. In chapter 5 an LR was then run to explore if there is a correlation between the IV and the DV. If there was no correlation no further regressions were performed. Where there was a correlation the IV was included in an OLR analysis. Due to the fact that the DV was not originally a scalar variable no more conclusions can be drawn from the LR results. Also the OLR analysis was limited to identifying which factors were the most significant. This included examining three parameters: estimate, standard error, and significance (no further steps were taken, such as to calculate the probabilities of these discrete choices).

If any given IV cohort did not have at least twenty responses a separate statistical analysis of that cohort could not be performed.

5.2 DATA ANALYSIS OF TOTAL SURVEY

5.2.1 TOTAL SURVEY

Before analyzing the IV, the total survey results were analyzed. The below table shows that 98% of the people that completed the survey answered the question "How should your company spend its efforts?". 1.41 was the average response, which means that the average responder leans toward Prevention. If we analyze the tails, 29% of the responders chose Prevention and on the other end of the tail 8% chose Response.

Table 14 – Resume of total survey responses

Description	Prevention 0	>> 1	Equal 2	>> 3	Response 4	TOTAL N°	TOTAL %
Responses	417	364	425	115	117	1,438	98%
Missing						23	2%
			%			%	Average
Responses	29%	25%	30%	8%	8%	98%	1.41
Missing	0%	0%	0%	0%	0%	2%	
TOTAL	417	364	425	115	117	1,461	

By graphing the results, it is evident that 84% of the responders chose options 0, 1 or 2, and only 16% chose options 3 and 4.

Figure 5 – Total number of answers - cumulative percentage of responses – total survey

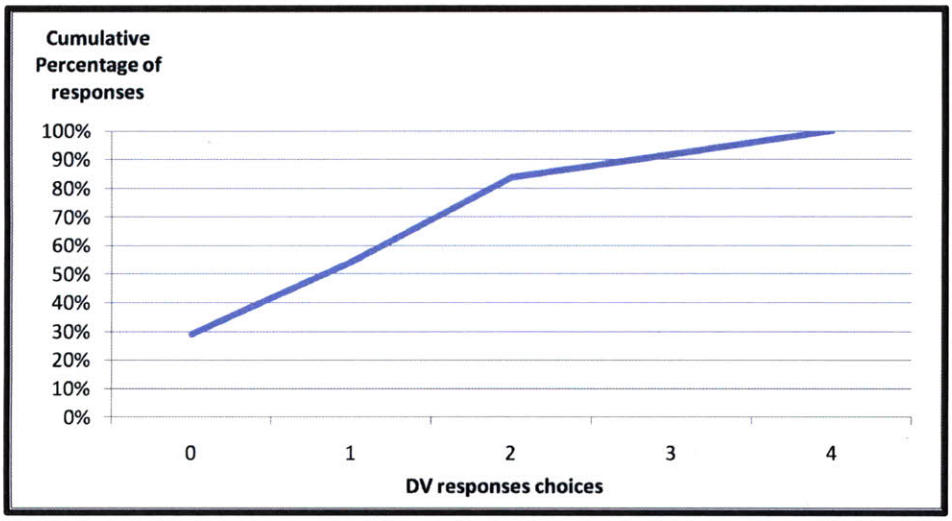
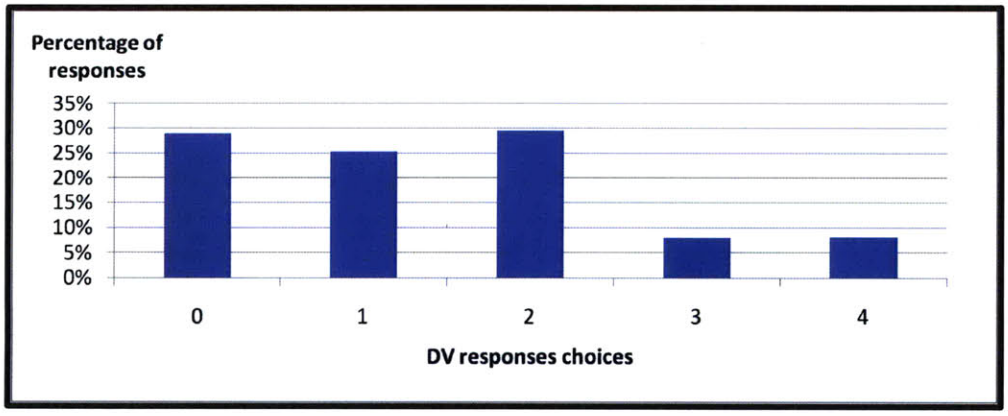


Figure 6 – Total number of responses by option (total survey)



Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.2.2 TYPE OF COUNTRY: SUPPLIER OR CONSUMER

The survey gathered data from "Supplier countries" and from "Consumer countries". The survey team defined "Supplier countries" as the countries that traditionally manufacture products, the great majority of them being developing countries. The "Consumer countries" are countries in the developed world. In order to simplify the analysis, the division by type of country was made by region. Asia, India, Middle East, and Latin America were considered "Supplier countries" and Australia & New Zealand, Africa (almost all the responses from Africa are from large corporations operating in South Africa, therefore we included as a consumer country), Europe and North America were considered "Consumer countries". The analysis was conducted taking into account the answer to two IV: "country you grew up in" and "country you work in now".

5.2.2.1 Type of country: Country you grew up in

Although there are no significant differences between the results of the two groups of countries (supplier and consumer), it is possible to observe that the "Consumer countries" lean more toward Prevention (average 1.37), while the "Supplier countries" lean more toward Response (average 1.56). The average response of both is 1.41. The LR shows a level of significance.

Figure 7 – Supplier or Consumer – Country you grew up in – Average responses

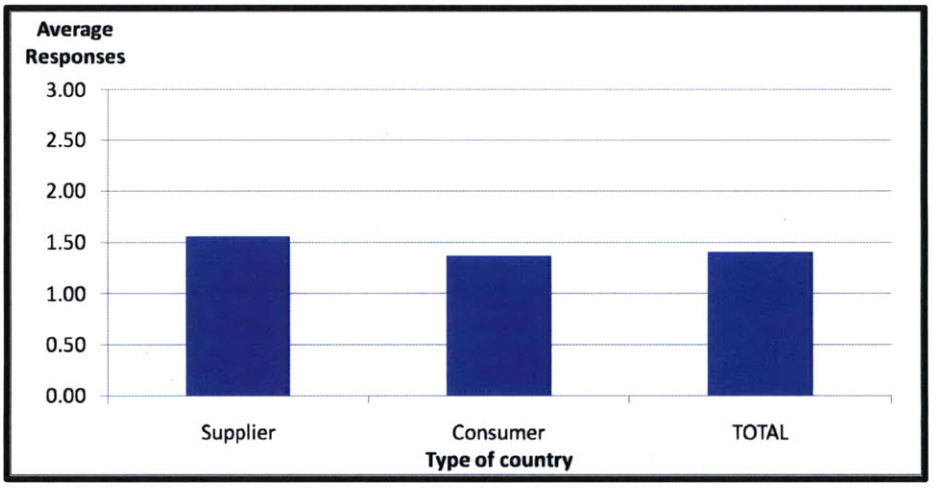


Table 15 – Supplier or Consumer – Country you grew up in – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Supplier	308	33%	15%	28%	10%	14%	1.56
Consumer	1,082	28%	28%	30%	8%	6%	1.37
TOTAL	1,390	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.2.2.2 Type of country: Country you work in now

Although there are no significant differences between the results of the two groups of countries (supplier and consumer), it is possible to observe that the "Consumer countries" lean more toward Prevention (average 1.38), while the "Supplier countries" lean more toward Response (average 1.55). The average response of both is 1.41. The LR shows a level of significance.

Figure 8 – Supplier or Consumer – Country you work in now – Average responses

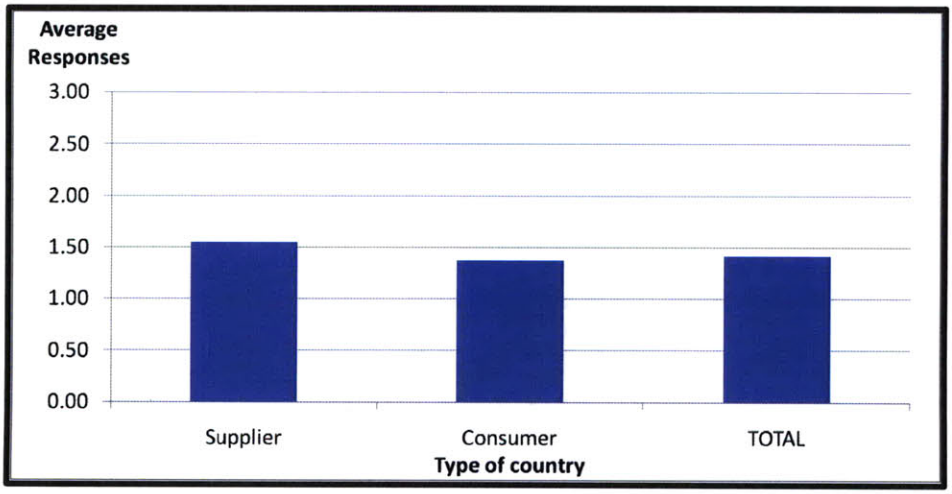


Table 16 Supplier or Consumer – Country you grew up in – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Supplier	281	34%	15%	27%	9%	15%	1.55
Consumer	1,106	28%	28%	30%	8%	6%	1.38
TOTAL	1,387	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.2.3 MAIN JOB FUNCTION

This was the first question of the survey. Although it is an IV, the survey team decided to analyze it separately from the IV analysis, and also to not include it in the OLR analysis.

The data shows that the cohort "Supply Chain Risk Manager and the Business Continuity Manager" lean toward Prevention more than any other main job function. These two groups of professionals are more aware than any other supply chain function of the problems that disruptions can cause in supply chains. This cohort has an average response of 1.07, while the average response is 1.41. This cohort also shows a unique pattern of response in the tail toward Response. Only 5% chose option 3 or 4 while the average for all job functions is 16%. The below graph and table shows with greater detail the above mentioned as well as how the other job functions perceive the efforts to mitigate Supply Chain risks.

Figure 9 – What is your main job function? – Average responses

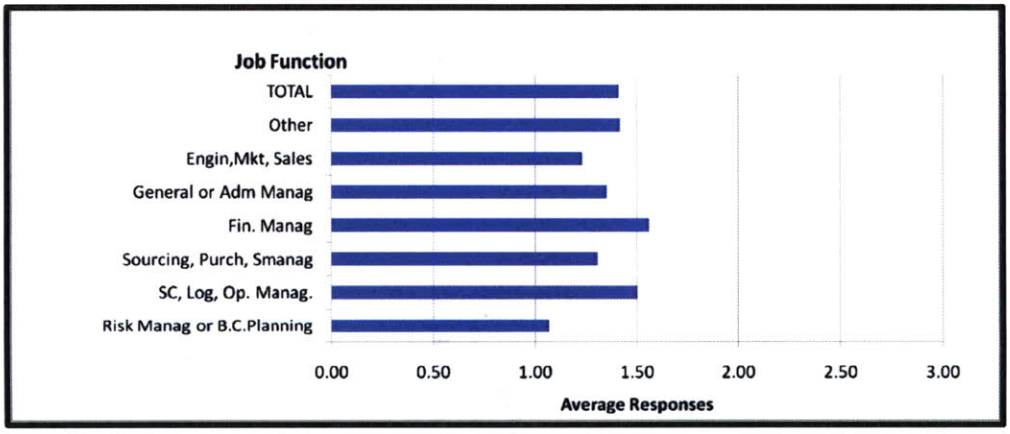


Table 17 – What is your main job function? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Risk Manag or B.C.Planning	60	37%	28%	30%	2%	3%	1.07
SC, Log, Op. Manag.	773	27%	24%	30%	9%	10%	1.50
Sourcing, Purch, Smanag	294	31%	28%	28%	7%	7%	1.31
Fin. Manag	34	26%	12%	47%	9%	6%	1.56
General or Adm Manag	114	25%	32%	31%	7%	5%	1.35
Engin,Mkt, Sales	90	37%	23%	27%	7%	7%	1.23
Other	72	33%	21%	26%	10%	10%	1.42
TOTAL	1,437	29%	25%	30%	8%	8%	1.41

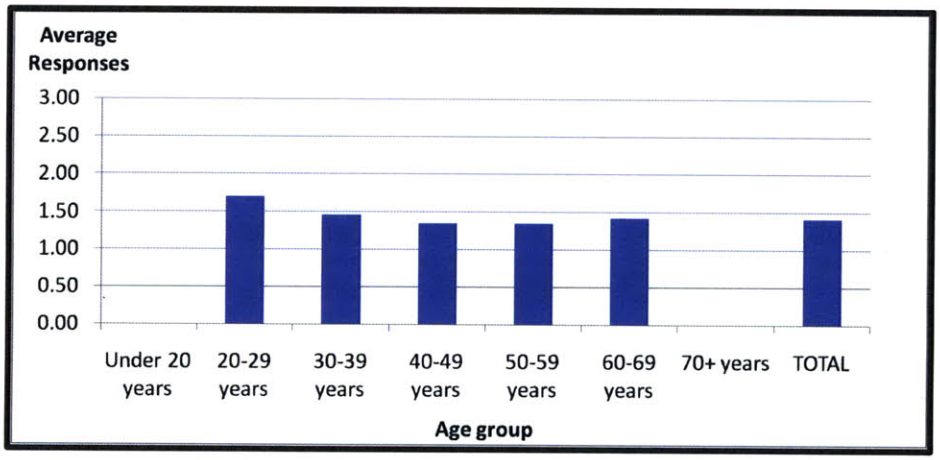
Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3 DATA ANALYSIS OF INDEPENDENT VARIABLES

5.3.1 AGE

As the below graph shows, the only cohort of the IV Age question that shows a different pattern than that of the other cohorts is the cohort "20-29 years". This cohort averages 1.70 versus the average of 1.41, which means that younger professionals tend to believe that Supply Chain risk management response planning and practices are necessary.

Figure 10 – What is your age group? – Average responses



The below table shows that the right tail of the cohort "20-29 years" (response - choice 3 & 4) represents 28% of the answers, while the average responses average 16%. One binary dummy variable was created for this cohort. The LR with the DV showed a level of significance that suggests a correlation.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: The cohort "under 20 years" and "70+years" had less than twenty responses, therefore they were not included in the analysis.

Table 18 – What is your age group? – Percentage responses

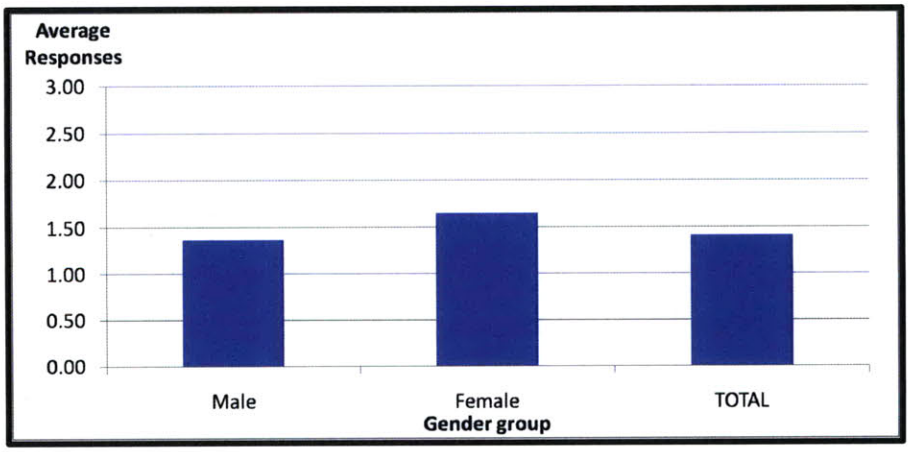
Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Under 20 years	0	0%	0%	0%	0%	0%	
20-29 years	105	30%	16%	26%	11%	17%	1.70
30-39 years	408	28%	27%	26%	8%	11%	1.46
40-49 years	489	30%	27%	29%	8%	6%	1.35
50-59 years	323	30%	24%	33%	8%	6%	1.35
60-69 years	63	21%	25%	46%	6%	2%	1.43
70+ years	2	50%	0%	50%	0%	0%	
TOTAL	1,390	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.2 GENDER

This IV shows a clear distinction in what males and females perceive the supply chain risk management practices should be. Females lean more toward Response (average 1.65), while males lean more toward Prevention (average 1.37).The total respondents of the DV question have an average of 1.41.

Figure 11 – What is your gender? – Average responses



At first sight it seems that the difference between female and male responses is minimal, however because it is a binary variable and we have a large number of observations (1,391 people answered this question) we can conclude that the way females and males perceive supply chain management risk is very different. The below table shows that 56% of males believe that Prevention is more important than Response, while only 47% of females share the same opinion.

Table 19 – What is your gender? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Male	1,185	30%	26%	29%	9%	7%	1.37
Female	206	23%	24%	34%	5%	15%	1.65
TOTAL	1,391	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

By visual inspection it was possible to observe a correlation between gender and the DV choice. A LR was run, and indeed there is a level of significance between gender and response to the DV.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

5.3.3 LEVEL OF EDUCATION

As the below graph and table show, the IV level of education does not appear to be a variable that enables us to predict the response to the DV. The cohort "doctors degree" has clear tendencies toward Response. The shape of distribution of the responses, suggests that this IV does not have any correlation. One binary dummy variable was created for this cohort; however it did not show any level of significance that suggests a correlation. This IV was not included in the OLR analysis.

Figure 12 – What is your level of education? – Average responses

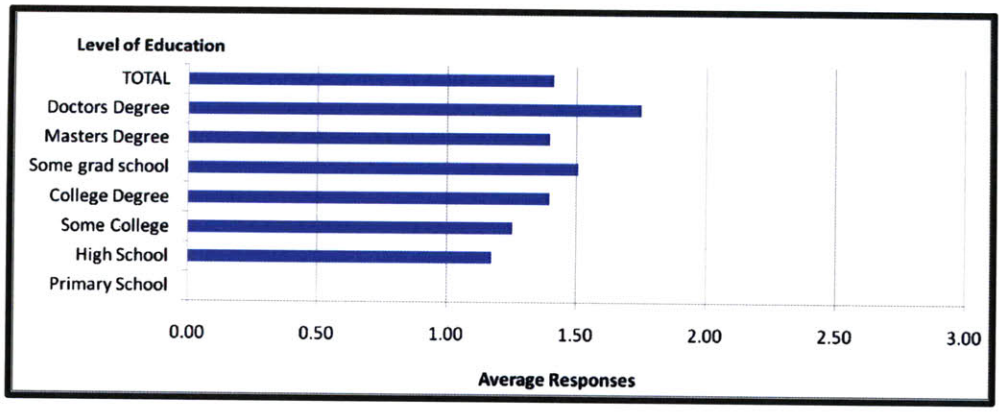


Table 20 – What is your level of education? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Primary School	1	0%	100%	0%	0%	0%	
High School	46	33%	28%	33%	2%	4%	1.17
Some College	75	33%	27%	29%	3%	8%	1.25
College Degree	374	28%	25%	33%	7%	7%	1.40
Some grad school	235	31%	21%	25%	11%	11%	1.51
Masters Degree	622	29%	27%	28%	9%	8%	1.40
Doctors Degree	40	20%	18%	43%	8%	13%	1.75
TOTAL	1,393	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

Note: The cohort "primary school" had less than twenty responses; therefore it was not included in the analysis.

5.3.4 PRIMARY FIELD OF STUDY

The below graph and table show that the three fields of studies that have a different average from the rest are "liberal arts", "sciences", and "teaching". The average of these three fields is lower than the average of the other cohorts suggesting that a person from these fields of study leans more toward Prevention (average 1.14, 1.16 and 1.25 respectively) with the total average being 1.41. A binary dummy variable of these IV was created (value1 if "liberal arts", "sciences" or "teaching" and 0 if a different field). This showed a level of significance that suggests a correlation.

This dummy variable was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: The cohort "teaching" had less than twenty responses (eight responses), nevertheless was included in the analysis because it presented the same trend as "liberal arts" and "sciences".

Figure 13 – What is your primary field of study? – Average responses

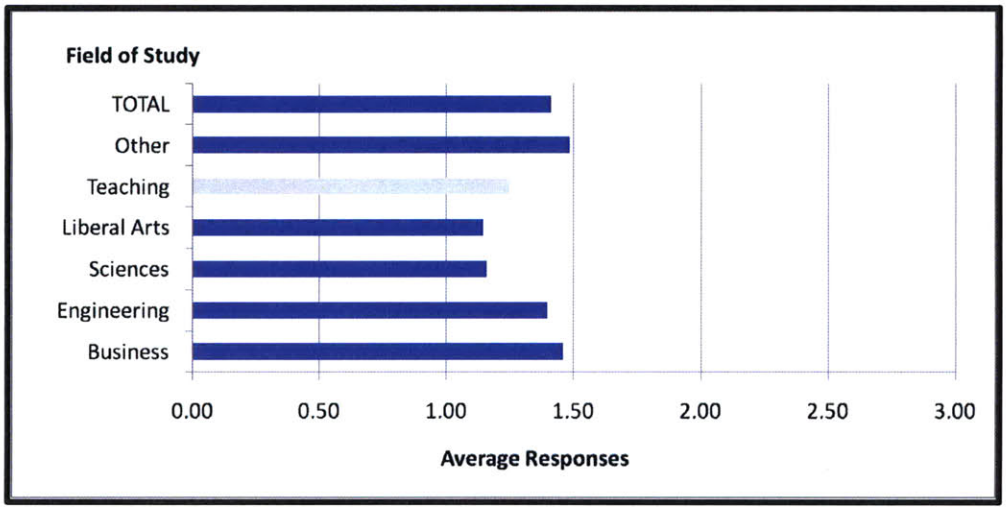


Table 21 – What is your primary field of study? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Business	705	27%	26%	30%	9%	8%	1.46
Engineering	468	31%	25%	26%	9%	9%	1.40
Sciences	89	38%	20%	33%	6%	3%	1.16
Liberal Arts	35	34%	26%	34%	3%	3%	1.14
Teaching	8	38%	0%	63%	0%	0%	1.25
Other	85	27%	22%	35%	6%	9%	1.48
TOTAL	1,390	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.5 COUNTRY YOU GREW UP IN

The below graph and table show that there are several cohorts of this IV with a very distinct pattern. On the Response side, there is Brazil. Brazil has an average response of 2.41versus the average of 1.41 of total countries. More than half (54%) of the responders from Brazil believe that Response should be the focus of supply chain risk management. On the other end, Colombia is the country that leans more toward Prevention (an average of 0.70). 75% of the responders from Colombia believe that the efforts regarding supply chain risk management should be toward Prevention. There is another country that also clearly leans toward Prevention (but is not as extreme as Colombia), that is Spain with an average response of 1.05. Spain also as a high number of responders (68%) that believe the supply chain risk management efforts should be devoted to Prevention.

Two binary dummy variables of this IV were created. One was for Brazil. 1 if the responder grew up in Brazil and 0 if the responder grew up in any other country. The other dummy variable was for Spain. 1 if the responder grew up in Spain and 0 if the responder grew up in any other country. Both showed a level of significance that suggests a correlation. Colombia appears to be the most prevention minded country of the survey, but due to the low number of responses it was not included in the OLR.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: There are several countries that had less than twenty responses; therefore they were not included in the analysis.

Figure 14 – What is the country you grew up in? – Average responses

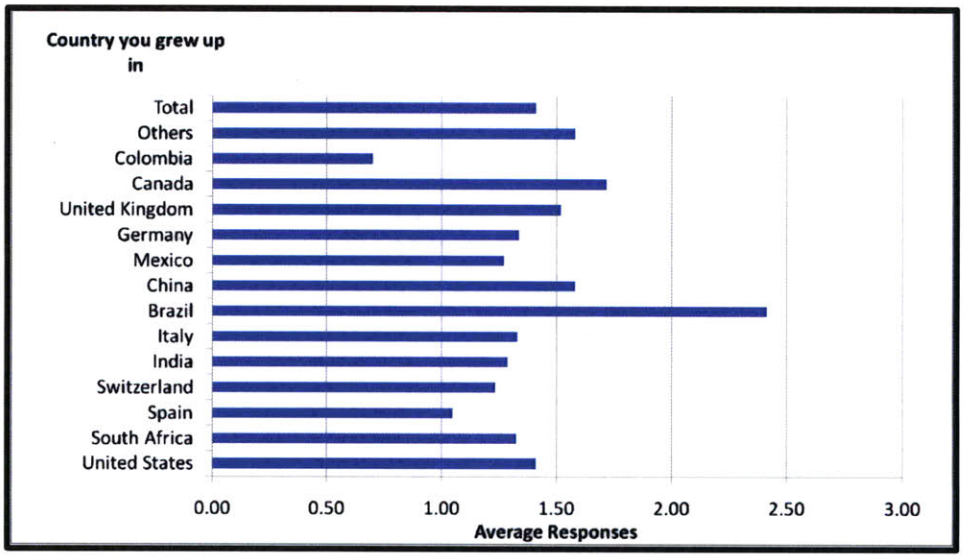


Table 22 – What is the country you grew up in? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
United States	407	22%	32%	35%	7%	4%	1.41
South Africa	139	33%	24%	28%	6%	9%	1.32
Spain	110	43%	25%	21%	6%	5%	1.05
Switzerland	104	28%	38%	21%	8%	5%	1.23
India	88	40%	15%	32%	5%	9%	1.28
Italy	76	34%	24%	28%	4%	11%	1.33
Brazil	56	14%	14%	18%	23%	30%	2.41
China	45	29%	18%	31%	11%	11%	1.58
Mexico	37	43%	8%	38%	0%	11%	1.27
Germany	33	24%	30%	36%	6%	3%	1.33
United Kingdom	29	24%	24%	34%	10%	7%	1.52
Canada	21	19%	19%	38%	19%	5%	1.71
Colombia	20	65%	10%	20%	0%	5%	0.70
Others	225	28%	21%	28%	12%	11%	1.58
Total	1,390	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.6 SETTING WHERE YOU GREW UP

The IV "setting where you grew up" doesn't show any particular difference between the different cohorts. The only cohort that has a significantly different average response is "Farm", with an average response of 1.18, therefore leaning toward Prevention. One binary dummy variable was created for this cohort; however it did not show any level of significance that suggests a correlation. This IV was not included in the OLR analysis.

Figure 15 – What is the setting where you grew up? – Average responses

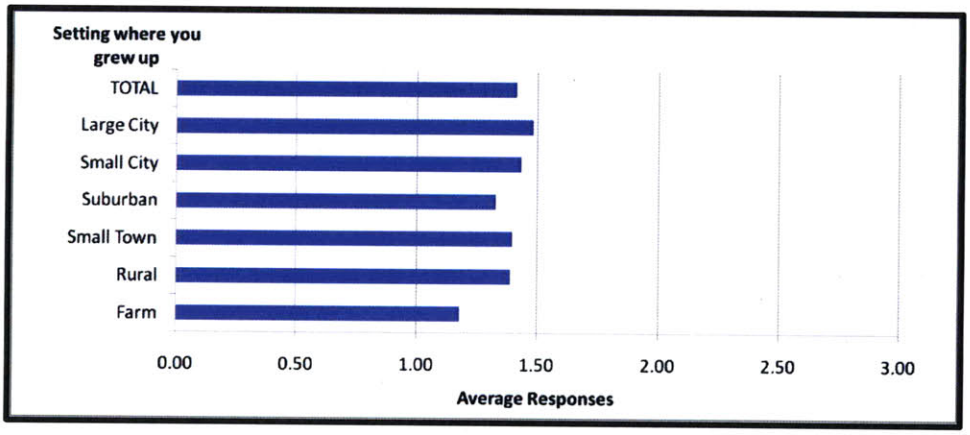


Table 23 – What is the setting where you grew up? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Farm	45	27%	36%	31%	7%	0%	1.18
Rural	111	30%	27%	27%	7%	9%	1.39
Small Town	240	29%	24%	33%	8%	7%	1.40
Suburban	214	26%	33%	29%	7%	5%	1.33
Small City	348	29%	24%	29%	10%	8%	1.43
Large City	429	30%	22%	29%	8%	11%	1.48
TOTAL	1,387	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.7 COUNTRY WHERE YOU WORK NOW

As expected this IV has a very similar behavior as the IV "country you grew up in". The below graph and table shows that Brazil is by far the country that leans most toward Response with an average response of 2.41 versus the average of 1.41 of total countries. More than half (53%) of the responders from Brazil believe that Response should be the focus of supply chain risk management. Colombia was not considered because there were less than twenty responses (there were only 17). There are countries that also clearly lean toward Prevention - Spain and India have the same average response of 1.05. Also a high number of responders (68% in Spain and 60% in India) believe that the supply chain risk management efforts should be devoted to Prevention. Mexico (with 1.14 average response) also leans clearly toward Prevention.

Two binary dummy variables of this IV were created. One is for Brazil. 1 if the responder grew up in Brazil and 0 if the responder grew up in any other country. The other dummy variable is for Spain and India. 1 if the responder grew up in Spain or India, and 0 if the responder grew up in any other country. Both showed a level of significance that suggests a correlation.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: There are several countries that had less than twenty responses; therefore they were not included in the analysis.

Figure 16 – What is the country you work in now? – Average responses

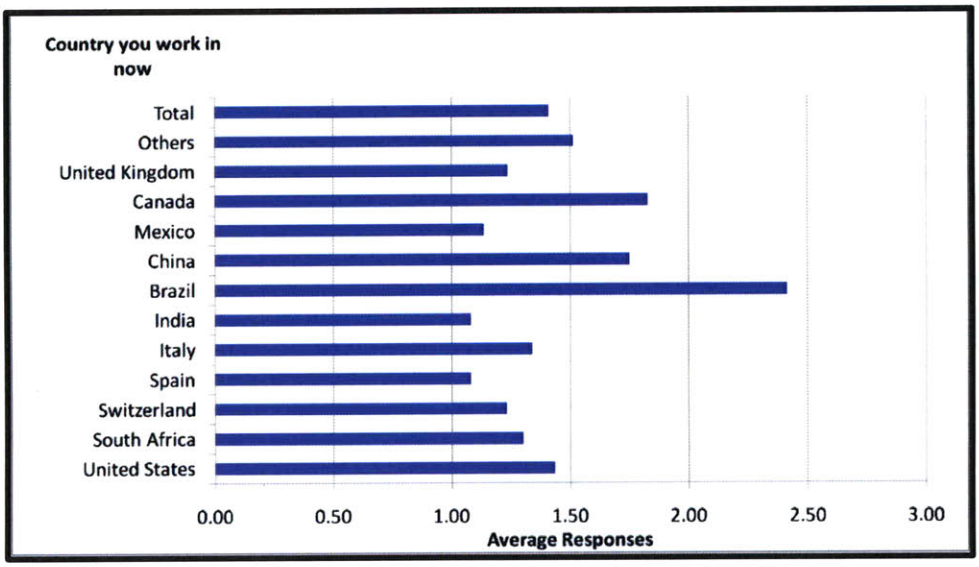


Table 24 – What is the country you work in now? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
United States	455	22%	30%	36%	8%	4%	1.43
South Africa	150	34%	25%	26%	6%	9%	1.30
Switzerland	129	29%	35%	26%	6%	5%	1.23
Spain	113	42%	26%	21%	6%	5%	1.08
Italy	74	34%	24%	27%	4%	11%	1.34
India	63	46%	14%	32%	2%	6%	1.08
Brazil	58	14%	14%	19%	24%	29%	2.41
China	52	27%	13%	31%	15%	13%	1.75
Mexico	37	46%	11%	35%	0%	8%	1.14
Canada	23	17%	17%	39%	17%	9%	1.83
United Kingdom	21	38%	24%	24%	5%	10%	1.24
Others	212	30%	22%	26%	11%	11%	1.51
Total	1,387	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.8 SETTING WHERE YOU WORK NOW

The below graph and table show that this IV does not present any particular differences between the different cohorts. It shows almost the same pattern as the IV "setting where you grew up". The only cohort that has a significant different average response is "Rural", with an average response of 1.19, therefore leaning toward Prevention. One binary dummy variable was created for this cohort, however it did not show any level of significance that suggests a correlation. This IV was not included in the OLR analysis.

Note: The cohort "Farm" had less than twenty responses; therefore it was not included in the analysis.

Figure 17 – Where is the setting where you work now? – Average responses

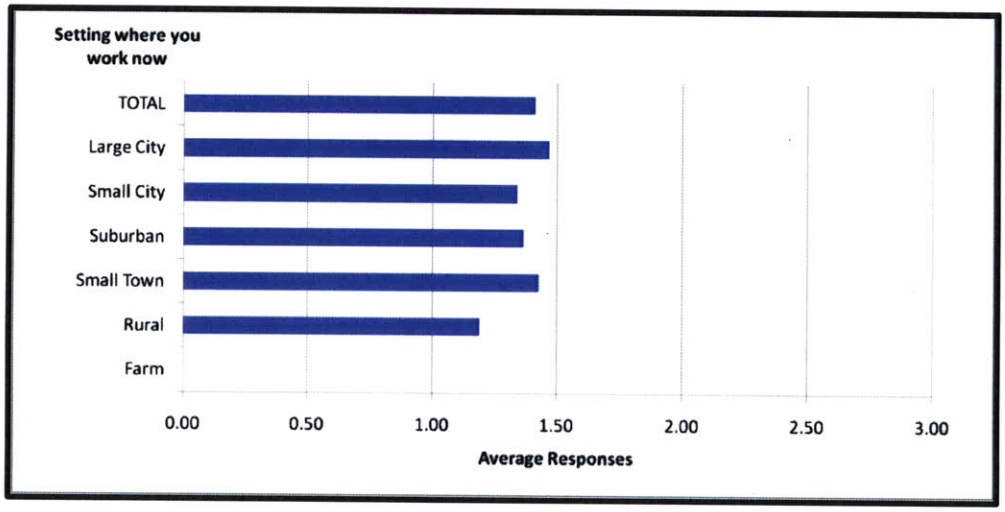


Table 25 – Where is the setting where you work now? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Farm	1	0%	0%	0%	0%	100%	0.00
Rural	37	30%	38%	22%	5%	5%	1.19
Small Town	120	27%	23%	37%	8%	6%	1.43
Suburban	159	26%	30%	31%	7%	6%	1.36
Small City	384	31%	26%	28%	8%	7%	1.34
Large City	679	29%	23%	29%	9%	10%	1.47
TOTAL	1,380	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.9 PRIMARY LANGUAGE SPOKEN AS A CHILD

The below graph and table show that the responders that spoke Portuguese as a primary language as children lean more than any other cohort toward Response (average response 2.32 versus average response of 1.41). Only 28% of this cohort choose Prevention options (option 0 or 1), while the average responders have an average of 54%. On the other end of the spectrum there are the people that spoke Spanish. The average response is 1.16 and 63% lean toward Prevention. We can also notice that only 5% of the responders that spoke Hindi/Urdu as a primary language as children lean toward Response.

One binary dummy variable of this IV was created. 1 if Portuguese is the primary language spoken as a child, and 0 if any other language was spoken as a child. A LR analysis shows a level of significance that suggests a correlation.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: There are several "primary languages spoken as a child" cohorts that had less than twenty responses; therefore they were not included in the analysis.

Figure 18 – What is the primary language spoken as a child? – Average responses

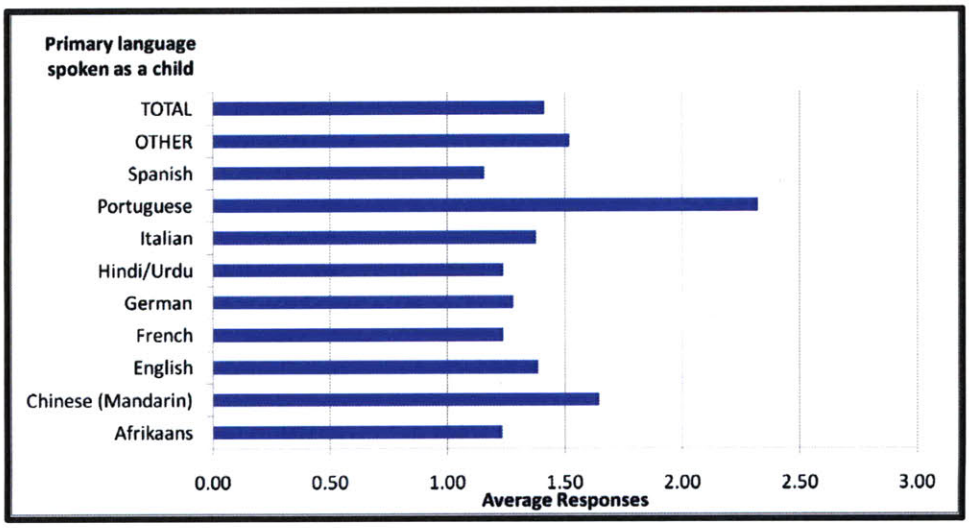


Table 26 – What is the primary language spoken as a child? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Afrikaans	60	33%	32%	22%	5%	8%	1.23
Chinese (Mandarin)	51	25%	22%	29%	10%	14%	1.65
English	570	26%	28%	33%	8%	5%	1.39
French	21	43%	19%	14%	19%	5%	1.24
German	142	25%	36%	27%	8%	4%	1.28
Hindi/Urdu	21	33%	19%	43%	0%	5%	1.24
Italian	74	34%	23%	27%	4%	12%	1.38
Portuguese	75	12%	16%	25%	21%	25%	2.32
Spanish	178	42%	21%	24%	6%	7%	1.16
OTHER	186	32%	16%	32%	9%	12%	1.52
TOTAL	1,378	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.10 PRIMARY LANGUAGE SPOKEN AT WORK

Not surprisingly the below graph and table show that the responders that speak Portuguese as a primary language at work exhibit the same pattern as the responders

of the previous question (primary language spoken as a child). They lean more than any other cohort toward Response (average response 2.33 versus average response of 1.41). Only 26% of this cohort chose Prevention options (option 0 or 1), while the average responders have an average of 54%. On the other end of the spectrum again there are the people that speak Spanish as a primary language at work. The average response is 1.13 and 63% lean toward Prevention. Interestingly while we had twenty one responders that spoke Hindi/Urdu as a primary language as children, only two responders speak Hindi/Urdu as a primary language at work, therefore we cannot draw any conclusions regarding this group of responders.

One binary dummy variables of this IV was created. 1 if Portuguese is the primary language spoken at work, and 0 if any other language is the primary language spoken at work. A LR analysis shows a level of significance that suggests a correlation.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: There are several "primary languages spoken at work" cohorts that had less than twenty responses; therefore they were not included in the analysis.

Figure 19 – What is the primary language spoken at work? – Average responses

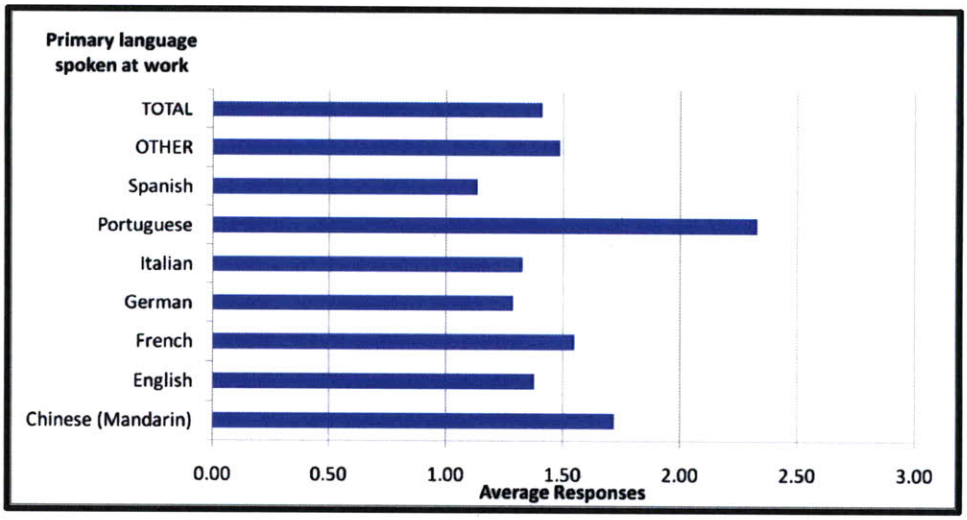


Table 27 – What is the primary language spoken at work? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Chinese (Mandarin)	39	26%	15%	33%	13%	13%	1.72
English	859	28%	26%	31%	7%	7%	1.38
French	20	25%	20%	35%	15%	5%	1.55
German	122	25%	38%	25%	7%	5%	1.29
Italian	58	34%	22%	29%	3%	10%	1.33
Portuguese	73	14%	12%	27%	21%	26%	2.33
Spanish	144	42%	21%	24%	6%	6%	1.13
OTHER	64	31%	19%	31%	8%	11%	1.48
TOTAL	1,379	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.11 SECONDARY LANGUAGE SPOKEN AT WORK

Despite the fact that this IV was part of the survey, the survey team decided that this IV was not worth analyzing in detail. Nevertheless, the graph and table with the results can be found below.

Note: There are several "secondary languages spoken at work" cohorts that had less than twenty responses; therefore they were not included in the analysis.

Figure 20 – What is the secondary language spoken at work? – Average responses

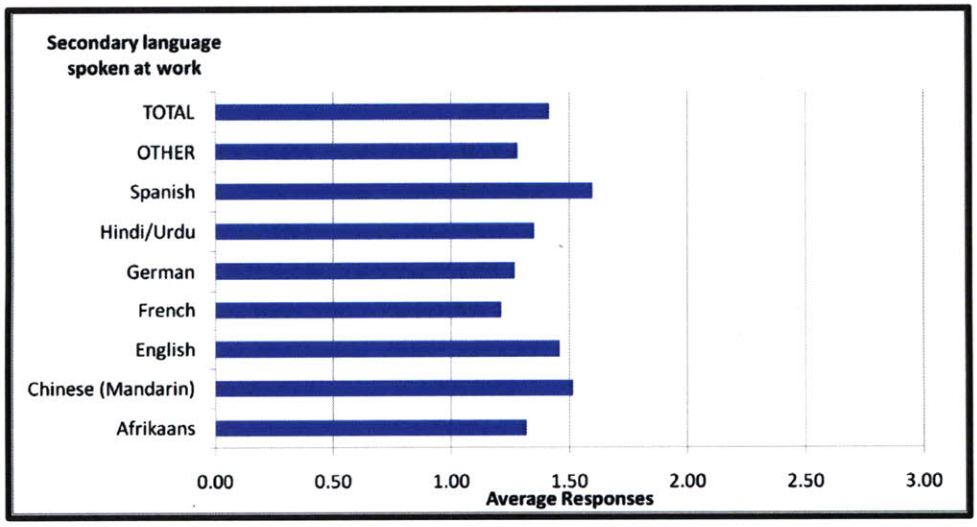


Table 28 – What is the secondary language spoken at work? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Afrikaans	107	32%	25%	31%	4%	8%	1.32
Chinese (Mandarin)	35	26%	23%	34%	9%	9%	1.51
English	562	29%	25%	27%	8%	10%	1.46
French	71	38%	23%	27%	6%	7%	1.21
German	41	37%	22%	27%	7%	7%	1.27
Hindi/Urdu	40	40%	15%	28%	5%	13%	1.35
Spanish	114	19%	25%	39%	10%	7%	1.60
OTHER	111	32%	25%	32%	5%	5%	1.28
TOTAL	1,081	30%	24%	30%	7%	9%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.12 INDUSTRY IS YOUR COMPANY IN

The below graph and table show that the responders in the "Manufacturer - Primary metal industries" lean more than any other cohort toward Response (average response 1.87 versus average response of 1.41). 33% of the responders that work in "Manufacturer - Primary metal industries" chose Response options (option 3 or 4), while the average responders have an average of only 16%. On the other end of the spectrum there are the responders from "Utilities (phone & telecom companies, utilities – gas, electric, water)", "Manufacturer - Fabricated metal products, except machinery", and "Manufacturer - Transportation equipment, Autos, Trucks, Buses, & Related". The average responses for them are 1.20, 1.22, and 1.25 respectively. The percentage of Prevention options (option 0 or 1) are 63%, 64% and 62% respectively.

One binary dummy variable of this IV was created. 1 if "Manufacturer - Primary metal industries" is the industry the company is in, and 0 if any other industry. A LR analysis shows a level of significance that suggests a correlation.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: There are several "what industry" cohorts that had less than twenty responses; therefore they were not included in the analysis.

Figure 21 – What Industry is your Company in? – Average responses

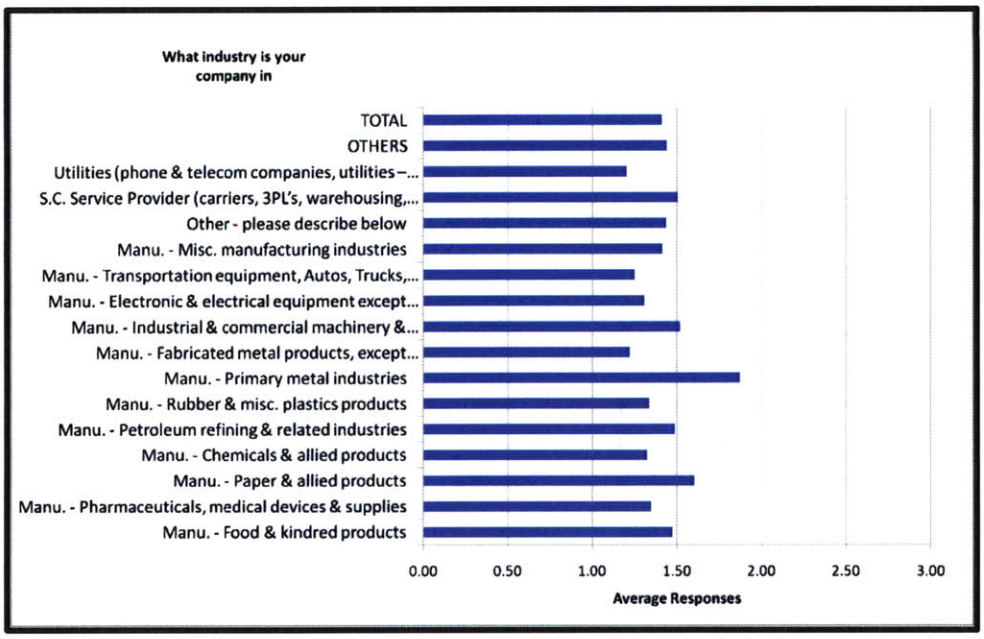


Table 29 – What Industry is your Company In? – Percentage responses

Cohort	Number Responses	Prev. 0	>> 1	Equal 2	>> 3	Resp. 4	Average Response
Manu. - Food & kindred products	106	27%	23%	36%	4%	10%	1.47
Manu. - Pharmaceuticals, medical devices & supplies	107	31%	25%	27%	12%	5%	1.35
Manu. - Paper & allied products	25	32%	16%	24%	16%	12%	1.60
Manu. - Chemicals & allied products	62	32%	27%	24%	8%	8%	1.32
Manu. - Petroleum refining & related industries	35	34%	20%	23%	9%	14%	1.49
Manu. - Rubber & misc. plastics products	24	25%	33%	33%	0%	8%	1.33
Manu. - Primary metal industries	31	23%	23%	23%	10%	23%	1.87
Manu. - Fabricated metal products, except machinery	59	31%	34%	24%	7%	5%	1.22
Manu. - Industrial & commercial machinery & computer equipment	81	22%	23%	40%	10%	5%	1.52
Manu. - Electronic & electrical equipment except computers	124	26%	39%	23%	5%	8%	1.31
Manu. - Transportation equipment, Autos, Trucks, Buses, & Related	93	35%	28%	20%	9%	8%	1.25
Manu. - Misc. manufacturing industries	102	25%	29%	32%	8%	6%	1.41
Other - please describe below	182	27%	20%	38%	9%	5%	1.43
S.C. Service Provider (carriers, 3PL's, warehousing, expediters, UPS, Fedex, etc);	117	28%	21%	32%	9%	9%	1.50
Utilities (phone & telecom companies, utilities – gas, electric, water)	30	40%	23%	17%	17%	3%	1.20
OTHERS	215	31%	22%	29%	7%	10%	1.44
TOTAL	1,393	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.13 YOUR COMPANY – SIZE OF ANNUAL REVENUES (GLOBALLY) IN USD

The below graph and table show that this IV does not present any particular differences between the different cohorts. The LR does not show any level of significance. This IV was not included in the OLR analysis.

Figure 22 – What is the size of annual revenues (globally) in USD of your company? – Average responses

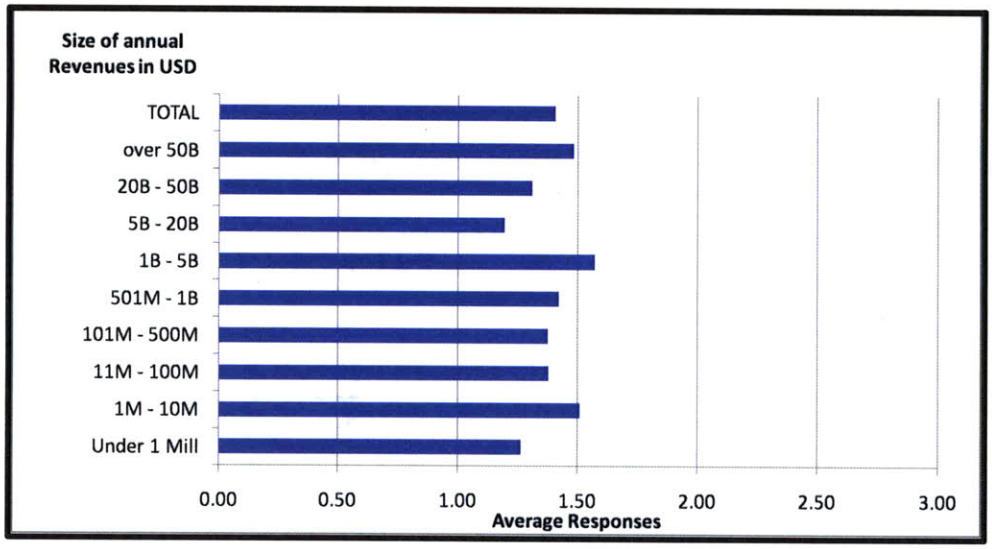


Table 30 – What is the size of annual revenues (globally) in USD of your company? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Under 1 Mill	57	39%	14%	37%	4%	7%	1.26
1M - 10M	100	29%	20%	31%	11%	9%	1.51
11M - 100M	229	31%	25%	29%	5%	10%	1.38
101M - 500M	215	31%	21%	31%	11%	5%	1.38
501M - 1B	116	26%	33%	24%	8%	9%	1.42
1B - 5B	217	22%	29%	29%	10%	10%	1.57
5B - 20B	139	31%	33%	26%	6%	4%	1.19
20B - 50B	94	33%	28%	24%	5%	10%	1.31
over 50B	122	29%	21%	31%	11%	8%	1.48
TOTAL	1,289	29%	26%	29%	8%	8%	1.40

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.14 YOUR COMPANY – NUMBER OF PEOPLE AT YOUR SITE

The below graph and table show that this IV does not present any particular differences between the different cohorts. The LR does not show any level of significance. This IV was not included in the OLR analysis.

Figure 23 – What is the number of people at your site in your company? – Average responses

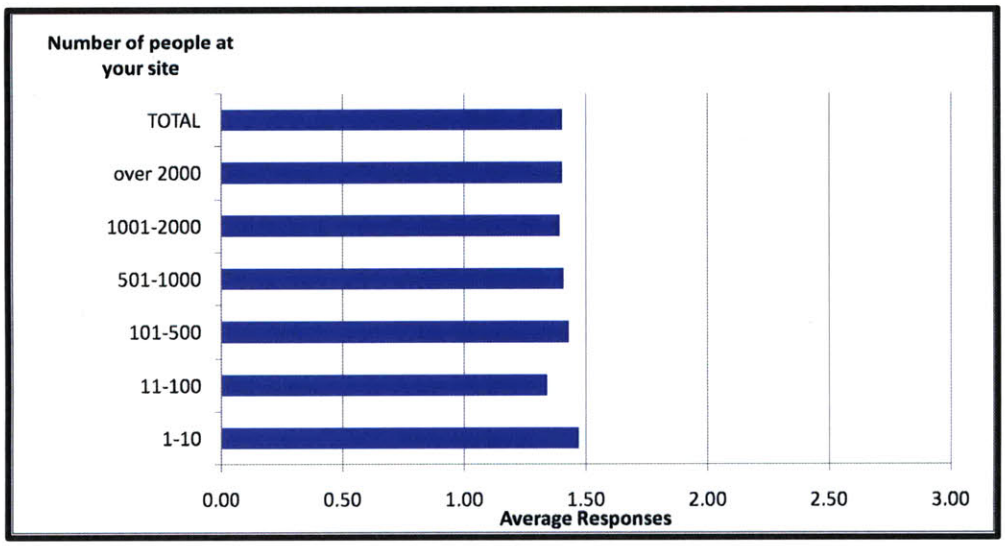


Table 31 – What is the number of people at your site in your company? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
1-10	64	27%	17%	44%	8%	5%	1.47
11-100	279	32%	26%	27%	7%	8%	1.34
101-500	512	29%	26%	28%	8%	9%	1.43
501-1000	174	27%	24%	36%	8%	5%	1.41
1001-2000	102	28%	29%	23%	14%	6%	1.39
over 2000	219	29%	26%	28%	8%	8%	1.40
TOTAL	1,350	29%	26%	29%	8%	8%	1.40

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.15 YOUR COMPANY – NUMBER OF PEOPLE WORLDWIDE

The below graph and table show that this IV does not present any particular differences between the different cohorts. The LR does not show any level of significance. This IV was not included in the OLR analysis.

Figure 24 – What is the number of people worldwide in your company? – Average responses

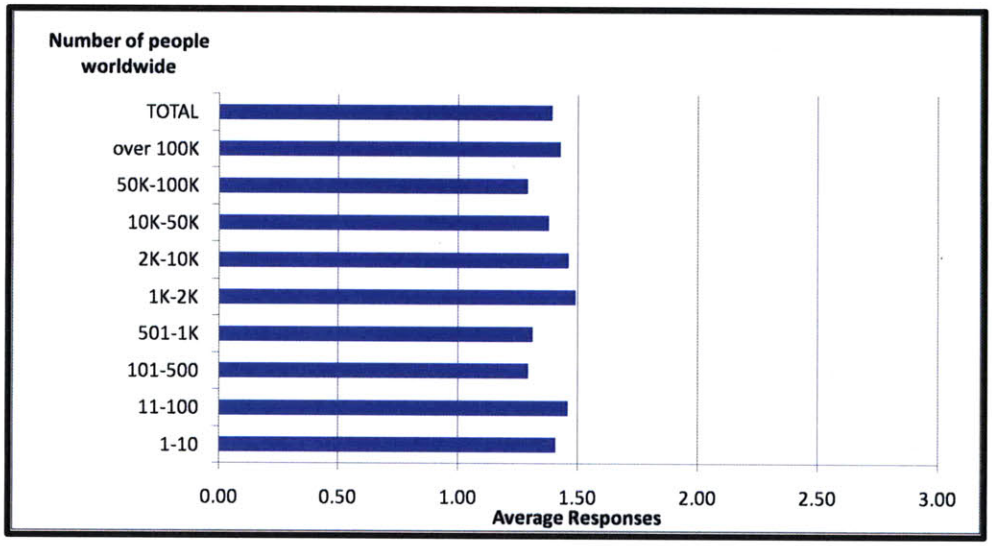


Table 32 – What is the number of people worldwide in your company? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
1-10	49	33%	14%	39%	8%	6%	1.41
11-100	109	28%	27%	27%	7%	11%	1.46
101-500	181	38%	19%	28%	7%	8%	1.29
501-1K	96	23%	36%	30%	7%	3%	1.31
1K-2K	96	32%	20%	26%	10%	11%	1.49
2K-10K	256	27%	27%	29%	9%	8%	1.46
10K-50K	222	25%	32%	30%	8%	6%	1.38
50K-100K	128	30%	28%	29%	7%	5%	1.29
over 100K	145	30%	23%	29%	8%	10%	1.43
TOTAL	1,282	29%	26%	29%	8%	8%	1.39

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.16 HOW LONG HAVE YOU WORKED FOR THIS COMPANY

The below graph and table show that this IV does not present any particular differences between the different cohorts. The LR does not show any level of significance. This IV was not included in the OLR analysis.

Figure 25 – How long have you worked for this company? – Average responses

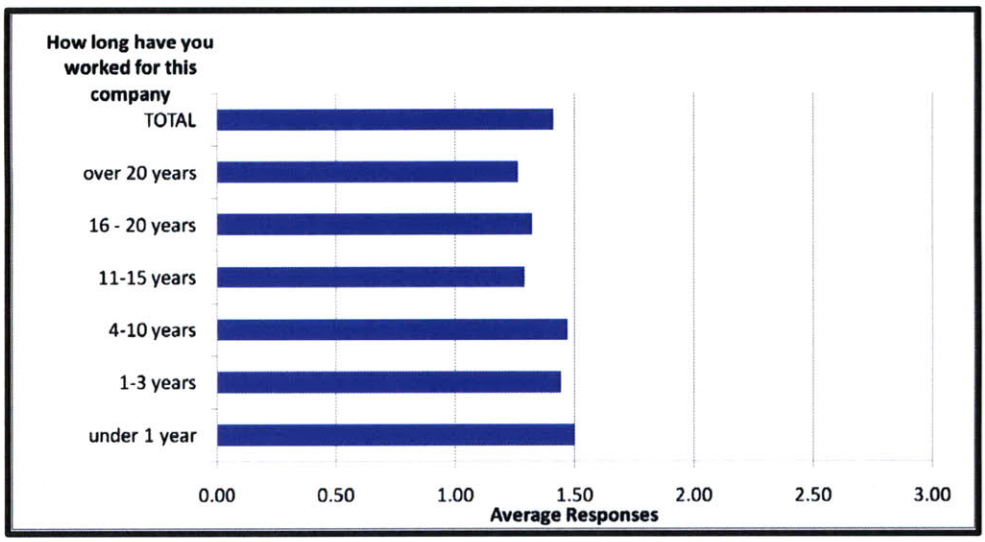


Table 33 – How long have you worked for this company? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
under 1 year	90	27%	24%	29%	12%	8%	1.50
1-3 years	393	30%	23%	31%	8%	9%	1.44
4-10 years	489	28%	26%	28%	9%	10%	1.47
11-15 years	176	31%	28%	27%	7%	6%	1.29
16 - 20 years	90	31%	26%	30%	7%	7%	1.32
over 20 years	148	29%	28%	33%	6%	3%	1.26
TOTAL	1,386	29%	25%	29%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.17 WHAT IS YOUR JOB LEVEL

The below graph and table show that this IV does not present any particular differences between the different cohorts. The LR does not show any level of significance. This IV was not included in the OLR analysis.

Figure 26 – What is your Job level? – Average responses

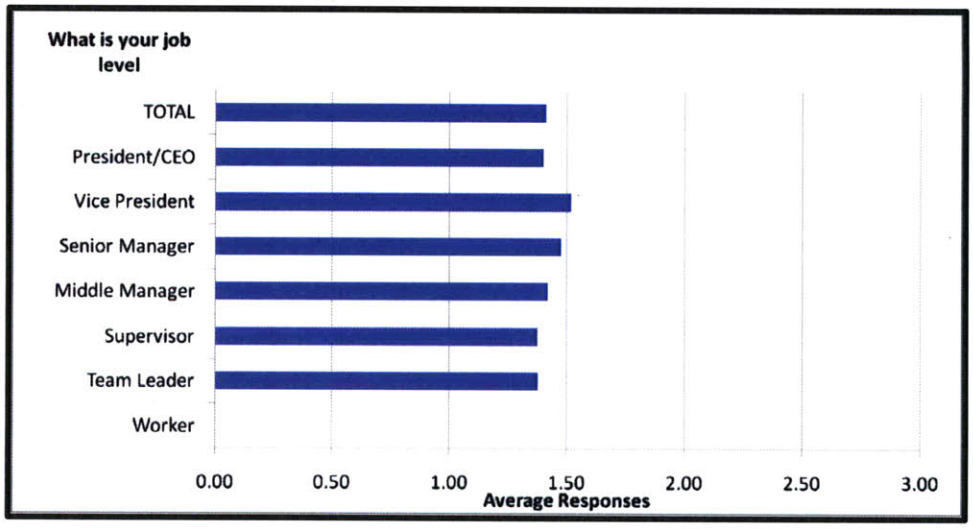


Table 34 – What is your Job level? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
Worker	0	0%	0%	0%	0%	0%	
Team Leader	114	26%	30%	30%	8%	6%	1.38
Supervisor	457	31%	24%	30%	7%	8%	1.38
Middle Manager	469	28%	28%	28%	9%	8%	1.42
Senior Manager	97	33%	15%	33%	8%	10%	1.47
Vice President	91	25%	26%	29%	11%	9%	1.52
President/CEO	158	30%	23%	31%	8%	8%	1.40
TOTAL	1,386	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.18 FUNCTION ARE YOU IN

The below graph and table show that the IV "what function are you in" plays a significant role in the way the different cohorts perceive how the supply chain risk management should be addressed. "Transportation" is by far the function that leans most toward Response with an average response of 2.13 versus the average of 1.41 of total functions. 37% of the responders from Transportation believe that Response should be the focus of supply chain risk management. There are several functions that also clearly lean toward Prevention. "Sourcing", "Risk Management", "General Management", "Marketing", "Manufacturing", and "Purchasing" lean toward Prevention. Their averages are 1.24, 1.24, 1.28, 1.29, 1.30, and 1.31 respectively. Their percentage of Prevention options (option 0 or 1) are 64%, 62%, 56%, 57%, 68%, and 56% respectively.

One binary dummy variable was created for each of the seven IV. Only the cohort "Transportation" showed a level of significance that suggests a correlation.

This IV was included in an OLR analysis that includes all the IV that showed any type of correlation.

Note: There are several job functions that had less than twenty responses; therefore they were not included in the analysis.

Figure 27 – What function are you in? – Average responses

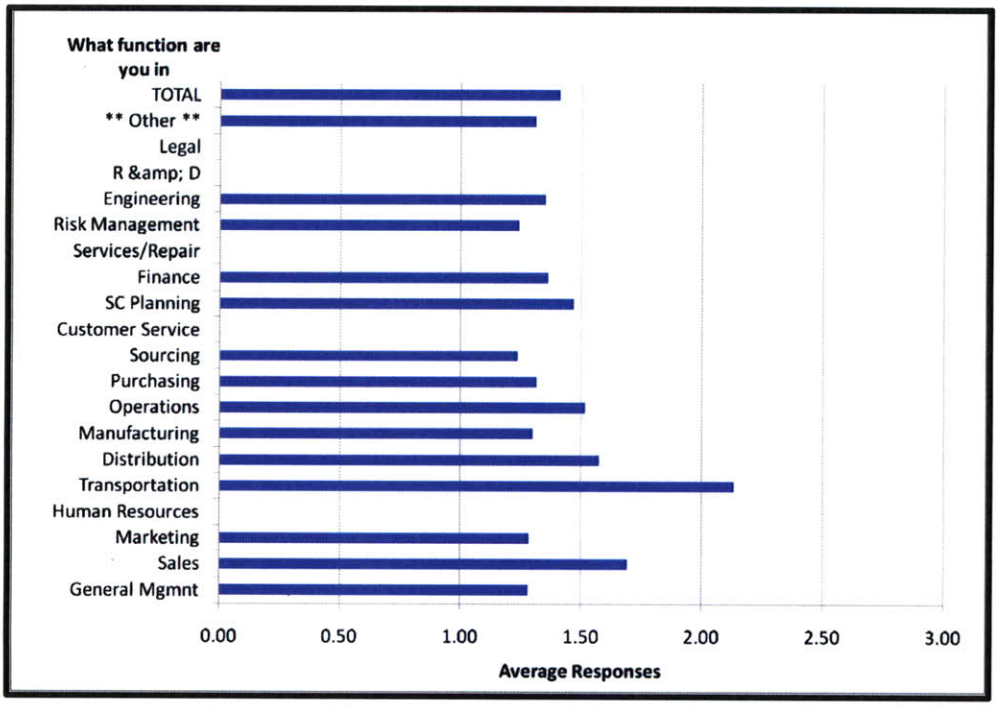


Table 35 – What function are you in? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
General Mgmnt	142	32%	25%	32%	8%	4%	1.28
Sales	42	24%	21%	31%	10%	14%	1.69
Marketing	21	29%	29%	33%	5%	5%	1.29
Human Resources	3	33%	33%	33%	0%	0%	
Transportation	30	13%	23%	27%	10%	27%	2.13
Distribution	96	27%	19%	33%	11%	9%	1.57
Manufacturing	40	30%	38%	15%	8%	10%	1.30
Operations	256	27%	23%	31%	10%	9%	1.52
Purchasing	207	31%	25%	31%	6%	6%	1.31
Sourcing	76	34%	30%	21%	7%	8%	1.24
Customer Service	16	56%	13%	13%	6%	13%	
SC Planning	190	26%	29%	25%	11%	8%	1.47
Finance	36	33%	14%	42%	6%	6%	1.36
Services/Repair	14	21%	29%	14%	21%	14%	
Risk Management	29	31%	31%	28%	3%	7%	1.24
Engineering	37	30%	27%	30%	5%	8%	1.35
R & D	15	33%	33%	33%	0%	0%	
Legal	7	29%	29%	29%	14%	0%	
** Other **	132	30%	27%	33%	5%	6%	1.31
TOTAL	1,389	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.19 HOW LONG HAVE YOU WORKED IN THIS INDUSTRY

The below graph and table show that this IV does not present any particular differences between the cohorts. Two binary dummy variables of this IV were created. One is for "under 1 year". 1 if the responder worked in this industry less than one year and 0 if the responder worked for more than one year. The other dummy variable is for "more than 20 years". 1 if the responder worked more than 20 years in this industry, and 0 if the responder worked for less than 20 years. Neither showed a level of significance that suggests a correlation.

This IV was not included in an OLR analysis.

Figure 28 – How long have you worked in this industry? – Average responses

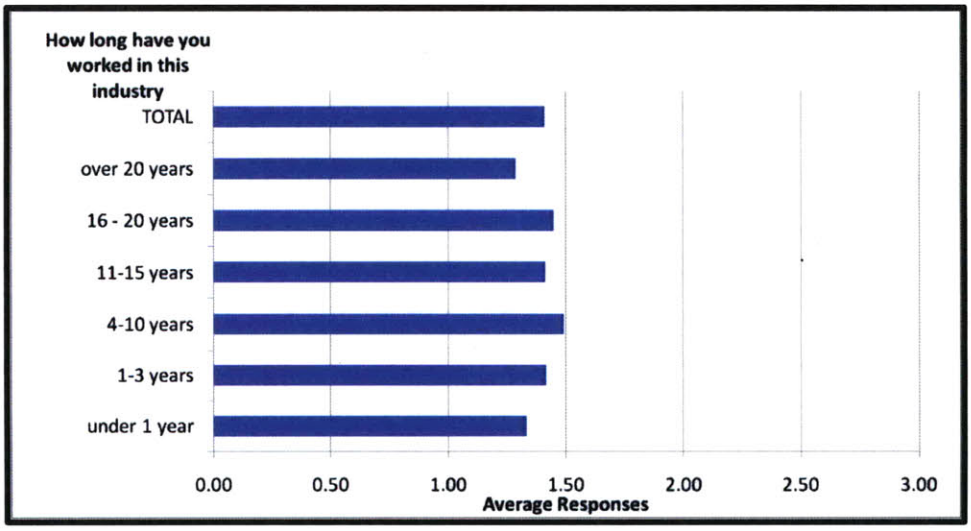


Table 36 – How long have you worked in this industry? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
under 1 year	36	36%	22%	19%	17%	6%	1.33
1-3 years	168	29%	24%	32%	8%	8%	1.42
4-10 years	444	26%	28%	27%	8%	11%	1.49
11-15 years	254	31%	21%	32%	7%	9%	1.41
16 - 20 years	154	31%	22%	28%	11%	8%	1.45
over 20 years	332	30%	27%	32%	8%	4%	1.29
TOTAL	1,388	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.3.20 HOW LONG HAVE YOU WORKED IN THIS FUNCTION

The below graph and table show that this IV does not present any particular differences between the different cohorts. The LR does not show any level of significance. This IV was not included in the OLR analysis.

Figure 29 – How long have you worked in this function? – Average responses

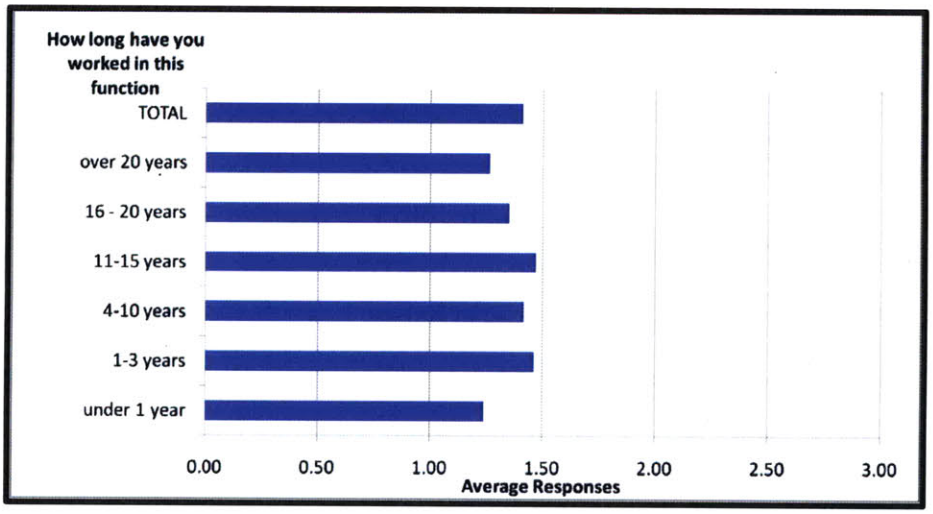


Table 37 – How long have you worked in this function? – Percentage responses

Cohort	Number Responses	Prevention 0	>> 1	Equal 2	>> 3	Response 4	Average Response
under 1 year	71	31%	30%	31%	1%	7%	1.24
1-3 years	389	27%	26%	30%	10%	8%	1.46
4-10 years	526	30%	25%	28%	8%	10%	1.42
11-15 years	185	27%	24%	30%	11%	7%	1.47
16 - 20 years	92	27%	26%	36%	7%	4%	1.35
over 20 years	122	34%	24%	30%	7%	5%	1.26
TOTAL	1,385	29%	25%	30%	8%	8%	1.41

Legend:
Question: How should your company spend its efforts?
Choices: 0 = Much more PREVENTION; 1 = More PREVENTION; 2 = Equal effort to each; 3 = More RESPONSE; 4 = Much more RESPONSE

5.4 ORDINAL LOGISTIC REGRESSION ANALYSIS

As discussed in section 4.1.4 (Reclassification of responses based on survey structure) and section 5 (Data Analysis) although the DV is a nominal variable, the survey team decided to treat it as a scalar variable, ranging from 0 to 4. Due to the fact that the DV was not originally a scalar variable the OLRs analysis limits its

analysis to three parameters: estimate, standard error, and significance. No more conclusions can be drawn by the OLR results, and also no equation can be formulated.

In the previous section (5.1 Data Analysis of Independent Variables) nine IV were selected to be included in an OLR analysis. From those nine IV, twelve binary dummy variables were created. The objective of this section is to build a model that will help predict the way people manage their supply chain in terms of prevention versus response.

In order to run an ordinal regression, it is assumed that the effect of the IV is the same for each level of the DV. In order to find the optimal predictive model, the IV were combined one at a time in different combinations with the DV. The IV that were related to each other, were not combined. This was the case for "country you grew up", "country you live in", "language spoken as a child", and "language spoken at work".

The below table shows the list of nine selected IV and also the twelve dummy variables created. Because the IV "gender" was already a binary variable, in total thirteen variables were tested in the model.

Table 38 – List of IV and dummy variables

Question	Independ Variable	Type	Dummy ?	Type of Dummy	Binary
P6Q1a Tell us about yourself: Age	Age	Scalar	Dummy	Binary	20-29 years 1 / Others 0
P6Q1b Tell us about yourself: Gender	Gender	Binary			Female 1 / Male 0
P6Q1d Tell us about yourself: Primary Field of Study	Primary field of study	Nominal	Dummy	Binary	SC+LA+T 0 / B+Eng+Oth 1
P6Q4a What Industry is your company in?	Industry	Nominal	Dummy	Binary	Primary Metal Ind 1 / Others 0
P6Q6c Job and supply chain position - What function are you in?	Function are you in	Nominal	Dummy	Binary	Transportation 1 / Other 0
P6Q2a Country you grew up in?	Country grew up	Nominal	Dummy	Binary	Brazil 1 / Others 0
P6Q2a Country you grew up in?	Country grew up	Nominal	Dummy	Binary	Spain 1 / Other 0
P6Q2c Country you work in now?	Country work in now	Nominal	Dummy	Binary	Brazil 1 / Others 0
P6Q2c Country you work in now?	Country work in now	Nominal	Dummy	Binary	Spain 1 / Other 0
P6Q3a Primary language spoken as a child	Language as a child	Nominal	Dummy	Binary	Portuguese 1 / Others 0
P6Q3a Primary language spoken as a child	Language as a child	Nominal	Dummy	Binary	Spanish 1 / Others 0
P6Q3b Primary language spoken at work	Language at work	Nominal	Dummy	Binary	Portuguese 1 / Others 0
P6Q3b Primary language spoken at work	Language at work	Nominal	Dummy	Binary	Spanish 1 / Others 0

Using OLR analysis, thirty-six different models were tested. The two first IV that were chosen to start the model were "gender" and the dummy binary variable "country grew up – Brazil 1 / other countries 0". These two variables were selected because of the level of statistical significance of the LR (that were performed in the previous section). This first model was called "Base 1". As it was mentioned previously, the OLR results were analyzed in terms of three parameters: estimate, standard error, and significance. The results of "Base 1" model show that indeed those two IV are key demographics to help predict what will be the tendency toward prevention or response. Only the DV "2 = Equal effort to each" didn't show a level of statistical significance (>0.05), but all the other DV are significant, and both variables ("gender" and "country") are significant.

Taking the "Base 1" model as a starting point, one variable was added one at a time in order to test if the result was better compared with the "Base1" model. There were variations in the level of statistical significance of the three parameters: estimate,

standard error, and significance in the DV and also the IV, but none of the results were better than the "Base 1" model (exhibit 4). It was also possible to conclude that the two binary IV "age – 20-29 years 1 / other age 0" and "industry – primary metal industry 1 / other industry 0" are not significant, and therefore were not included in further analysis.

After testing all the possible combinations with the base model, a new base model was created. "Base 2" model also included only two IV, "gender" and the dummy binary variable "country grew up – Spain 1 / other countries 0". This model is better than "Base 1" because all variables (DV and IV) show a level of statistical significance. Using as a base the "Base 2" model, different combinations with the other IV were tested, but none of them show better results than the "Base 2" model (exhibit 5).

From round twelve till round thirty-one, this was the methodology followed. Testing at each time a different variable from the group "country you live in", "language spoken as a child", and "language spoken at work" and combining it with the remaining variables (exhibit 6).

After all these runs, it was evident that the best variable to use from the group "country you grew up", "country you live in", "language spoken as a child", and "language spoken at work" was "country you grew up". Therefore, a new model was tested combining the two dummy binary variables "country grew up – Brazil 1 / other countries 0" and "country grew up – Spain 1 / other countries 0" with the other variables (exhibit 8). The variables "age" and "industry" were included again in the runs, but they showed no signs of improving the model, therefore were not included in the final model. Comparing the results of run thirty two with the "Base 2" model

shows that one of the DV lost statistical significance, but the remaining DV got much better statistical significant values. The other IV ("gender") improved slightly in terms of statistical significance. Between run 33 and run 35 different combinations were tested.

On round 36 the two country variables were included, together with the three other variables that showed more statistical significance in the previous runs ("gender", "primary field of study" and "function you are in"). This run was called, MODEL. Comparing this run with "Base 2" it is evident that two DV lost statistical significance, but the other two DV gain much more significance. The decision to adopt this run as the "MODEL", was based in the fact that it is more valuable to have a model that includes more variables with statistical significance and also that can predict better the DV with statistical significance. Exhibit 9shows a summary table with the "Base 1", "Base 2" and "MODEL" run results.

If one wants to have a model where all the DV and IV have statistical significance, then the best model to use would be "Base 2".

6 CONCLUSIONS

In this section the main conclusions of the data analysis are presented. Additionally, the business take-away's that supply chain managers should consider when doing business with people from different regions of the world are discussed.

Before presenting the conclusions, here is a reminder of the problem statement of this thesis: Do demographic variables such as age, gender, educational level, field of study, job function, years of professional experience, country of residence, language(s) spoken, company's industry, company size and number of people working in the company, help to predict the answer to the question "How should your company spend its efforts? (Prevention versus Response)".

Using the results of a world-wide survey conducted by the MIT Global SCALE Risk Initiative team (exhibit 1), led by Dr. Bruce Arntzen the question that this thesis intends to answer is the following: Is it possible to predict the way people manage their supply chains in terms of prevention versus response, based on demographics?

Based on the analysis performed, it is possible to predict the way people manage their supply chains in terms of prevention versus response, based on certain demographics. The demographics factors that have more statistical significance are: "gender", "primary field of study", "industry", "job function", and "country you grew up in". These are the factors which would be included in a predicted model of discrete choice between prevention and response.

The main conclusions were:

- In general, people tend to lean more toward prevention, than response. In fact 54% of people favored prevention, 30% had a neutral stance, and 16% favored response.
- Males lean toward prevention, while females lean toward response. Gender is with no doubt a demographic factor that can help predict tendency toward prevention or response.
- People with primary studies in sciences, liberal arts or teaching lean more toward prevention.
- People whose main job function is transportation lean more towards response.
- Among the listed IV, the one that is most statistically significant is the "country you grew up in". Knowing that the person grew up in Brazil is a clear indicator that the person leans toward response. On the other hand, if the person grew up in Spain, they are more likely to lean toward prevention. These are the only two countries that are statistical significant. Note that Colombia was (by far) the most prevention-minded country in the survey, however because we only had 20 responses it was not statistically significant.

Knowing that certain demographic factors have more influence in the way people manage their supply chain in terms of prevention versus response can be useful knowledge to supply chain managers. To better understand the underlying causes of these tendencies it would be helpful to interview a sample of the survey responders. Such interviews would be a natural follow-on to this research.

Being able to predict the way people will manage their supply chains in terms of prevention versus response based on demographics can be a competitive advantage.

In recent weeks the cases of the eruption of the volcano (Eyjafjallajoekull) in Iceland and the oil spill in the Gulf of Mexico constitute evidence that there will always be natural or man-made disasters that can heavily disrupt the best supply chains unexpectedly. The success of global corporate programs to prevent risks or prepare continuity plans can be significantly increased by knowing the attitudes of trading partners from other regions and cultures.

BIBLIOGRAPHY

Arntzen, B. (2010, April 27). *Harvard Business Review Blogs - The conversation*. Retrieved April 30, 2010, from Harvard Business: http://blogs.hbr.org/cs/2010/04/how_do_you_prevent_volcano.html

CTL. (2010, April). *global_scale_risk_initiative*. Retrieved April 30, 2010, from CTL: http://ctl.mit.edu/research/global_scale_risk_initiative

McKinsey. (2008, June). Managing global supply chains: Mckinsey Global Survey Results. *The McKinsey Quarterly* .

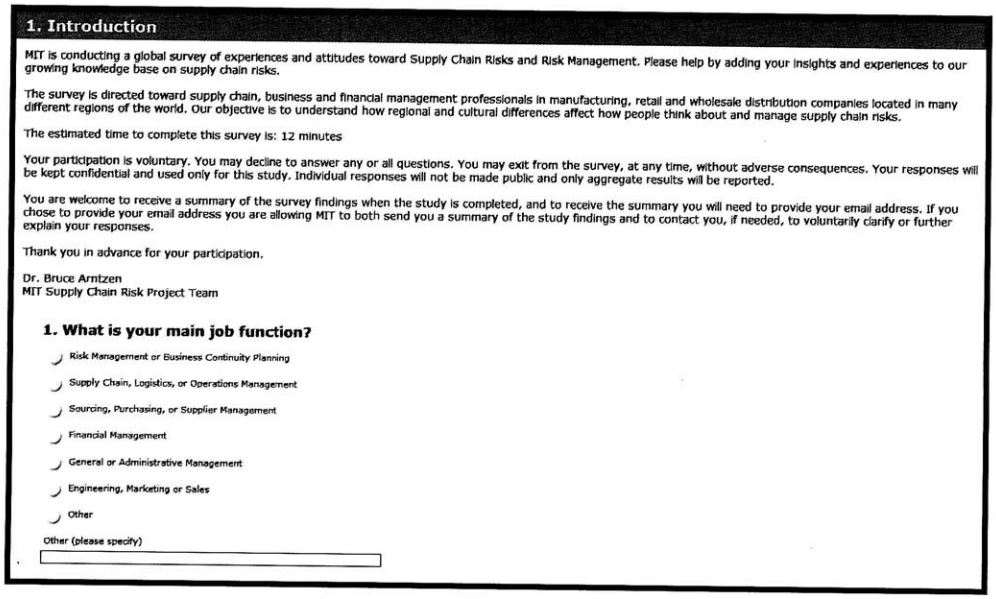
McKinsey. (2006, September). Understanding supply chain risk: A McKinsey Global Survey. *The McKinsey Quarterly* .

Sheffi, Y. (2005). *The Resilient Enterprise.*

LIST OF EXHIBITS

Exhibit 1 – Survey (partial)

Only the relevant parts of the survey (Dependent Variable and Independent Variables) were included.



1. Introduction

MIT is conducting a global survey of experiences and attitudes toward Supply Chain Risks and Risk Management. Please help by adding your insights and experiences to our growing knowledge base on supply chain risks.

The survey is directed toward supply chain, business and financial management professionals in manufacturing, retail and wholesale distribution companies located in many different regions of the world. Our objective is to understand how regional and cultural differences affect how people think about and manage supply chain risks.

The estimated time to complete this survey is: 12 minutes

Your participation is voluntary. You may decline to answer any or all questions. You may exit from the survey, at any time, without adverse consequences. Your responses will be kept confidential and used only for this study. Individual responses will not be made public and only aggregate results will be reported.

You are welcome to receive a summary of the survey findings when the study is completed, and to receive the summary you will need to provide your email address. If you chose to provide your email address you are allowing MIT to both send you a summary of the study findings and to contact you, if needed, to voluntarily clarify or further explain your responses.

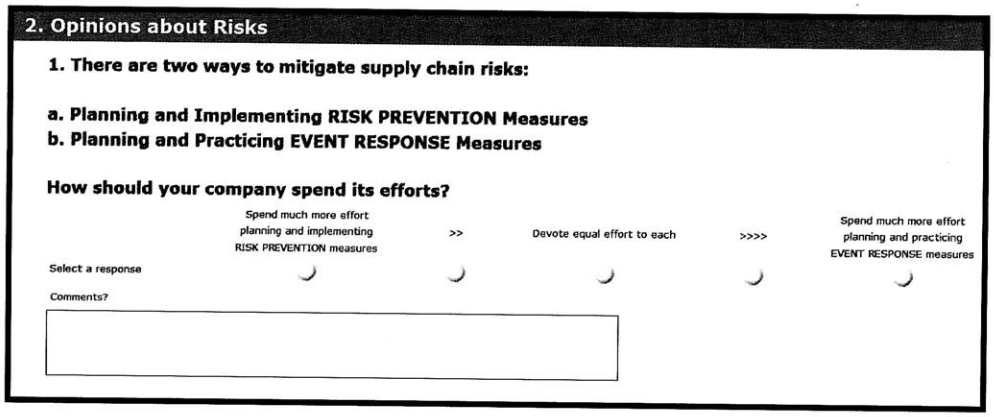
Thank you in advance for your participation.

Dr. Bruce Arntzen
MIT Supply Chain Risk Project Team

1. What is your main job function?

- Risk Management or Business Continuity Planning
- Supply Chain, Logistics, or Operations Management
- Sourcing, Purchasing, or Supplier Management
- Financial Management
- General or Administrative Management
- Engineering, Marketing or Sales
- Other

Other (please specify)



2. Opinions about Risks

1. There are two ways to mitigate supply chain risks:

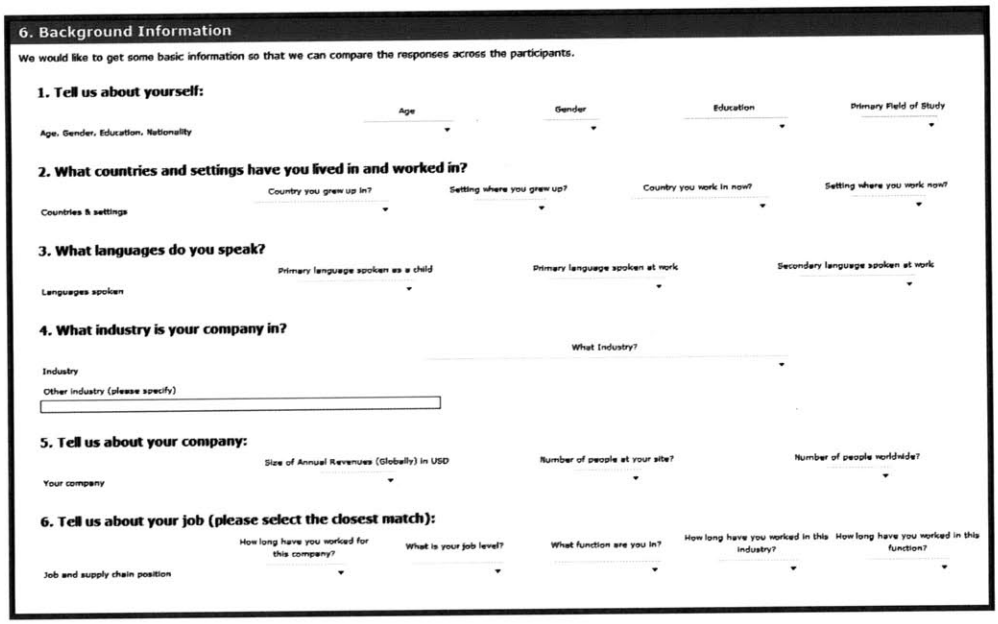
a. Planning and Implementing RISK PREVENTION Measures
b. Planning and Practicing EVENT RESPONSE Measures

How should your company spend its efforts?

	Spend much more effort planning and implementing RISK PREVENTION measures	>>	Devote equal effort to each	>>>>	Spend much more effort planning and practicing EVENT RESPONSE measures
Select a response					

Comments?

Exhibit 2 – Survey (partial) – Continuation



6. Background Information

We would like to get some basic information so that we can compare the responses across the participants.

1. Tell us about yourself:

Age, Gender, Education, Nationality — Age | Gender | Education | Primary Field of Study

2. What countries and settings have you lived in and worked in?

Countries & settings — Country you grew up in? | Setting where you grew up? | Country you work in now? | Setting where you work now?

3. What languages do you speak?

Languages spoken — Primary language spoken as a child | Primary language spoken at work | Secondary language spoken at work

4. What industry is your company in?

Industry — What Industry?

Other industry (please specify)

5. Tell us about your company:

Your company — Size of Annual Revenues (Globally) in USD | Number of people at your site? | Number of people worldwide?

6. Tell us about your job (please select the closest match):

Job and supply chain position — How long have you worked for this company? | What is your job level? | What function are you in? | How long have you worked in this industry? | How long have you worked in this function?

Exhibit 3 – List of different surveys

Survey Label	Country	Language	Responsibility
ALL SURVEYS	ALL		TEAM
SN01	North America	English	MIT - USA
SN02	Brazil	Brazilian Portuguese	Local Team
SN03	Colombia	Spanish from LA	Local Team
SN04	Mexico	Spanish from LA	Local Team
SN05	Spain	Spanish from Spain	Local Team
SN06	Germany Swiss	German	Local Team
SN07	Greece	Greek	MIT - USA
SN08	Italy	Italian	Local Team
SN09	West Africa	English	MIT - USA
SN10	South Africa	English	Local Team
SN11	India	English	Local Team
SN12	China	Chinese (Mandarin)	Local Team
SN13	CTL Visitor	English	MIT - USA
SN14	APICS	English	MIT - USA
SN15	Europe	English	Local Team
SN16	SC Council	English	MIT - USA
SN17	China English	English	MIT - USA
SN18	Portugal	Portuguese	MIT - USA

Exhibit 4 – Drop down menus (IV)

6. Background Information

We would like to get some basic information so that we can compare the responses across the participants.

1. How old are you?

○ Under 20 years ○ 20-29 years ○ 30-39 years ○ 40-49 years ○ 50-59 years ○ 60-69 years ○ 70+ years

2. Are you male or female?

○ Male ○ Female

3. What is your level of education?

○ Primary School ○ High School ○ Some College ○ College Degree ○ Some grad school ○ Masters Degree ○ Doctors Degree

4. What was your field of study in school?

○ Business ○ Engineering ○ Sciences ○ Liberal Arts ○ Teaching ○ Other

5. Countries that you grew up in and now work in.

	USA	BRZ	MEX	COL	UK	IND	CHI	GHA	NIG	LIB	CAM	OTH
What country did you grow up in?	○	○	○	○	○	○	○	○	○	○	○	○
what country do you work in now?	○	○	○	○	○	○	○	○	○	○	○	○

Other (please specify)

6. Settings where you grew up and now work:

	Farm	Rural	Small Town	Suburban	Small City	Large City
Setting where you grew up?	○	○	○	○	○	○
Setting thay you work in now?	○	○	○	○	○	○

7. What languages do you speak?

	Engl	Fren	Span	Port	Hind Urdu	Chin Mand	Chin Cant	Hausa	Yoruba	Other
Lanuage spoken as a child?	○	○	○	○	○	○	○	○	○	○
Lanugage spoken at work?	○	○	○	○	○	○	○	○	○	○
Secondary language at work?	○	○	○	○	○	○	○	○	○	○

Other (please specify)

Exhibit 3 – Drop down menus (IV) - Continuation

8. What industry is your company in?

- Manufacturer - Food & kindred products
- Manufacturer - Pharmaceuticals, medical devices & supplies
- Manufacturer - Textile mill products
- Manufacturer - Apparel & other fabric products
- Manufacturer - Lumber & wood products, except furniture
- Manufacturer - Furniture & fixtures
- Manufacturer - Paper & allied products
- Manufacturer - Printing, publishing, & allied industries
- Manufacturer - Chemicals & allied products
- Manufacturer - Petroleum refining & related industries
- Manufacturer - Rubber & misc. plastics products
- Manufacturer - Leather & leather products
- Manufacturer - Stone, clay, glass, & concrete products
- Manufacturer - Primary metal industries
- Manufacturer - Fabricated metal products, except machinery
- Manufacturer - Industrial & commercial machinery & computer equipment
- Manufacturer - Electronic & electrical equipment except computers
- Manufacturer - Transportation equipment, Autos, Trucks, Buses, & Related
- Manufacturer - Instruments; photographic, medical, optical, timing
- Manufacturer - Misc. manufacturing industries
- Retailer - Apparel, Shoes, Accessories
- Retailer - Autos, Boats, Motorcycles, RV's, Gas stations
- Retailer - Bldg. materials, hardware, garden supply, & mobile home dealers
- Retailer - Books, stationery, jewelry, gifts, luggage, crafts, sporting goods
- Retailer - Drug stores, liquor, used merchandise
- Retailer - Food stores, bakeries, dairy, candy
- Retailer - General merchandise stores
- Retailer - Home furniture & furnishings stores
- Retailer - Household appliance stores
- Retailer - On-line, Catalog & Mail-order houses

Exhibit 3 – Drop down menus (IV) - Continuation

- Retailer - Radio, television consumer electronics, & music stores
- Retailer - Tobacco, flower, newstands, optical, other
- Wholesaler - Motor vehicles & motor vehicle parts & supplies
- Wholesaler - Furniture & home furnishings
- Wholesaler - Lumber & other construction materials
- Wholesaler - Professional & commercial equipment & supplies
- Wholesaler - Electrical goods
- Wholesaler - Hardware, & plumbing & heating equipment & supplies
- Wholesaler - Machinery, equipment, & supplies
- Wholesaler - Misc. durable goods
- Wholesaler - Paper & paper products
- Wholesaler - Drugs, drug proprietaries, & druggists' sundries
- Wholesaler - Groceries & related products
- Wholesaler - Farm-product raw materials
- Wholesaler - Chemicals & allied products
- Wholesaler - Petroleum & petroleum products
- Wholesaler - Metals & minerals, except petroleum
- Wholesaler - Beer, wine, & distilled alcoholic beverages
- Wholesaler - Misc., books, tobacco, paint, flowers, farm supplies
- Other - please describe below

Other industry (please specify)

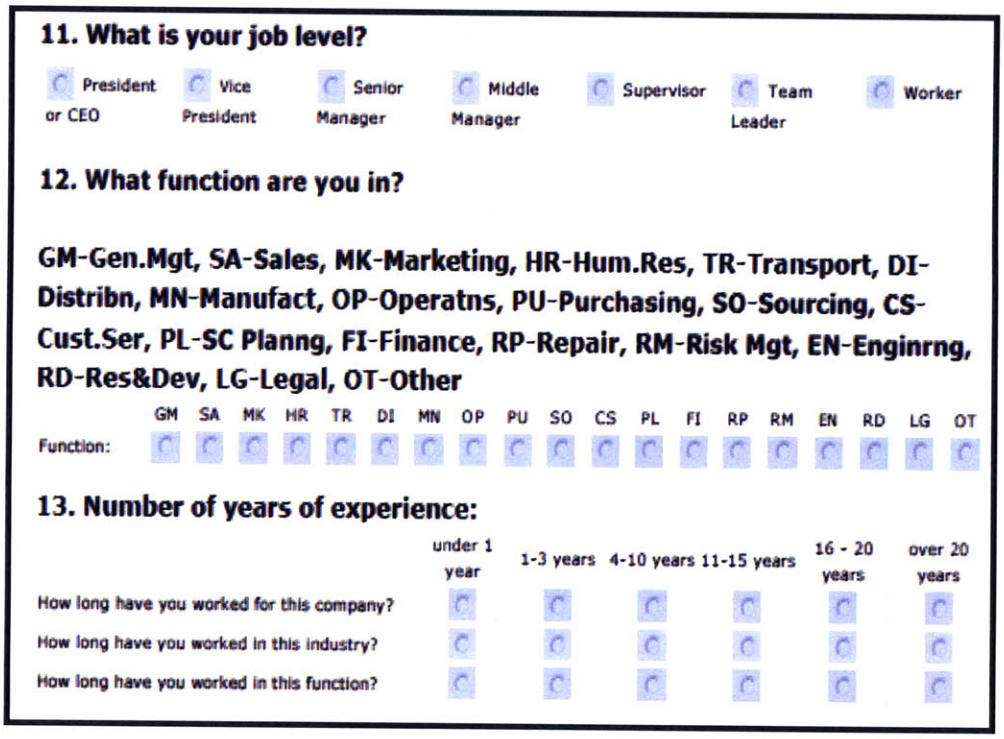
9. Size of your company (Annual Revenues) globally in INR?

Under INR 5	INR 5.1 to 50 Crores	INR 51 to 500 Crores	INR 501 to 2500 Crores	INR 2501 to 5000 Crores	INR 5001 to 25000 Crores	INR 25001 to 100000 Crores	INR 100001 to 250000 Crores	Over 250000 Crores

10. Size of company (number of people):

	1-10	11-100	101-500	501-1K	1K-2K	2K-10K	10K-50K	50K-100K	over 100K
Number of people in your company at your site?									
Number of people in your company worldwide?									

Exhibit 3 – Drop down menus (IV) - Continuation



11. What is your job level?

President or CEO | Vice President | Senior Manager | Middle Manager | Supervisor | Team Leader | Worker

12. What function are you in?

GM-Gen.Mgt, SA-Sales, MK-Marketing, HR-Hum.Res, TR-Transport, DI-Distribn, MN-Manufact, OP-Operatns, PU-Purchasing, SO-Sourcing, CS-Cust.Ser, PL-SC Planng, FI-Finance, RP-Repair, RM-Risk Mgt, EN-Enginrng, RD-Res&Dev, LG-Legal, OT-Other

	GM	SA	MK	HR	TR	DI	MN	OP	PU	SO	CS	PL	FI	RP	RM	EN	RD	LG	OT
Function:																			

13. Number of years of experience:

	under 1 year	1-3 years	4-10 years	11-15 years	16 - 20 years	over 20 years
How long have you worked for this company?						
How long have you worked in this industry?						
How long have you worked in this function?						

Exhibit 5 – Model "Base 1" - first six runs

			BASE 1			Run 2			Run 3			Run 4			Run 5			Run 6		
Dependent Variable		**Type**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**
DV_0 = Much more PREVENTION		Nominal	-2.792	0.276	0.000	-2.803	0.277	0.000	-3.630	0.411	0.000	-3.645	0.411	0.000	-3.342	0.418	0.000	-2.899	0.302	0.000
DV_1 = More PREVENTION		Nominal	-1.705	0.272	0.000	-1.718	0.272	0.000	-2.544	0.407	0.000	-2.558	0.407	0.000	-2.255	0.414	0.000	-1.813	0.298	0.000
DV_2 = Equal effort to each		Nominal	-0.206	0.267	0.441	-0.218	0.267	0.415	-1.043	0.401	0.009	-1.057	0.401	0.008	-0.754	0.410	0.066	-0.308	0.293	0.293
DV_3 = More RESPONSE		Nominal	0.618	0.270	0.022	0.608	0.271	0.025	-0.209	0.402	0.604	-0.221	0.402	0.582	0.075	0.411	0.856	0.522	0.296	0.078
Independ Variable	**Binary**	**Type**																		
Age	20-29 years 1 / Others 0	Binary																-0.170	0.188	0.364
Gender	Female 1 / Male 0	Binary	-0.399	0.136	0.003	-0.412	0.136	0.003	-0.383	0.137	0.005	-0.397	0.137	0.004	-0.392	0.136	0.004	-0.377	0.138	0.006
Primary field of study	SC+LA+T 0 / B+Eng+Oth 1	Binary				-0.349	0.167	0.036				-0.345	0.167	0.039						
Industry	Primary Metal Ind 1 / Others 0	Binary													-0.614	0.326	0.060			
Function are you in	Transportation 1 / Other 0	Binary							-0.916	0.337	0.007	-0.916	0.337	0.007						
Country grew up	Brazil 1 / Others 0	Binary	-1.592	0.248	0.000	-1.557	0.249	0.000	-1.544	0.251	0.000	-1.510	0.252	0.000	-1.542	0.250	0.000	-1.555	0.252	0.000
Country grew up	Spain 1 / Others 0	Binary																		
Country work in now	Brazil 1 / Others 0	Binary																		
Country work in now	Spain 1 / Others 0	Binary																		
Language as a child	Portuguese 1 / Others 0	Binary																		
Language as a child	Spanish 1 / Others 0	Binary																		
Language at work	Portuguese 1 / Others 0	Binary																		
Language at work	Spanish 1 / Others 0	Binary																		

Exhibit 6 – Model – Base 1, Base 2 and runs 8 till 11

			BASE 1			BASE 2			Run 8			Run 9			Run 10			Run 11		
Dependent Variable		**Type**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**
DV_0 = Much more PREVENTION		Nominal	-2.792	0.276	0.000	-0.649	0.217	0.003	-0.721	0.219	0.001	-1.703	0.401	0.000	-0.931	0.277	0.001	-1.246	0.392	0.001
DV_1 = More PREVENTION		Nominal	-1.705	0.272	0.000	0.435	0.217	0.045	0.361	0.219	0.099	-0.619	0.400	0.122	0.153	0.276	0.579	-0.161	0.391	0.680
DV_2 = Equal effort to each		Nominal	-0.206	0.267	0.441	1.903	0.223	0.000	1.831	0.224	0.000	0.854	0.399	0.032	1.629	0.279	0.000	1.311	0.392	0.001
DV_3 = More RESPONSE		Nominal	0.618	0.270	0.022	2.702	0.232	0.000	2.632	0.234	0.000	1.664	0.403	0.000	2.434	0.287	0.000	2.116	0.397	0.000
Independ Variable	**Binary**	**Type**																		
Age	20-29 years 1 / Others 0	Binary													-0.317	0.185	0.088			
Gender	Female 1 / Male 0	Binary	-0.399	0.136	0.003	-0.356	0.136	0.009	-0.373	0.137	0.006	-0.355	0.138	0.010	-0.318	0.138	0.021	-0.346	0.137	0.011
Primary field of study	SC+LA+T 0 / B+Eng+Oth 1	Binary							-0.402	0.167	0.016	-0.396	0.167	0.018						
Industry	Primary Metal Ind 1 / Others 0	Binary																-0.606	0.325	0.063
Function are you in	Transportation 1 / Other 0	Binary										-1.013	0.331	0.002						
Country grew up	Brazil 1 / Others 0	Binary	-1.592	0.248	0.000															
Country grew up	Spain 1 / Others 0	Binary				0.607	0.182	0.001	0.587	0.183	0.001	0.583	0.184	0.002	0.591	0.183	0.001	0.596	0.182	0.001
Country work in now	Brazil 1 / Others 0	Binary																		
Country work in now	Spain 1 / Others 0	Binary																		
Language as a child	Portuguese 1 / Others 0	Binary																		
Language as a child	Spanish 1 / Others 0	Binary																		
Language at work	Portuguese 1 / Others 0	Binary																		
Language at work	Spanish 1 / Others 0	Binary																		

Exhibit 7 – Model – Base 2 and runs 12 till 31

			BASE 2			Run 12			Run 13			Run 14			Run 15			Run 16			Run 17			Run 18			Run 19			Run 20		
Dependent Variable		**Type**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**
DV_0 = Much more PREVENTION		Nominal	-0.649	0.217	0.003	-2.774	0.273	0.000	-2.785	0.273	0.000	-3.632	0.410	0.000	-0.672	0.214	0.002	-1.653	0.398	0.000	-1.728	0.399	0.000	-0.743	0.216	0.001	-1.728	0.399	0.000	-2.632	0.248	0.000
DV_1 = More PREVENTION		Nominal	0.435	0.217	0.045	-1.687	0.269	0.000	-1.700	0.269	0.000	-2.543	0.406	0.000	0.410	0.213	0.054	-0.569	0.396	0.151	-0.643	0.397	0.106	0.338	0.215	0.117	-0.643	0.397	0.106	-1.547	0.243	0.000
DV_2 = Equal effort to each		Nominal	1.903	0.223	0.000	-0.187	0.264	0.478	-0.199	0.264	0.450	-1.042	0.400	0.009	1.877	0.219	0.000	0.900	0.396	0.023	0.827	0.397	0.037	1.806	0.221	0.000	0.827	0.397	0.037	-0.042	0.239	0.862
DV_3 = More RESPONSE		Nominal	2.702	0.232	0.000	0.638	0.267	0.017	0.627	0.267	0.019	-0.206	0.401	0.607	2.675	0.229	0.000	1.707	0.400	0.000	1.637	0.401	0.000	2.607	0.231	0.000	1.637	0.401	0.000	0.786	0.244	0.001
Independ Variable	**Binary**	**Type**																														
Age	20-29 years 1 / Others 0	Binary																														
Gender	Female 1 / Male 0	Binary	-0.356	0.136	0.009	-0.374	0.136	0.006	-0.388	0.137	0.005	-0.375	0.138	0.007	-0.336	0.136	0.014	-0.318	0.137	0.021	-0.337	0.138	0.014	-0.353	0.137	0.010	-0.337	0.138	0.014	-0.400	0.136	0.003
Primary field of study	SC+LA+T 0 / B+Eng+Oth 1	Binary							-0.348	0.167	0.037	-0.342	0.167	0.041							-0.397	0.167	0.017	-0.406	0.167	0.015	-0.397	0.167	0.017			
Industry	Primary Metal Ind 1 / Others 0	Binary																														
Function are you in	Transportation 1 / Other 0	Binary										-0.916	0.337	0.007				-1.011	0.331	0.002	-1.011	0.331	0.002				-1.011	0.331	0.002			
Country grew up	Brazil 1 / Others 0	Binary																														
Country grew up	Spain 1 / Others 0	Binary	0.607	0.182	0.001																											
Country work in now	Brazil 1 / Others 0	Binary				-1.595	0.244	0.000	-1.560	0.245	0.000	-1.519	0.247	0.000																		
Country work in now	Spain 1 / Others 0	Binary													0.566	0.179	0.002	0.560	0.181	0.002	0.541	0.181	0.003	0.548	0.180	0.002	0.541	0.181	0.003			
Language as a child	Portuguese 1 / Others 0	Binary																												-1.444	0.216	0.000
Language as a child	Spanish 1 / Others 0	Binary																														
Language at work	Portuguese 1 / Others 0	Binary																														
Language at work	Spanish 1 / Others 0	Binary																														

Exhibit 8 – Model – Base 2 and runs 12 till 31

			Run 21			Run 22			Run 23			Run 24			Run 25			Run 26			Run 27			Run 28			Run 29			Run 30			Run 31		
Dependent Variable		**Type**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**
DV_0 = Much more PREVENTION		Nominal	-2.652	0.249	0.000	-3.547	0.399	0.000	-0.774	0.184	0.000	-0.828	0.186	0.000	-1.802	0.383	0.000	-2.658	0.251	0.000	-2.677	0.251	0.000	-3.573	0.400	0.000	-0.738	0.197	0.000	-0.796	0.199	0.000	-1.799	0.390	0.000
DV_1 = More PREVENTION		Nominal	-1.568	0.244	0.000	-2.462	0.395	0.000	0.304	0.183	0.097	0.249	0.185	0.177	-0.723	0.382	0.058	-1.573	0.246	0.000	-1.594	0.246	0.000	-2.486	0.396	0.000	0.339	0.197	0.085	0.280	0.198	0.158	-0.721	0.388	0.063
DV_2 = Equal effort to each		Nominal	-0.062	0.239	0.794	-0.955	0.389	0.014	1.774	0.190	0.000	1.721	0.191	0.000	0.750	0.381	0.049	-0.049	0.241	0.838	-0.069	0.241	0.774	-0.960	0.390	0.014	1.823	0.203	0.000	1.766	0.204	0.000	0.767	0.388	0.048
DV_3 = More RESPONSE		Nominal	0.767	0.244	0.002	-0.115	0.390	0.768	2.578	0.201	0.000	2.527	0.202	0.000	1.565	0.385	0.000	0.772	0.246	0.002	0.754	0.246	0.002	-0.127	0.391	0.745	2.620	0.214	0.000	2.565	0.215	0.000	1.576	0.392	0.000
Independ Variable	**Binary**	**Type**																																	
Age	20-29 years 1 / Others 0	Binary																																	
Gender	Female 1 / Male 0	Binary	-0.415	0.136	0.002	-0.402	0.137	0.003	-0.352	0.136	0.009	-0.371	0.136	0.006	-0.356	0.137	0.009	-0.388	0.136	0.004	-0.403	0.136	0.003	-0.390	0.137	0.005	-0.341	0.136	0.012	-0.359	0.136	0.008	-0.348	0.137	0.011
Primary field of study	SC+LA+T 0 / B+Eng+Oth 1	Binary	-0.356	0.167	0.033	-0.348	0.167	0.037				-0.438	0.167	0.009	-0.429	0.167	0.010				-0.340	0.167	0.041	-0.332	0.167	0.046				-0.411	0.166	0.014	-0.402	0.166	0.016
Industry	Primary Metal Ind 1 / Others 0	Binary																																	
Function are you in	Transportation 1 / Other 0	Binary				-0.951	0.335	0.005							-0.995	0.332	0.003							-0.952	0.336	0.005							-1.012	0.332	0.002
Country grew up	Brazil 1 / Others 0	Binary																																	
Country grew up	Spain 1 / Others 0	Binary																																	
Country work in now	Brazil 1 / Others 0	Binary																																	
Country work in now	Spain 1 / Others 0	Binary																																	
Language as a child	Portuguese 1 / Others 0	Binary	-1.415	0.217	0.000	-1.388	0.218	0.000																											
Language as a child	Spanish 1 / Others 0	Binary							0.492	0.146	0.001	0.499	0.147	0.001	0.484	0.147	0.001																		
Language at work	Portuguese 1 / Others 0	Binary																-1.478	0.219	0.000	-1.450	0.220	0.000	-1.423	0.221	0.000									
Language at work	Spanish 1 / Others 0	Binary																									0.508	0.161	0.002	0.506	0.161	0.002	0.483	0.161	0.003

Exhibit 9 – Model – Base 1, Base 2,run 31 till 35 and MODEL

			BASE 2			Run 32			Run 33			Run 34			Run 35			Run 35			MODEL		
Dependent Variable		**Type**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**
DV_0 = Much more PREVENTION		Nominal	-0.649	0.217	0.003	-2.224	0.332	0.000	-3.023	0.455	0.000	-2.255	0.333	0.000	-2.341	0.359	0.000	-2.746	0.463	0.000	-3.059	0.456	0.000
DV_1 = More PREVENTION		Nominal	0.435	0.217	0.045	-1.132	0.330	0.001	-1.930	0.453	0.000	-1.164	0.331	0.000	-1.250	0.357	0.000	-1.654	0.460	0.000	-1.966	0.453	0.000
DV_2 = Equal effort to each		Nominal	1.903	0.223	0.000	0.372	0.328	0.255	-0.424	0.448	0.344	0.340	0.328	0.300	0.259	0.354	0.464	-0.148	0.457	0.746	-0.460	0.449	0.305
DV_3 = More RESPONSE		Nominal	2.702	0.232	0.000	1.197	0.331	0.000	0.410	0.449	0.361	1.166	0.331	0.000	1.091	0.357	0.002	0.683	0.459	0.137	0.375	0.450	0.404
Independ Variable	**Binary**	**Type**																					
Age	20-29 years 1 / Others 0	Binary													-0.129	0.188	0.492						
Gender	Female 1 / Male 0	Binary	-0.356	0.136	0.009	-0.373	0.136	0.006	-0.353	0.137	0.010	-0.387	0.137	0.005	-0.369	0.138	0.008	-0.379	0.137	0.006	-0.369	0.138	0.007
Primary field of study	SC+LA+T 0 / B+Eng+Oth 1	Binary										-0.349	0.167	0.037	-0.332	0.168	0.048	-0.343	0.167	0.040	-0.344	0.167	0.040
Industry	Primary Metal Ind 1 / Others 0	Binary																-0.546	0.326	0.094			
Function are you in	Transportation 1 / Other 0	Binary							-0.877	0.337	0.009										-0.879	0.337	0.009
Country grew up	Brazil 1 / Others 0	Binary				-1.552	0.249	0.000	-1.507	0.251	0.000	-1.519	0.249	0.000	-1.493	0.252	0.000	-1.470	0.251	0.000	-1.474	0.252	0.000
Country grew up	Spain 1 / Others 0	Binary	0.607	0.182	0.001	0.554	0.183	0.002	0.555	0.184	0.003	0.535	0.183	0.004	0.531	0.184	0.004	0.528	0.183	0.004	0.536	0.184	0.004
Country work in now	Brazil 1 / Others 0	Binary																					
Country work in now	Spain 1 / Others 0	Binary																					
Language as a child	Portuguese 1 / Others 0	Binary																					
Language as a child	Spanish 1 / Others 0	Binary																					
Language at work	Portuguese 1 / Others 0	Binary																					
Language at work	Spanish 1 / Others 0	Binary																					

Exhibit 10 – Base 1, Base 2 and MODEL

			BASE 1			BASE 2			MODEL		
Dependent Variable		**Type**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**	**Est.**	**Std. Error**	**Sign.**
DV_0 = Much more PREVENTION		Nominal	-2.792	0.276	0.000	-0.649	0.217	0.003	-3.059	0.456	0.000
DV_1 = More PREVENTION		Nominal	-1.705	0.272	0.000	0.435	0.217	0.045	-1.966	0.453	0.000
DV_2 = Equal effort to each		Nominal	-0.206	0.267	0.441	1.903	0.223	0.000	-0.460	0.449	0.305
DV_3 = More RESPONSE		Nominal	0.618	0.270	0.022	2.702	0.232	0.000	0.375	0.450	0.404
Independ Variable	**Binary**	**Type**									
Age	20-29 years 1 / Others 0	Binary									
Gender	Female 1 / Male 0	Binary	-0.399	0.136	0.003	-0.356	0.136	0.009	-0.369	0.138	0.007
Primary field of study	SC+LA+T 0 / B+Eng+Oth 1	Binary							-0.344	0.167	0.040
Industry	Primary Metal Ind 1 / Others 0	Binary									
Function are you in	Transportation 1 / Other 0	Binary							-0.879	0.337	0.009
Country grew up	Brazil 1 / Others 0	Binary	-1.592	0.248	0.000				-1.474	0.252	0.000
Country grew up	Spain 1 / Others 0	Binary				0.607	0.182	0.001	0.536	0.184	0.004
Country work in now	Brazil 1 / Others 0	Binary									
Country work in now	Spain 1 / Others 0	Binary									
Language as a child	Portuguese 1 / Others 0	Binary									
Language as a child	Spanish 1 / Others 0	Binary									
Language at work	Portuguese 1 / Others 0	Binary									
Language at work	Spanish 1 / Others 0	Binary									