Off-Hour Delivery Trusted Vendor Program

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Off-Hour Delivery Trusted Vendor Program

Final Report

Prepared for:

New York State Energy Research and Development Authority

Albany, NY

Joseph Tario and David McCabe
Project Managers

New York State Department of Transportation

Albany, NY

Bob Ancar and David Rosenberg
Project Managers

Prepared by:

Rensselaer Polytechnic Institute

Troy, NY

José Holguín-Veras
Principle Investigator

Cara Wang
Co-principle Investigator

Jeffrey Wojtowicz
Co-principle Investigator

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16. Abstract
The New York City Off-Hour Delivery (OHD) Program—a program that encourages night deliveries (between 7 p.m. and 6 a.m.) to businesses in NYC—has proven to be successful and impactful, reducing freight traffic in the daytime hours and providing significant savings in terms of transportation costs and environmental emissions. The main objective of the program was to create and implement the Trusted Vendor Program (TVP), a recognition program designed to foster OHD in urban areas. Businesses that have a Trusted Vendor are more likely to accept off-hour deliveries because the program provides business establishments with information about trustworthy shippers and carriers that fulfill the required conditions of safe and community-friendly delivery practices. The program functions through a nomination process, where vendors are recognized based on their excellent track record with clients, business partners, and government agencies. Certified Trusted Vendors are acknowledged and displayed on the program website, providing an initial reference for receivers and promoting vendor involvement in OHD and future sustainability initiatives.

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Abstract

The New York City Off-Hour Delivery (OHD) Program—a program that encourages night deliveries (between 7 p.m. and 6 a.m.) to businesses in NYC—has proven to be successful and impactful, reducing freight traffic in the daytime hours and providing significant savings in terms of transportation costs and environmental emissions. The main objective of the program was to create and implement the Trusted Vendor Program (TVP), a recognition program designed to foster OHD in urban areas. Businesses that have a Trusted Vendor are more likely to accept off-hour deliveries because the program provides business establishments with information about trustworthy shippers and carriers that fulfill the required conditions of safe and community-friendly delivery practices. The program functions through a nomination process, where vendors are recognized based on their excellent track record with clients, business partners, and government agencies. Certified Trusted Vendors are acknowledged and displayed on the program website, providing an initial reference for receivers and promoting vendor involvement in OHD and future sustainability initiatives.

Keywords

Acknowledgments

Table of Contents

List of Figures

List of Tables

Acronyms and Abbreviations

NYSERDA	New York State Energy Research and Development Authority
NYSDOT	New York State Department of Transportation
RPI	Rensselaer Polytechnic Institute
TANY	Trucking Association of New York
GCP	Grand Central Partnership
NYCDOT	New York City Department of Transportation
OHD	Off-Hour Deliveries
TVP	Trusted Vendor Program
BID	Business Improvement District
USDOT	United States Department of Transportation
RITA	Research and Innovation and Technology Administration
FHWA	Federal Highway Administration
EPA	Protection Agency
NAICS	North American Industry Classification System

Summary

Metropolitan areas are the heart of national economies with 80% of the cargo transported in the United States originating or arriving in one of the country's top 100 cities. Freight logistics act as circulatory systems for these economic powerhouses. In the New York Metropolitan Area, 1.4 million deliveries are made daily. With congestion, the number of vehicles required to make those deliveries increases, as does energy consumption and emissions, along with its negative health effects, while the overall maintainability of logistical operations decreases. To achieve vibrant urban economies, enhanced livability, and a high quality of life, greater efficiency must be fostered in freight systems.

The Off-Hour Delivery Program (OHD) is a freight demand management initiative that has been implemented in New York City and has since been adopted by multiple cities globally, including Orlando (FL), Washington DC, London (UK), Sao Paulo (Brazil), and Bogota (Columbia). Based on a unique private-public-academic partnership, the NYC OHD program induces receivers of freight supplies to voluntarily accept deliveries between the hours of 7 p.m. and 6 a.m. This conceptually simple shift in delivery times—and the change in focus from the carriers of freight to the receivers that generate the demand—is the core of an innovative program that has achieved remarkable direct impacts.

Carriers in NYC that shift from regular-hour to the off-hours delivery routes have reduced operational costs by 35 to 45%, with estimates showing savings of \$30,000 to \$50,000 per year. More importantly, the combined effects of less traffic and more direct routes leads to emission reductions per vehicle in the range of 60 to 70%. Specifically, if 30% of midsize trucks in the City shifted their deliveries to the night hours, emission reductions could reach an estimated 8.66 million tons/year of CO_2 and 24.5 thousand tons/year of CO or more than 6,300 metric tons of CO_2 eliminated for every OHD receiver.

A major challenge to the implementation and success of the OHD program is encouraging businesses to shift their deliveries to the off-hours. For carriers, the reduced congestion of nighttime deliveries is clearly advantageous as it decreases delivery costs with less time on the road, provides more available parking, and moderates fuel consumption. Receivers, however, often require additional arrangements that included security implementations to accept cargo at night without the need of additional staff (unassisted OHD or UOHD). Successful pilot studies have suggested that while economic incentives are a key to encouraging receiver participation initially, to ensure a self-maintained program collaboration, or trust, among stakeholders is needed for the long-term. A survey in 2015 offered to encourage receivers to

make the switch to OHD found that receivers valued having a "trusted vendor" highest among multiple incentives (monetary and non-monetary). These findings inspired the development of a Trusted Vendor Program (TVP) that certifies and officially recognizes qualified vendors. The project team believes that such a program endorsed by established organizations can help vendors, especially small vendors, earn confidence from receivers, thereby increasing participation in OHD. The goal of TVP is to develop a qualified pool of vendors to expand the OHD program and reap its efficiency and environmental benefits.

The Trusted Vendor Program is a collaborative effort between Rensselaer Polytechnic Institute (RPI), the Trucking Association of New York (TANY), Grand Central Partnership (GCP) and the New York City Department of Transportation (NYCDOT), designed to provide businesses with information about shippers and carriers that fulfill the required conditions of safe and community-friendly delivery practices. The program functions through a nomination process, in which vendors are recognized based on excellent track record with clients, business partners, and government agencies. Vendors recognized as Trusted Vendors are displayed on the program website, which provides an initial reference for receivers and promotes vendor involvement in OHD and future sustainability initiatives.

This report details the planning, design, implementation, and evaluation of the Trusted Vendor Program. RPI led the research through designing the program, a process that included a market assessment (Task 3), developing liability and funding models (Task 4), establishing qualifications and criteria (Task 5), process design (Task 6), program maintenance, and evaluation (Task 6), and creating training materials (Task 6). With the collaboration of TANY, GCP and NYCDOT, RPI also led the program outreach (Task 2) and implementation of TVP (Task 7). The report details the research and planning effort, including a market analysis, development of the program's funding models, criteria, governance and maintenance, program implementation, as well as its evaluation via a cost/benefit analysis, and current status.

A market analysis was created to assess (1) what types of businesses—previously unwilling to participate in OHD—might consider the Trusted Vendor Program, (2) what types of carriers are most interested in being certified as Trusted Vendors, and (3) what are the major concerns and obstacles of participating in the TVP. Results from the study showed that one-third of the establishments indicated they already have a trusted vendor. Certain sectors, such as Transportation and Warehousing (NAICS 48-49), Finance and Insurance (NAICS 52), and Healthcare and Social Assistance (NAICS 62) generally did not have trusted

vendors, while the highest percentage of trusted vendors (44.4%) was found in Accommodation and Food (NAICS 72). The study revealed that in general, based on employment size, establishments with less than 30 employees engage trusted vendors, while larger establishments did not. This information presents a valuable opportunity to target establishments that do not currently have a vendor they trust.

By design, the TVP needs to be flexible for large-scale implementation as well as include a communication mechanism, liability solutions, and funding models to make it self-sustaining and reliable. A recognition-based program available on a web platform, TVP must allow interaction among businesses as well as offer transparency to the public, with information about best practices for freight delivery. A nomination application process is used for new trusted vendors, in which businesses nominate carriers they trust, and the TVP administrator evaluates the application, based on specific guidelines and the verification of references submitted during nomination.

To establish the Trusted Vendor criteria, the project team reviewed the literature on trust and best practices for existing programs. Given the basis for this program, the key qualification requires some experience in OHD. Nonetheless, if a vendor is new to OHD but has a long-standing reputation with customers and has public recognition, it is still possible to become a trusted vendor. Key features of the program were established with insights from the food and accommodation sector and other receiver business sectors. The insights included practical aspects of the OHD performance experience, insurance, training, and the type of evaluation system for the program.

The TVP website facilitates interaction and synergy between vendors, receivers, and the program administrator. [1] The homepage includes (1) a brief description of the program and benefits, (2) trusted vendor testimonials, (3) news relevant to the program, and (4) the list of sponsors. The list of Trusted Vendors—with their names and logos displayed—on the homepage dynamically updates as new vendors are accepted. Vendor stories are included as well as information about the program and its sponsors. The benefits for vendors, receivers, and the community as well as the three-step process for becoming accepted is outlined. The role of the third- party nominator is described, and the corresponding links for the Self-Nomination Form for vendors, and the Third-Party Nomination form for businesses are provided. In addition, training materials for (1) off-hour deliveries, (2) low-noise deliveries, and (3) fostering trust are included.

The implementation phase of the TVP, which included recruiting potential participants, began in spring 2018 with a small-scale rollout that coincided with the release of the website. By mid-2018 several receivers were ready to nominate vendors to the program, and representatives from the SmartWay program sent information about TVP to the SmartWay community. NYCDOT also engaged actively to nominate businesses that were already performing off-hour deliveries in NYC, and they will be promoting TVP as a key tool to potential participants in the OHD relaunch campaign. The program currently has ten trusted vendors, which will continue to grow as more businesses seek recognition for participating in OHD and for providing sustainable freight transportation practices.

A cost benefit analysis was developed for the Trusted Vendor Program, with metrics to assess different stages of implementation that apply to key stakeholders (i.e., vendors, receivers, and the community). The impacts of the TVP were detailed for three scenarios: base case, short-term, and long-term. The base case assumption was that all businesses would conduct operations as usual (i.e., with approximately 30% of establishments currently engaging trusted vendors). The short-term assumption was that the TVP would increase public recognition of receivers and vendors performing OHD, while the proportion of establishments with trusted vendors would remain unchanged. The long-term scenario assumed that the proportion of establishments with trusted vendors would increase from 30% to 50%. Additional analysis was developed to quantify the impact of OHD in the reduction of greenhouse gas (GHG) emissions. Overall, the benefits from the program were found to far outweigh the costs. Vendors benefit through enhanced productivity and reduced operational costs. Vendors participating in the program also have the potential to increase business, given the recognition and advertising they receive as participants. The receivers also benefit through enhanced productivity and reliable deliveries. For the community, the reduction of regular-hour deliveries effectively reduces traffic congestion, and thereby air pollutants. The results indicate that TVP in enhancing OHD is clearly a positive solution that benefits vendors, receivers, and urban communities at all hours, enhancing urban quality of life, economic development, and environmental sustainability.

1   Introduction

Freight activities are a complex system of operational relationships and logistics as well as an essential part of society. However, to achieve vibrant urban economies, enhanced livability, and a high quality of life, planners must consider how to foster greater efficiency in freight systems. Significant research conducted on the different initiatives that tackle freight logistic issues include (1) supply-centered initiatives such as Infrastructure Management, Parking/Loading Zones Management, Traffic Management and (2) demand-centered initiatives such as Freight Demand Management (FDM). An increased attention on the supply-end of the initiatives has helped to improve various aspects of the freight supply. Yet, when it comes to FDM there are challenges because demand management aims to change the behaviors of businesses, a purview that is often outside the control of planners and authorities. Examples of these initiatives include encouraging receivers to consolidate or retime their deliveries (Holguín-Veras and Sánchez-Díaz, 2016). Implementation of such initiatives requires receivers to change the way they are running their businesses, and as running a business is significantly demanding in and of itself with many day-to-day activities, it is difficult to get managers/owners to alter their patterns of operation. If receivers are convinced the changes will be beneficial, they might consider them; if not, they typically maintain business-as-usual. Not surprisingly, gaining the attention of receivers is still a challenge.

Urban freight behavioral studies in FDM initiatives have shown that incentives are the key to behavior changes (Holguín-Veras et al., 2008; Kawamura and Lu, 2008; Holguín-Veras, 2009; Domínguez et al., 2012; Holguín-Veras et al., 2014; Holguín-Veras et al., 2017a; Holguín-Veras et al., 2018a). In the case of off-hour deliveries (OHD)—shifting deliveries to off-peak hours (between 7 p.m. and 6 a.m.)—the opposition is that the change would require an additional staff member to receive the cargo during the overnight hours. Successful pilot studies of OHD conducted in NYC and other parts of the world have suggested that while economic incentives are a key to changing behavior initially, collaboration among stakeholders is needed to ensure a self-sustaining program in the long run. In terms of unassisted OHD, the operation relies primarily on the trust the receiver business has with their vendors, making an established, certified trusted vendor more appealing and making receivers more inclined to participate in this program (Holguín-Veras et al., 2017a). Thus, in practice it is important to create the conditions in which receivers have trusted vendors to perform unassisted OHD. The Trusted Vendor Program is designed to certify and recognize Trusted Vendors that are currently or starting to perform unassisted in NYC.

In considering unassisted OHD, both receivers and vendors have concerns; for example, the risk or safety surrounding the delivery area, the risk or safety of the transported supplies, the trustworthiness of the

vendor, and the economic consequences of a potentially negative outcome. Therefore, it is crucial to set the stage and identify trusted vendors that are gaining experience in OHD and performing deliveries with excellence. The project team believes that a Trusted Vendor Program, endorsed by trustworthy organizations, can help vendors, especially small vendors, earn the trust of their receivers, which can increase participation in OHD. And the benefits extend beyond OHD in that with trusted vendors, receivers tend to be more willing to accept freight consolidation and other sustainability strategies focusing on last-leg deliveries. Once developed, the program can be operated with minimal involvement from public agencies, making it an attractive long-term incentive. The TVP can effectively engage the private sector, foster OHD and other urban freight management policies, and eventually promote, facilitate, and enable a more sustainable urban freight system.

The Trusted Vendor Program outlined in this report is a collaborative effort between Rensselaer Polytechnic Institute (RPI), the Trucking Association of New York (TANY), Grand Central Partnership (GCP) and New York City Department of Transportation (NYCDOT). RPI led the research through designing the program, a process that included a market assessment (Task 3), developing liability and funding models (Task 4), establishing qualifications and criteria (Task 5), process design (Task 6), program maintenance, and evaluation (Task 6), and creating training materials (Task 6). With the collaboration of TANY, GCP and NYCDOT, RPI also led the program outreach (Task 2) and implementation of TVP (Task 7). TANY's role has been to actively reach out to vendors to gain feedback for the design of the program and to further support its implementation. GCP has played a similar role with the receivers, continually reaching out to local establishments in their business improvement districts (BID) to provide feedback through focus groups and to promote the program during its implementation stage. NYCDOT provided institutional support as a public authority and has been an active promoter of the program through their OHD campaign and the identification of potential trusted vendors.

The report is divided into seven sections. The first provides a brief background on the Off-Hour Delivery Project and outlines the importance of Trusted Vendors in encouraging OHD participation. Section 2 describes the market analysis and marketing plan for the Trusted Vendor Program. Section 3 details the program design, including establishment of the qualifications and criteria of a Trusted Vendor, design phases, liabilities, maintenance and evaluation, and training materials. Section 4 describes the webpage developed to host the TVP. Section 5 provides an overview of the implementation and includes the list of Trusted Vendors enrolled in the program to date. Section 6 describes the cost benefit analysis, and the final section presents concluding remarks and next steps.

2 Background

2.1 The Urban Freight System and Off-Hour Deliveries

A well-functioning urban freight system is important for the industrial, commercial, and leisure activities that foster economic vitality. However, it also aggravates traffic congestion and pollution problems. Operating freight activity in a way that maximizes efficiency and minimizes negative externalities is extremely important for the economy and quality of life.

Between 2011 and 2013, Rensselaer Polytechnic Institute (RPI), in collaboration with the New York City Department of Transportation (NYCDOT), led a project aimed at increasing off-hour deliveries (OHD) (deliveries made between 7 p.m. and 6 a.m.) with support from the Research and Innovation Technology Administration (RITA), a unit of the United States Department of Transportation (U.S. DOT). After the successful pilot test, the team continued to lead a large-scale implementation of OHD in New York City.

The Off-Hour Deliveries (OHD) program has been profoundly influential and impactful, locally, domestically, and internationally. For New York City, the average fuel consumption rate and total emission rate during off-hours were found to be significantly lower than those during regular hours. The differences are generally larger than 20% for highway and toll road segments and larger than 50% for urban arterial road. The congestion and pollution savings for regular-hour road users are significant. If 20.9% of the deliveries in Manhattan were shifted to the off hours, each receiver would be responsible for an annual reduction of about 551 vehicles miles traveled (VMT), 195 vehicle hours traveled (VHT), carbon monoxide (CO) of 12 kg, hydro carbons (HC) of 1.9 kg, nitrogen oxides (NO_x) of 0.7 kg and particulate matter (PM_{10}) 0.004kg. This translates into a total reduction of 202.7 tons of CO, 40 tons of HC, 11.8 tons of NO_x and 70 kg of PM_{10} per year.

To date, the OHD program has been officially adopted by the City of New York as a feature of its sustainability plan—the first research project incorporated into NYC transportation policy. Further, the success of the NYC OHD program garnered a grant program, jointly funded by the Federal Highway Administration (FHWA) and the Environmental Protection Agency (EPA), to foster OHD programs in other cities. Orlando, Florida, and Washington, DC were selected as the first recipients and are actively developing their own versions of OHD programs. OHD has also captured the attention of public and private-sector representatives from multiple U.S. cities, including Boston, Atlanta, Chicago, and Seattle. Internationally, the program has also been implemented in European and Latin American cities, including London, Stockholm, Brussels, Copenhagen, São Paulo, Bogotá, Santiago de Chile, and Barranquilla

(Douglas et al., 2008; Verlinde et al., 2010; Brom et al., 2011; Holguín-Veras et al., 2012b; Centro de Inovação em Sistemas Logísticos, 2015; CISLOG, 2015; COE-SUFS, 2016; Holguín-Veras et al., 2016; Jaller et al., 2016; SEPRO, 2016; Transport for London, 2017; Fu and Jenelius, 2018). Overall, these implementations have proven that OHD is effective in reducing congestion, pollution, vehicle accidents, noise, and infrastructure damage.

One major challenge for the long-term maintainability of the OHD program is the provision of cost-effective incentives to promote program participation. For carriers and shippers, the cost and time savings are sufficient reasons to change; other incentives are not necessary. As deliveries shift from the regular hours, carrier travel times are reduced, and fuel savings gained due to lower congestion. In the off-hours, there is also low probability that the truck driver will have difficulty finding suitable parking/unloading areas or get parking fines. Yet, for receivers, overnight cargo requires additional time and financial costs, as receivers that are not open at night need to hire additional staff to receive shipments. Unassisted OHD, that is, deliveries received outside of the regular hours without the assistance of staff, have been proposed to tackle this issue. However, the decision to accept either unassisted OHD or staffed OHD requires a tradeoff between risk and reward (Holguín-Veras et al., 2007; 2008; Holguín-Veras, 2011).

2.2   Trusted Vendor Program

To ensure participation in the NYC OHD program, several incentive mechanisms were provided to both types of receivers, those accepting staffed as well as those accepting unassisted OHD. With support from U.S. DOT, several forms of incentives—both monetary and non-monetary—were offered to businesses, with different degrees of success. The resulting estimates are listed in Table 1. As shown, the various policy incentives have a sizable monetary value, though the valuation varies with industry segment. The results reveal that offering business support has the same effect as a $1,078 to $3,049 one-time incentive, although it would also require public-sector investment, which would need to be factored in for implementation. Providing public recognition is equivalent to a one-time incentive ranging from $666 to $1,885. This range is lower than the one for business support, although it is an attractive alternative because the need to incur large expenses is not necessary. The project findings revealed that having a vendor they trust is the most important factor for receivers to continue to participate in OHD. As shown in Table 1, responders valued the importance of a trusted vendor with a subjective monetary value ranging from $1,741 to $36,538 (Holguín-Veras et al., 2017a). This, together with the finding that 48.58% of establishments do not need the consent of anyone else to implement OHD suggests that a Trusted Vendor Program could play a key role in fostering OHD.

Table 1. Subjective Monetary Values of Incentives for Each Industry Segment

Resulting estimates for the various policy incentives offered.

Source: (Holguín-Veras et al., 2017a)

NAICS	315	424	445	448	453	711	812		
Description	Apparel manufacturing	Non-durable wholesaler	Food and beverages	Clothing stores	Miscellaneous store retail	Performing arts	Personal and laundry services	Other segments	Range
Business Support	$1,340	$1,078	$1,831	$1,308	$3,049	$3,049	$3,049	$3,049	$1,078 - $3,049
Public Recognition	$829	$666	$1,132	$809	$1,885	$1,885	$1,885	$1,885	$666 - $1,885
Trusted Vendor	$3,357	$1,741	$14,483	$12,037	$36,538	$25,782	$5,529	$5,529	$1,741 - $36,538

To further investigate the feasibility of a Trusted Vendor Program, a small sample follow-up survey was conducted to assess receivers' perceptions. Fifteen business establishments were randomly selected and interviewed via phone. For the question: What makes a vendor "trusted"? The answers included: reputable name, large company size, long-term contract, same delivery guy every day, and making deliveries safely and on-time. When asked whether they would trust a vendor if the vendor was certified, nine (60%) answered "yes" or "possibly." For the question, Would you participate in OHD if you had a certified Trusted Vendor? Two businesses that previously stated they were "not willing" answered "yes."

These findings suggest a recognition program endorsed by trustworthy organizations could indeed help vendors, especially small vendors, earn trust from receivers, thereby increasing participation in OHD.

3 Trusted Vendor Program in New York City: Market Analysis and Marketing Plan

The purpose of the Trusted Vendor Program is to encourage OHD in urban areas, which requires that both the vendors/carriers and the receivers alter their current business operations. Carriers are more inclined to participate in the program, as they directly benefit from the time and economic savings associated with nighttime deliveries, including not having to spend time finding suitable parking in crowded urban areas (Holguín-Veras et al., 2008) and completing their deliveries without the added stress of traffic congestion that occurs during the daytime hours (Brom et al., 2011).

The project research showed that the willingness to accept unassisted OHD increases with the presence of a trusted vendor, and that having a trusted vendor has the same effect on the acceptability of UOHD as offering an incentive of between $4,863 and $33,139, depending on the industry sector. (Holguín-Veras et al., 2017b). The study further suggests that receivers of "miscellaneous retail" are those that feel a trusted vendor would most impact their willingness to accept unassisted OHD. The potential acceptance of unassisted OHD by these receivers was increased to 50% from the presence of a trusted vendor.

To maximize the efficiency of the Trusted Vendor Program, it is important to understand which types of receivers would react well to the program. This section analyzes the potential of a TVP in NYC and discusses the marketing plan.

3.1 Market Assessment

3.1.1 Receivers with a Trusted Vendor

A survey was conducted to investigate whether receivers worked with vendors they considered to be trusted. A Trusted Vendor is defined here specifically as a vendor that receivers would be comfortable allowing access to their premises during the off-hours, between 7 p.m. and 6 a.m., without staff present to receive the supplies. In the survey, the respondents were asked if they have such a vendor currently. The data were collected randomly from 263 establishments receiving freight trips in New York City. The sample was designed to resemble the statistical distribution of establishments in Manhattan, but with a higher weight given to industry sectors that generate freight trips and potential participants in public-sector initiatives aimed at enhancing the performance and sustainability of the urban freight system.

The establishments involved in the analysis were categorized using two-digit NAICS codes. Participants included representatives from the Manufacturing (NAICS 31-33), Wholesale Trade (NACIS 42), Retail Trade (NAICS 44-45), Transportation and Warehousing (NAICS 48-49), Financial and Insurance (NAICS 52), Health Care and Social Assistance (NAICS 62), Arts, Entertainment, and Recreation (NAICS 71), Accommodation and Food Services (NAICS 72), and Other Services (NAICS 81). Table 2 shows the list of industry sectors and their corresponding number and percentage of respondents. A brief description of the industry sectors and their general sales practices follows Table 2.

Table 2. Surveyed Establishments by Industry Sector

Breakdown of the respondents based on industry sectors.

Source: (Holguín-Veras et al., 2017b)

NAICS	Description (Code)	No. of Respondents	Percentage
44-45	Retail Trade	107	40.68%
81	Other Services	55	20.91%
31-33	Manufacturing	44	16.73%
42	Wholesale Trade	28	10.65%
71	Arts, Entertainment, Recreation	15	5.70%
72	Accommodation and Food Services	9	3.42%
62	Health Care and Social Assistance	2	0.77%
48-49	Transportation and Warehousing	2	0.76%
52	Financial and Insurance	1	0.38%

The Retail Trade sector (NAICS 44-45) are businesses involved in retailing merchandise and providing services related to the sale of merchandise and products sold to the general public. This type of establishment includes store retailers, characterized by fixed point-of-sale locations. Businesses that do some manufacturing and sell their products at the same time are not considered under this classification, nor are wholesalers; the retail trade sector includes businesses organized to serve the general public.

Establishments in the Wholesale Trade sector (NAICS 42) are engaged in the sale and resale of merchandise, generally without transformation, and services related to this activity. These businesses sell merchandise to other businesses and usually operate out of warehouses or offices. Some of the establishments may be connected to a single manufacturer, selling its products to a number of retailers, or connected to a number of retail chains and providing products from multiple manufacturers.

The main activity for firms in the Manufacturing sector (NAICS 31-33) is the production of new products, according to a mechanical, physical, or chemical transformation of materials, substances or components. The establishments in this sector are most frequently plants, factories, or mills and are characterized by having heavy machinery and materials-handling equipment. Yet, other establishments that produce handmade products at home are also classified in this sector. Usually, manufacturers transform raw materials that may be purchased directly from producers or through traditional trade channels as well as from their own businesses.

The Arts, Entertainment, and Recreation sector (NAICS 71) includes establishments that manage facilities or provide services for cultural, entertainment, and recreational purposes, ranging from the promotion of live performances or events, the presentation of exhibits, to the preservation and exhibit of objects and sites of historical, cultural, or educational interest.

Establishments in the Accommodation and Food Services sector (NAICS 72) are those providing lodging and/or the preparation of food for immediate consumption. Food service contractors, caterers, mobile food services, and drinking establishments and restaurants are part of this sector, which may provide food service from (1) the customer's location, (2) a location designated by the customer, or (3) motorized or non-motorized vehicles.

The Transportation and Warehousing sector (NAICS 48-49) includes industries that provide transportation of passengers and cargo, warehousing and storage for goods, and other types of transportation or related modes of transportation. The establishments considered in this sector are basically those providing warehousing and storage of goods, postal services, or other courier services. Warehousing establishments differ from wholesale establishments in that warehousing establishments do not sell the goods being stored.

The Finance and Insurance sector (NAICS 52) includes establishments that perform and/or facilitate financial transactions, where three main activities take place: (1) financial intermediation, (2) risk management, and (3) specialized services related to the sector.

The Healthcare and Social Assistance sector (NAICS 62) is composed of businesses providing health- care and social assistance for individuals (U.S. Census Bureau, 2010).

The Other Services sector (NAICS 81) represents businesses providing services in areas not described in detail in other NAICS, such as dry cleaning and laundry services, spas, fitness centers, pet grooming, and pharmacies.

3.1.1.1 Industry Sectors That Have Trusted Vendors

The survey results indicate that there are establishments currently working with trusted vendors, which confirms different industry sectors are willing to accept the concept of a reliable or Trusted Vendor. However, the level of acceptance may vary depending on the industry sector. As shown in Figure 1, some sectors have a high percentage of trusted vendors, while others have none.

Figure 1. Trusted Vendors Per Two-Digit NAICS

The shaded area indicates the percentage of respondents per industry sector that have a trusted vendor. The number of responses for receivers with and without trusted vendors are shown in the table below.

Source: (Holguín-Veras et al., 2017b)

2-digit NAICS	72: Food & Accom.	81: Others	31-33: Manufacturing	42: Wholesale	44-45: Retail	71: Entertainment	48-49: Transp. & Wareh.	52: Finance & Insurance	62: Health & Social Assist
☐ No Trusted Vendor	5	35	30	19	75	11	2	1	2
■ Have Trusted Vendor	4	20	14	9	32	4	0	0	0
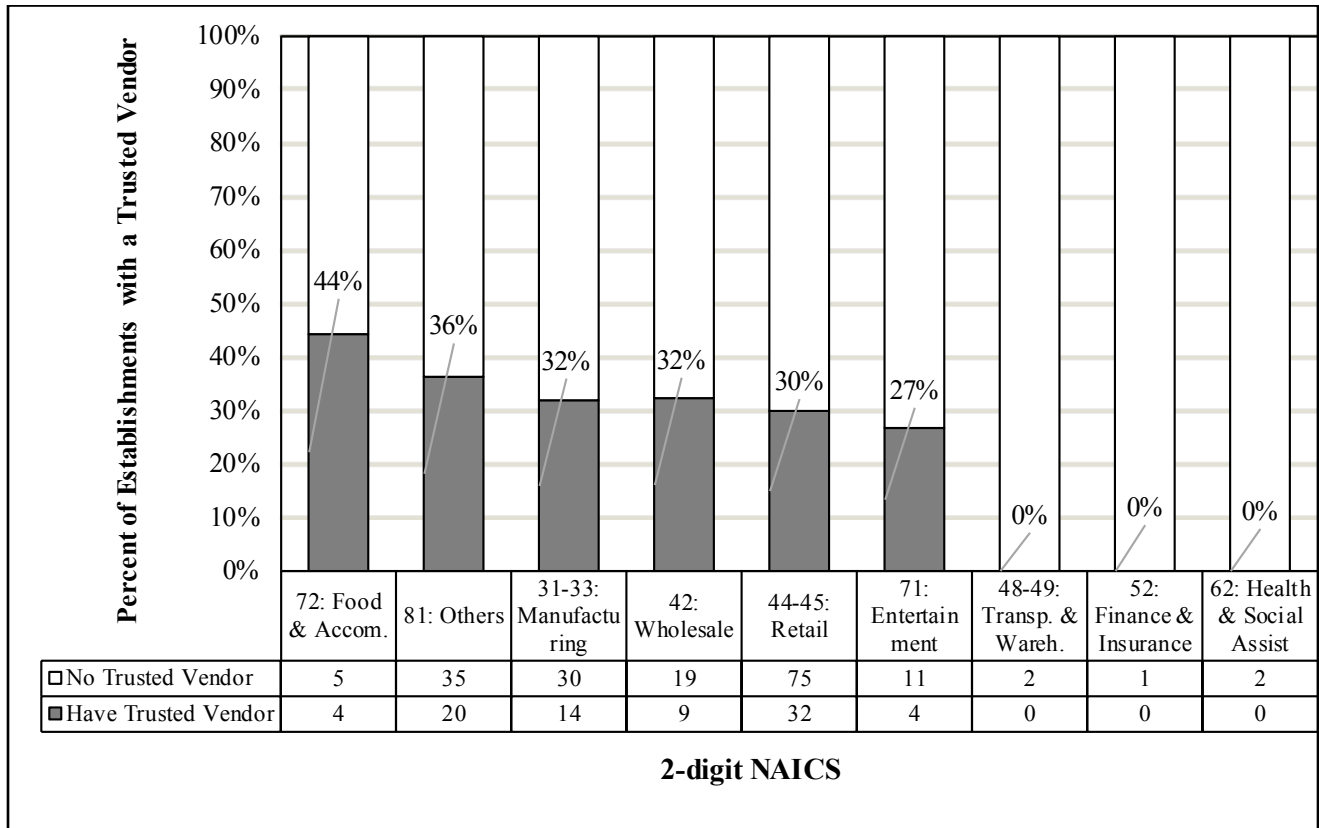
The highest percentage of trusted vendors is found in the Accommodation and Food sector (NAICS 72) (although this should be viewed with some caution because of the limited observations in this sector) where 44.4% of the establishments have a trusted vendor, followed by Other Services (NAICS 81) with 37.0%. Manufacturing establishments (NAICS 31-33) are next with 33.3% of the sector engaging trusted vendors and is followed by Wholesale establishments (NAICS 42) with 32.1%, Retail establishments (NAICS 44-45) with 29.7%, and Arts and Entertainment (NAICS 71) with 28.6%. In Figure 1 the percentages on the bars reflect the potential market for the TVP (i.e., the share of establishments without a trusted vendor in each sector).

3.1.1.2 Employment Size

A similar analysis was done to determine the percentage of trusted vendors for establishments with different numbers of employees to understand whether the size of the business affects the acceptance of trusted vendors. Figure 2 shows the results, with employment numbers classified into different employee bins. The results suggest that establishments with between 10 and 15 employees have the highest number of trusted vendors (60.0%). For the other employment bins, the percentage of trusted vendors varies between 20.9 and 39.8%, except for establishments with more than 30 employees, none of which noted a trusted vendor.

Figure 2. Trusted Vendors Versus Number of Employees for All Sectors

The shaded area indicates the percentage of respondents that have a trusted vendor by employment size.
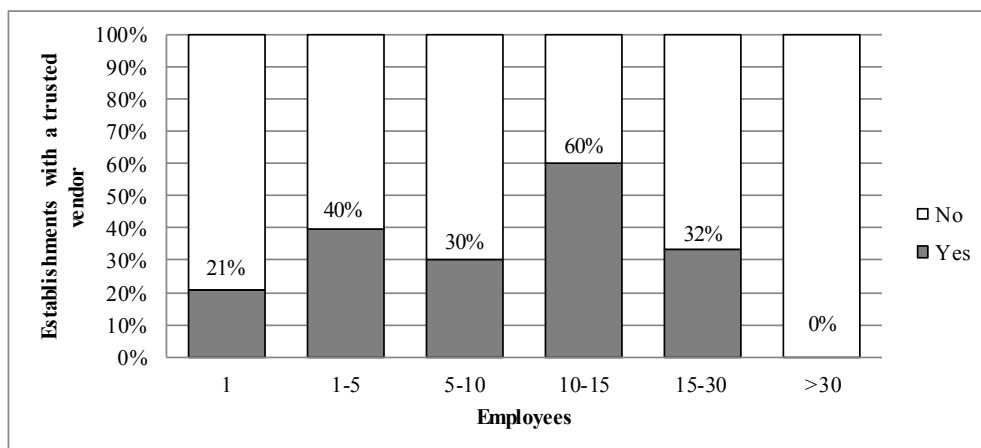
3.1.1.3 Industry Sector and Employment Size

Table 3 shows the share of establishments with a trusted vendor by type of industry sector as well as size by employment. The highest share of establishments with trusted vendors are found in the businesses with employee ranges from 6 to 30. An exception is found in the Restaurants and Accommodation sector (NAICS 72), where more than 50% of one-employee establishments have trusted vendors. It should be noted that establishments surveyed in this category have from 1 to 15 employees, which explains the shift in the percentage observed for Trusted Vendors. The retail sector (NAICS 42) and other service sectors (NAICS 81) show a similar pattern, where more than half of the establishments with employees ranging from 15 to 30 have trusted vendors, while in the wholesale sector (NAICS 42), 50% of the establishments with 10 to 15 employees have Trusted Vendors. Finally, two sectors have 100% of their establishments with Trusted Vendors in two categories: The Arts and Entertainments sector (NAICS 71) in the group of establishments with 10 to 15 employees, and the Manufacturing sector (NAICS 31–33) in establishments with 5 to 10 employees. This indicates a preference for trusted vendors in smaller industries.

Table 3. Share of Establishments with a Trusted Vendor per Industry and Employment

Each cell shows the percentage of establishments with a trusted vendor with respect to the type of industry (in NAICS code) and size of employment. Cells with "NA" have no observations in the sample, while 0% indicates that none of the establishments have a trusted vendor. Industry sector and employment combinations are shaded when more than half of the establishments have trusted vendors.

Industry Sector	Empl. 1	Empl. 2-5	Empl. 6-10	Empl. 11-15	Empl. 16-30	Empl. >30	Overall
Restaurants and Accommodation (NAICS 72) Survey Observations: 9	66.7%	0.0%	50.0%	50.0%	NA	NA	44.4%
Other services (NAICS 81) Survey Observations: 48	34.8%	36.8%	0.0%	NA	50.0%	0.0%	37.0%
Manufacturing (NAICS 31-33) Survey Observations: 42	0.0%	48.1%	100.0%	NA	NA	0.0%	33.3%
Wholesale (NAICS 42) Survey Observations: 28	12.5%	45.5%	33.3%	50.0%	0.0%	NA	32.1%
Retail (NAICS 44-45) Survey Observations: 95	18.9%	36.7%	33.3%	NA	50.0%	NA	29.7%
Arts and Entertainment (NAICS 71) Survey Observations: 13	25.0%	40.0%	0.0%	100.0%	NA	NA	28.6%
Total	21.8%	39.8%	30.0%	60.0%	40%	0.0%	30.2%

3.1.1.4 Geographic Location of Establishments

Additional insights can be gained by exploring the geographic location of the establishments with a trusted vendor per industry sector. Figure 3 and 4 show the proportion of establishments from retail trade, restaurants and accommodation, manufacturing, and retail with (black column) and without (white column) a trusted vendor.

Figure 3. Geographical Distribution of Trusted Vendors in Retail (NAICS 44-45) and Restaurants and Accommodation (NAICS 72) Sectors

The geographical distribution of trusted vendors in the Retail and Restaurants and Accommodation sectors are shown on the left and right, respectively. The height of the column indicates the number of respondents, while the section colored in black represents the number of respondents with trusted vendors, and the section colored in white represents the number of respondents without trusted vendors.
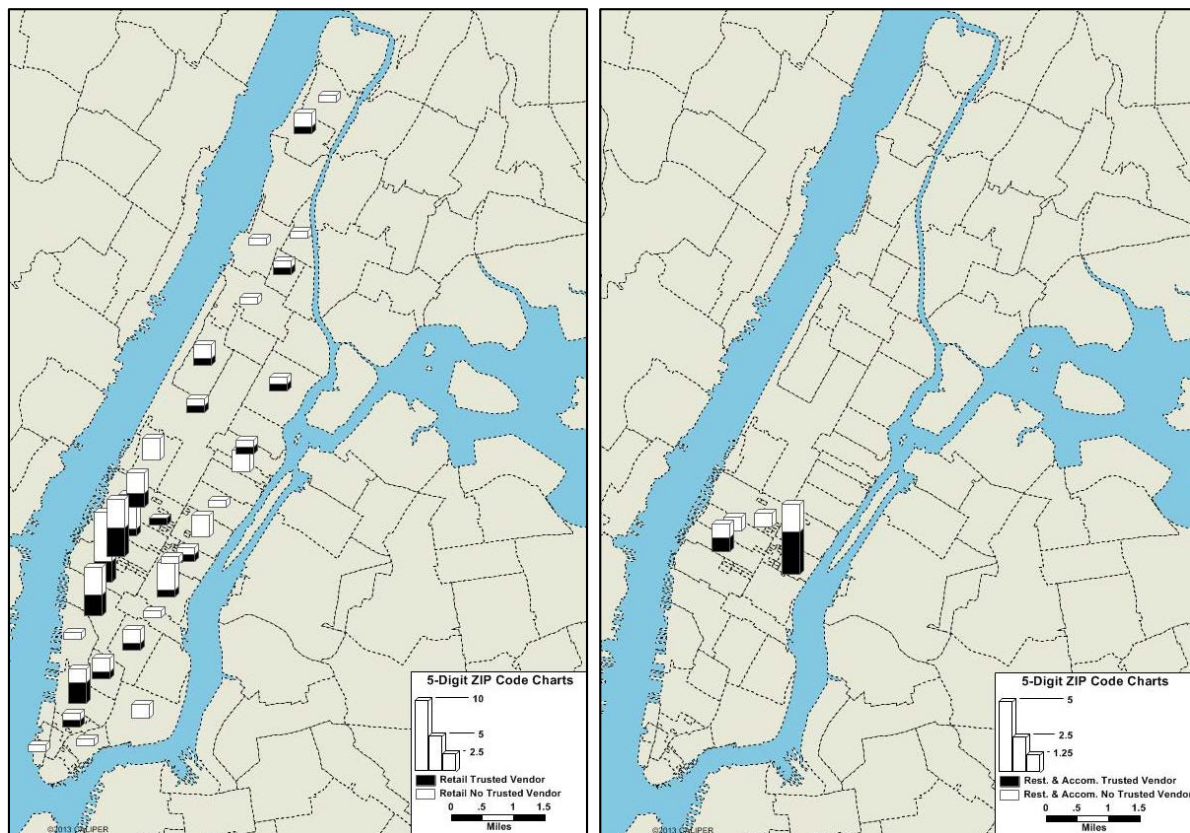
Figure 4. Geographical Distribution of Trusted Vendors in Manufacturing (NAICS 31-33) and Other Services (NAICS 81) Sectors

The geographical distribution of trusted vendors in the Manufacturing and Other Services sectors are shown on the left and right, respectively. The height of the column indicates the number of respondents, while the section colored in black represents the number of respondents with trusted vendors, and the section colored in white represents the number of respondents without trusted vendors.
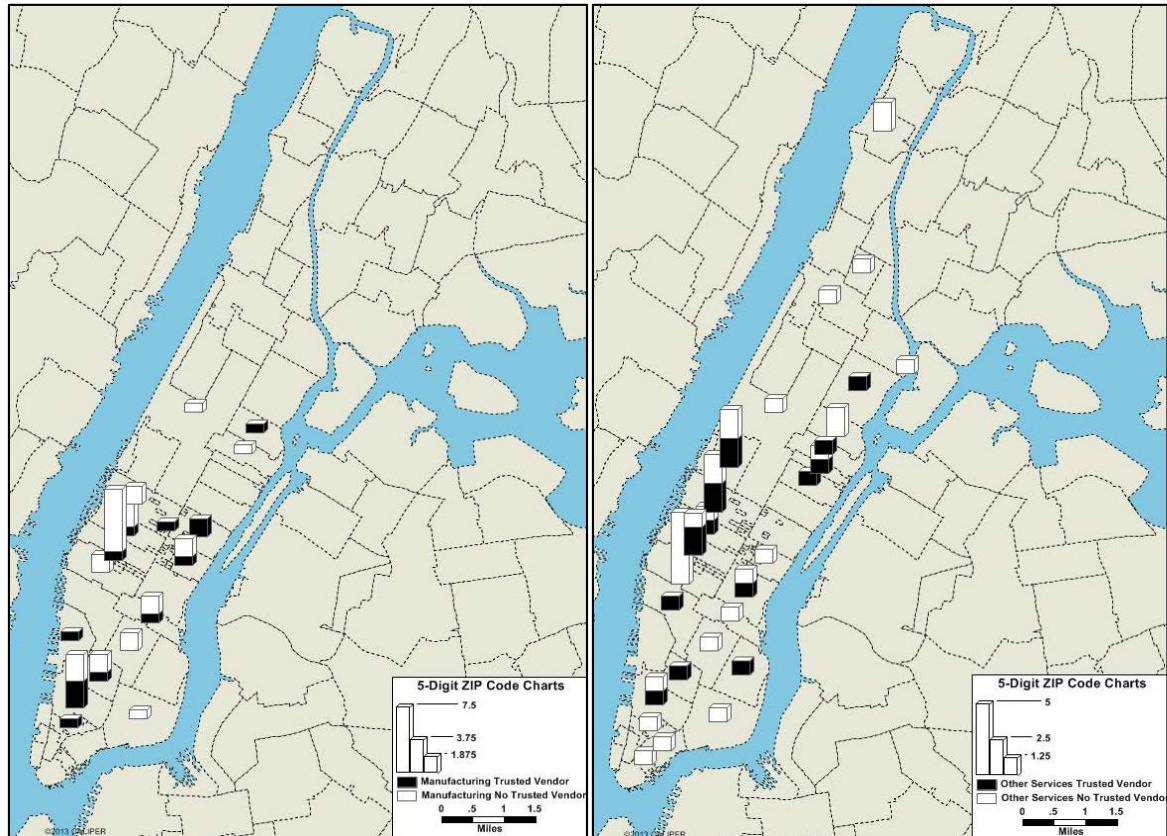
In essence, a number of establishments had trusted vendors in place initially, while the majority of establishments did not. This observation provides the key premise for the study, that is, the industry sectors that already had trusted vendors, offer the occasion to increase the number of establishments with a trusted vendor by means of a recognition program such as the Trusted Vendor Program. The benefits of the OHD program constitute an advantage that should inspire other businesses in the same industry to enlist a trusted vendor to achieve similar results. The establishments polled are concentrated in midtown and downtown Manhattan, the City's most congested areas. An increase in the number of establishments with a trusted vendor in the overcrowded areas will facilitate the implementation of unassisted OHD and significantly decrease the impacts of delivery traffic.

3.1.1.5 Summary of Findings

The study of existing establishments shows that only one-third of the establishments polled already had a trusted vendor in place, which presents a huge opportunity to target establishments without the vendor service. Findings demonstrate that certain sectors, such as Transportation and Warehousing (NAICS 48-49), Finance and Insurance (NAICS 52), and Healthcare and Social Assistance (NAICS 62) did not have trusted vendors. On the other hand, the Accommodation and Food sector (NAICS 72) had the highest percentage of trusted vendors (44.4%). Based on employment size, establishments with more than 30 employees generally did not have trusted vendors, while smaller establishments were more likely to have one. When exploring the geographical location of the establishments, the team found that the majority of establishments with a trusted vendor are concentrated in midtown and downtown Manhattan. Hence, it is important to focus on establishments within these areas. Further, the fact that the share of establishments with trusted vendors is low highlights the potential for a Trusted Vendor Program.

3.1.2 Businesses That Will Consider Unassisted OHD in the Presence of a Trusted Vendor

To investigate whether businesses could potentially become adopters of unassisted OHD, a stated preference question was included in a survey to assess the willingness to accept unassisted OHD if a vendor is certified by a Trusted Vendor Program. The sample had 450 observations; 62% from the NYC Metropolitan Area (primarily New York City and Northern New Jersey) and 38% from the New York Capital Region (NYCR)—Albany, NY and surrounding suburban areas. The shaded area shown in Figure 5 illustrates the coverage of the survey.

Figure 5. Map of New York City and New York Capital Region

The shaded area indicates the coverage of the survey.

Source: (Holguín-Veras et al., 2017b)
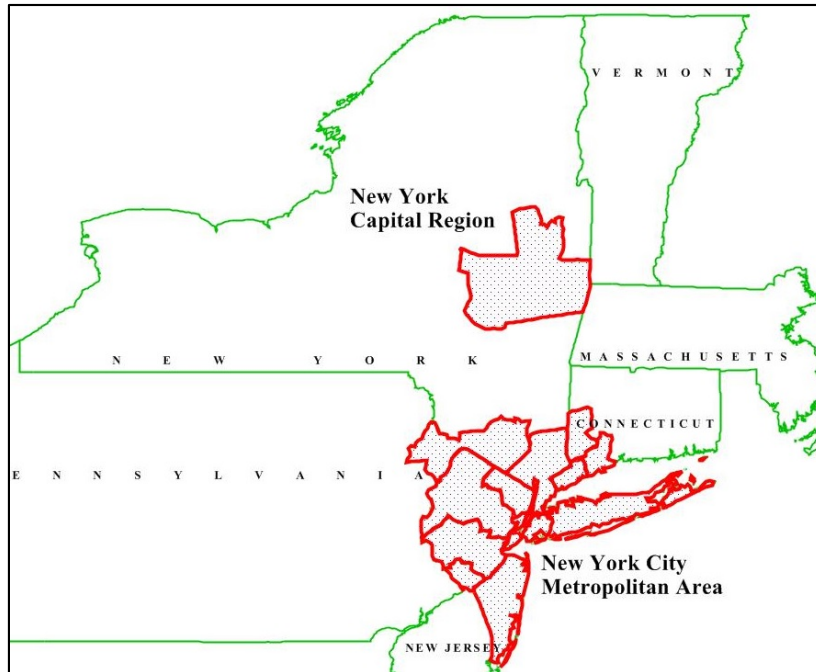
The survey collected data about freight and service vehicle trips in the two regions displayed in Figure 5. The survey questions consisted of three topic areas that gathered data pertaining to (1) deliveries (cargo received) and shipments (cargo sent out), (2) service trips, and (3) current operations and flexibility. Topic A referred to questions on deliveries and shipments made to and from the businesses, including: number of deliveries received, number of shipments sent out, typical size and weight of deliveries and shipments, vehicle types used for both deliveries and shipments, types of commodities received and shipped, and what companies transport the deliveries and shipments. Topic B, the service trip section, inquired about the number of service trips received, type of vehicle used for service trips, most common types of planned and emergency service trips, percentage of planned and emergency service trips that occur during regular business hours and those that take place during off-hours, and a willingness question to determine interest in receiving planned service trips during the off-hours. The final section, Topic C, contained questions pertaining to the businesses' current operations and flexibility, such as number of employees at the establishment, both full-time and part-time, fleet owned, freight loading/unloading facilities present at the business location, interest in consolidating shipments, and willingness to do unassisted OHD with a vendor that has been certified by a reputable organization as a trusted vendor.

To increase the efficiency of data collection, respondents were not asked to respond to all sections of the survey. Since the bulk of the freight trip generation is made by freight intensive sectors (FIS; industry sectors where the production and consumption of freight is the primary activity), it was decided to highlight observations from this group and reduce the observations from industries that are not freight intensive. However, this reduction in the sample size was applied to Section-A (320 observations) and Section-B (290 observations), which focused on Freight Trip Generation. The stated preference question that was used for modeling in this report is from Section-C and was posed to all 450 respondents in the sample. See Table 4 for the sample breakdown.

Table 4. Number Breakdown for Observations in the Sample

Source: (Holguín-Veras et al., 2017a)

Sector	Section-A		Section-B		Section-C	
	NYC	NYCR	NYC	NYCR	NYC	NYCR
Freight Intensive Sectors (FIS)	179	118	88	58	179	118
Non-FIS	21	2	92	52	101	52
Total	200	120	180	110	280	170

For the purpose of this study a key question was developed: If one of your vendors was certified by a reputable organization to do deliveries in the night hours, how likely would you be to consider allowing that vendor to make deliveries at night without any of your staff present? The range of answer options provided were: "completely likely," "very likely," "neither likely nor unlikely," "not likely," and "completely unlikely." For discussion purposes, the responses corresponding to "completely likely" are referred to in the paper as "committed;" the combined responses of "completely likely" and "very likely" are referred to as "interested;" while the combined total of "completely likely," "very likely" and "neither likely, nor unlikely" are assumed to represent the "potential" market.

3.1.2.1 Results by Industry Sector

Table 5 shows the overall results by industry sector for two major subgroups: (1) Freight-Intensive Sectors, or FIS, which are industry sectors where the production and consumption of freight is the primary activity, and (2) Service Intensive Sectors, or SIS, which are the sectors where the provision of services is the primary activity.

Of those surveyed, 64% of the NYC sample and 69% of the NYCR sample were from establishments that belong to the FIS category, while the rest of the observations came from SIS establishments. The largest portion of the complete sample is Manufacturing (NAICS 31, 32, and 33), constituting 22%.

Table 5. Willingness to Accept Unassisted OHD by a Certified Trusted Vendor

Source: (Holguín-Veras et al., 2017a)

Freight Intensive Sectors						
Willingness to accept	**NYC**		**NYCR**		**Total**	
	Obs.	**%**	**Obs.**	**%**	**Obs.**	**%**
Completely Likely	9	5.14%	4	3.45%	13	4.47%
Very likely	7	4.00%	1	0.86%	8	2.75%
Neither Likely, nor unlikely	8	4.57%	3	2.59%	11	3.78%
Not likely	59	33.71%	45	38.79%	104	35.74%
Completely unlikely	92	52.57%	63	54.31%	155	53.26%
Sub-Total	175	100%	116	100%	291	100%
Service Intensive Sectors						
Willingness to accept	**NYC**		**NYCR**		**Total**	
	Obs.	**%**	**Obs.**	**%**	**Obs.**	**%**
Completely Likely	0	0.00%	0	0.00%	0	0.00%
Very likely	5	5.21%	1	1.96%	6	4.08%
Neither Likely, nor unlikely	9	9.38%	1	1.96%	10	6.80%
Not likely	39	40.63%	23	45.10%	62	42.18%
Completely unlikely	43	44.79%	26	50.98%	69	46.94%
Sub-Total	96	100%	51	100%	147	100%
All Sectors						
Willingness to accept	**NYC**		**NYCR**		**Total**	
	Obs.	**%**	**Obs.**	**%**	**Obs.**	**%**
Completely Likely	9	3.32%	4	2.40%	13	2.97%
Very likely	12	4.43%	2	1.20%	14	3.20%
Neither Likely, nor unlikely	17	6.27%	4	2.40%	21	4.79%
Not likely	98	36.16%	68	40.72%	166	37.90%
Completely unlikely	135	49.82%	89	53.29%	224	51.14%
Sub-Total	271	100%	167	100%	438	100%

Table 5 shows overall, 2.97% of committed establishments, with another 6.17% interested in the program, and a potential market of about 11% of the establishments. The remaining 89% were not interested. In terms of location, there were significant differences in the responses. NYC respondents—both FIS and SIS—presented a larger potential market (13.71% and 14.59%, respectively) than their counterparts in the Capital Region (6.90% and 3.92%). These results make sense on account of the vastly different levels of congestion and their impacts on urban supply chains and the general awareness of deliveries in the off-hours in NYC, among other factors. The results also show a difference between the responses from FIS and SIS responders. Among FIS responders, about 4.5% indicated they were completely likely to accept unassisted OHD, while none of the SIS respondents expressed that level of interest. At the same time, the SIS group indicated a significantly smaller number of responses in the "completely unlikely"

group (46.94% versus 53.26% in FIS responses) and a larger percentage of responses in the neutral and "not likely" choices (6.80% and 42.18% versus 3.78% and 35.74% in SIS). Essentially, a larger portion of the SIS responses are clustered toward the middle of the ordinal scale ("very likely," "neither likely nor unlikely," "not likely"), rather than in the extreme positions ("completely likely" and "completely unlikely"), where 53.06% of SIS responses are found, versus 42.37% of FIS.

The sample of establishments in FIS and SIS are further subdivided by two-digit NAICS code. The breakdown is found in Table 5.

Table 6. Breakdown of Sample by Two-Digit NAICS code

"Obs." refers to the number of observations in the survey.

Source: (Holguín-Veras et al., 2017a)

NAICS	Description	NYC		NYCR		Total	
		Obs.	%	Obs.	%	Obs.	%
Freight Intensive Sector							
23	Construction	20	11.17%	9	7.63%	29	9.76%
31		10	5.59%	5	4.24%	15	5.05%
32	Manufacturing	24	13.41%	16	13.56%	40	13.47%
33		27	15.08%	17	14.41%	44	14.81%
42	Wholesale Trade	25	13.97%	30	25.42%	55	18.52%
44	Retail Trade	21	11.73%	23	19.49%	44	14.81%
45		6	3.35%	5	4.24%	11	3.70%
48	Transportation and Warehousing	16	8.94%	4	3.39%	20	6.73%
49		0	0.00%	1	0.85%	1	0.34%
72	Accommodation and Food Services	30	16.76%	8	6.78%	38	12.79%
	Sub-Total	179	100%	118	100%	297	100%
Service Intensive Sector							
51	Information	13	12.87%	7	13.46%	20	13.07%
52	Finance and Insurance	12	11.88%	2	3.85%	14	9.15%
53	Real Estate and Rental	8	7.92%	4	7.69%	12	7.84%
54	Professional, Scientific, Tech. Services	8	7.92%	16	30.77%	24	15.69%
56	Administrative, Support, Waste	12	11.88%	11	21.15%	23	15.03%
61	Educational Services	11	10.89%	4	7.69%	15	9.80%
62	Health Care and Social Assistance	9	8.91%	6	11.54%	15	9.80%
71	Arts, Entertainment, and Recreation	21	20.79%	2	3.85%	23	15.03%
81	Other Services (except Public Administration)	7	6.93%	0	0.00%	7	4.58%
	Sub-Total	179	100%	118	100%	297	100%
	Grand Total	280		170		450	

The responses by industry sector are shown in Table 7 for (1) Committed ("completely likely"), (2) Interested ("completely likely" plus "very likely"), and (3) Potential ("completely likely" plus "very likely" plus "neither likely, nor likely"). Presenting these different estimates provides a sense of the varying degrees of certainty in the responses from receivers. To facilitate interpretation, the team decided to shade the top five industry sectors in each set of results. In cases where the difference between two sectors was less than 0.5% the team assumes a connection, and include both industry sectors in the list. This explains why the last column has seven sectors in the top-five.

Table 7. Willingness to Use a Certified Trusted Vendor by Industry Sector

Shaded boxes indicate the top industry sectors that are either committed to using, interested in using, or potentially would use a certified Trusted Vendor.

Source: (Holguín-Veras et al., 2017a)

NAICS (Obs.)	Description	Committed (Completely Likely)	Interested (Completely/ Very Likely)	Potential (Completely/ Very/Neutral)	Range
72 (37)	Accommodation and Food Services	13.51%	13.51%	16.22%	14-16%
42 (53)	Wholesale Trade	5.66%	11.32%	13.21%	6-13%
48-49 (20)	Transportation and Warehousing	5.00%	10.00%	10.00%	5-10%
44-45 (55)	Retail Trade	3.64%	7.27%	12.73%	4-13%
31-33 (97)	Manufacturing	2.06%	3.09%	8.25%	2-8%
51 (20)	Information	0.00%	5.00%	15.00%	0-15%
61 (14)	Educational Services	0.00%	7.14%	14.29%	0-14%
71 (22)	Arts, Entertainment, and Recreation	0.00%	4.55%	13.64%	0-14%
54 (24)	Professional, Scientific, Tech. Services	0.00%	0.00%	12.50%	0-13%
52 (11)	Finance and Insurance	0.00%	9.09%	9.09%	0-9%
56 (22)	Administrative, Support, Waste	0.00%	4.55%	9.09%	0-9%
53 (12)	Real Estate and Rental	0.00%	0.00%	8.33%	0-8%
23 (29)	Construction	0.00%	3.45%	6.90%	0-7%
62 (15)	Health Care and Social Assistance	0.00%	6.67%	6.67%	0-7%
81 (7)	Other Services (except Public Admin.)	0.00%	0.00%	0.00%	0.00%

The results were very interesting. To start, the group of "committed" industry sectors is completely dominated by FIS; not a single SIS makes the top-five list. Once the list is broadened to form the "interested" group, SIS sectors begin to play an important role. Broadening the list to include neutral establishments, thus creates the group of "potential" adopters and leads to a situation where about half of the top spots are occupied by SIS. These results have a number of significant implications. First,

they show that a sizable number of establishments could be induced to accept unassisted OHD with the relatively small investment of creating the TVP. Second, the estimates clearly show that there is a potential market for unassisted OHD in the SIS group. This is important because SIS establishments create a significant amount of deliveries, estimated to be in excess of 250,000 deliveries/day in the NYC Metropolitan Area.

3.1.2.2 Key Factors That Induced Acceptance of Unassisted OHD Through the TVP

To get a better understanding of the data, discrete choice models were estimated using the stated preference data. The benefits of using behavioral models include their ability to (1) capture the influence of the attributes (e.g., industry sector, number of employees) and policy variables, (e.g., tolls) on the decision. In addition, these models provide a platform to analyze the responses to various policy alternatives and to assess the respective market shares. The resulting estimates offer more detailed insight and offer valuable input to policymaking. Due to the ordinal nature of the dependent variable being estimated, an ordered choice model was used. The dependent variable ranks the willingness to allow a trusted vendor that has been certified by a reputable program to perform unassisted OHD. The dependent variable is ranked from 1 to 5 in ascending order of willingness (i.e., 1 = completely unlikely, 2 = not likely, 3 = neither likely nor unlikely, 4 = very likely, and 5 = completely likely). The independent variables are attributes of the receiving establishments.

The modeling process entailed systematic testing of alternative specifications of the systematic component of the utility functions, including interaction terms between the key independent variables. The resulting models were analyzed in terms of statistical significance and conceptual validity; any model that did not meet these criteria was removed from consideration. Once the final models were obtained, the individual elasticities of the key variables were calculated. Based on the estimates for each individual, it is possible to compute the market elasticity to assess the overall effects of incentives (or attributes) on willingness to accept unassisted OHD. The next section discusses the final models obtained during the estimation process.

Table 8 shows the model selected as final. After removing observations with missing data, the number of observations included in the final model is 283 (170 observations from NYC, and 113 from the NYCR). The measures of the goodness of fit (McFadden Pseudo R2 and AIC) suggest that the controlled variables only slightly improve the prediction power, implying great heterogeneity in business responses.

In addition to the log-likelihood-based measures, measures based on model prediction are also presented. Table 8 shows the cross tabulations of prediction (both outcomes and probabilities) versus the actual outcomes, which yield additional measures of goodness of fit. The Count R2, which is the percentage of correct predictions, is 0.597, with low willingness level over-predicted. The adjusted Count R2 (Long and Freese, 2006) is 0.20.

Table 8. Discrete Choice Model Estimating Willingness to Use a Certified Trusted Vendor

The coefficient indicates the correlation between the independent variable with the willingness to use a certified Trusted Vendor.

Source: (Holguín-Veras et al., 2017a)

Independent Variable	Coefficient	t-stat	p-value
Constant	0.025	(0.14)	0.892
Number of employees	-0.004	(-2.24)	0.025
Type of establishment			
Headquarters	-0.416	(-1.47)	0.143
Commodity type			
Food	0.760	(2.36)	0.018
Metal	-0.577	(-1.43)	0.152
Not a freight intensive sector			
Interaction term for not being a FIS in the New York State Capital Region sample	1.415	(1.19)	0.233
Interaction terms: Number of deliveries (per day) and NAICS			
Number of deliveries for entertainment (NAICS 71)	-0.095	(-1.35)	0.178
Interaction terms: Number of deliveries (per day) and Commodity Type			
Number of deliveries of alcoholic beverages	0.127	(2.00)	0.046
Number of deliveries of plastics and rubber	0.045	(1.85)	0.065
Number of deliveries of wood and lumber	0.045	(1.86)	0.063
Number of deliveries of machinery	0.016	(1.16)	0.247
Number of deliveries of nonalcoholic beverages	0.014	(1.08)	0.281
Number of deliveries of computer and electronics	0.009	(2.95)	0.003
Number of deliveries of furniture	-0.123	(-1.85)	0.064
Number of deliveries of petrol and coal	-0.132	(-1.04)	0.299
Parameters			
μ(1)	2.222	(11.16)	0
μ(2)	2.758	(11.33)	0
μ(3)	3.357	(10.73)	0

In interpreting the model, it is important to keep in mind that "retail" and "household goods" were used as the default-base values for industry sector and commodity type, respectively. Thus, variables that contain either the industry sector or a commodity type must be interpreted as marginal effects with respect to the corresponding base. Generic variables, in contrast, apply to all establishments in the sample.

As shown, the willingness to accept Unassisted OHD from certified Trusted Vendors—referred to herein as "willingness to accept" or WTA—is a function of employment, the type of commodity transported, number of deliveries, industry sector (two-digit NAICS), and whether or not the establishment is the headquarter of the firm. The model has a number of noteworthy features. The commodity type is found in ten out of thirteen independent variables, playing a more significant role than the industry sector. This result is not entirely unexpected, as the team had long assumed that the industry sector is only a rough proxy for the commodity type and other establishment-related attributes. Such a proxy cannot fully capture the effects associated with commodity type. For instance, retail establishments could receive a wide range of supplies, from vegetables to jewelry. Obviously, the establishment owner's attitude towards unassisted OHD and the TVP will be heavily influenced by the nature of the supplies traded. Nevertheless, the dominance of the commodity type—which replaced the industry sector as the lead establishment descriptor—is significant because it may imply that mapping industry sectors to commodity types could increase the explanatory power of freight behavioral models.

The number of employees was found to have a negative relationship with WTA across all establishments. When the establishment is the company headquarters, it also reduces willingness to participate, which makes sense, because headquarters typically have tight access controls to protect commercially sensitive information and valuables stored. The results also indicate a significant difference between SIS establishments located in the NYCR and the rest of the respondents. As shown in the table, these establishments exhibit a larger WTA for unassisted OHD performed by certified Trusted Vendors.

The model shows that the Food and Accommodation sector shows a much higher WTA than those for the base industry sector (Retail), while the WTA for receivers of metal is significantly lower. Moreover, the commodity type has its most significant impact interacting with the number of deliveries. As shown, there are two subgroups of establishments: those with a WTA that increases with the number of deliveries and those with a WTA that decreases with the number of deliveries. The former group includes receivers of alcoholic beverages, wood and lumber, plastics and rubber, machinery, non-alcoholic beverages, and computer and electronics. The latter group includes the receivers of furniture and petrol and coal. The important role played by the commodity type does not imply that the industry sector plays no role. As

shown in the model, the propensity to participate diminishes with the number of deliveries made to establishments in Entertainment (NAICS 71). It should be noted that the test of parallel lines (Brant, 1990) indicated that the current model form, which assumes all parameters remain consistent across all willingness levels, is too restrictive. The parallel lines essentially compare the log-likelihood of a model with level-specific parameters and that with invariant parameters across levels using a Chi-squared test. Future research efforts should look into alternative model forms that allow parameters to vary across different willingness levels.

The chief insight derived from the model is that establishments that receive food, and particularly, those that receive a large number of deliveries of alcoholic beverages, wood and lumber, plastics and rubber, machinery, non-alcoholic beverages, and computer and electronics represent the most welcoming environment for TVP implementation.

3.1.3 Target Group

To maximize the effectiveness of the effort, the TVP will focus on industry sectors that offer the largest potential payoff, in terms of the number of deliveries switched to unassisted OHD. This will be jointly determined by the willingness of the industry sector to switch to unassisted OHD and the freight traffic generation (FTG)—the summation of the freight trip production and attractions—of these establishments. Table 9 shows the FTG for the NYC Metropolitan Area, which was estimated using a customized version of the Freight Trip Generation Estimator developed by the team (Holguín Veras et al., 2015), which uses the models from (Holguín-Veras et al., 2012a).

Table 9. Freight Traffic Generation (FTG) for the New York City Metro Area ('000 Deliveries/Day)

Source: (Holguín-Veras et al., 2017a)

NAICS	Description	Establishment Employment								
		1-4	5-9	10-19	20-49	50-99	100-249	> 250	Total	%
44	Retail Trade	177.9	63.6	46.6	49.5	26.7	27.5	22.7	414.4	29.9%
42	Wholesale Trade	98.6	29.4	22.1	21.6	10.8	8.5	10.8	201.7	14.6%
72	Accommodation/Food	59.7	26.2	25.5	32.7	15.4	7.1	4.7	171.2	12.4%
23	Construction	77.1	17.3	11.7	9.5	4.4	3.1	2.6	125.7	9.1%
31	Manufacturing	38.2	14.9	11.7	10.8	4.1	2.6	0.9	83.1	6.0%
54	Professional …	51.8	8.7	5.1	3.2	1.1	0.7	0.3	71.0	5.1%
48	Transport/Warehouse	34.2	8.2	6.1	5.7	3.2	3.4	4.0	64.8	4.7%
62	Health Care / Social	31.3	12.6	8.5	5.2	1.5	1.2	0.7	61.0	4.4%
81	Other Services…	40.5	9.8	4.9	2.5	0.6	0.2	0.1	58.6	4.2%
53	Real Estate …	25.7	4.2	2.1	1.1	0.3	0.1	0.0	33.5	2.4%
52	Finance, Insurance	16.4	6.0	4.1	1.8	0.7	0.5	0.3	29.8	2.2%
56	Administrative...Waste	19.5	3.8	2.5	1.9	0.9	0.6	0.4	29.4	2.1%
51	Information	6.5	1.5	1.3	1.1	0.5	0.3	0.2	11.6	0.8%
71	Arts, Entertainment…	7.5	1.2	1.0	1.0	0.4	0.2	0.1	11.4	0.8%
61	Educational Services	4.3	1.3	1.1	1.3	0.6	0.3	0.2	9.05	0.7%
55	Management of…	1.1	0.3	0.4	0.5	0.3	0.3	0.2	3.12	0.2%
22	Utilities	0.9	0.3	0.3	0.3	0.3	0.2	0.1	2.53	0.2%
11	Agriculture, Forestry…	1.4	0.2	0.1	0.0	0.0	-	-	1.68	0.1%
21	Mining, Quarrying…	0.3	0.1	0.1	0.1	0.0	0.0	-	0.53	0.0%
	Total	692.0	209.6	155.2	149.5	71.9	56.9	48.2	1,384	100.0%
	%	50.1%	15.1%	11.2%	10.8%	5.2%	4.1%	3.5%	100.0%	

The table shows a number of significant results. Most notably, the Retail, Wholesale, and Accommodation and Food sectors generate in excess of 55% of the total FTG in the area. Moreover, the smallest establishments (less than five employees) generate half the total FTG. Establishments in the Retail, Wholesale, and Accommodation and Food sectors with fewer than five employees generate almost a quarter (24%) of the total FTG. These estimates challenge widely held views that large establishments are the largest source of FTG. The reality is that, although large establishments do generate a large FTG per capita, the more numerous small establishments generate as much FTG as all of the other establishments combined.

To assess the range of TVP impacts, the estimates of participation from Table 7 are combined with FTG estimates from Table 9 to create Table 10. Three different sets of estimates are provided, based on those sectors that participated in unassisted OHD. The results indicate that if only the top-five sectors participate, between 3.94% and 8.89% of deliveries could switch to unassisted OHD. This would lead to a reduction in daytime freight traffic in the NYC Metropolitan Area in the range of 54,000 to 127,000 deliveries/day. If the entire potential market (11.19%) accepts unassisted OHD, the reduction in the number of deliveries during the day hours would include an additional 155,000 deliveries/day. These sizable numbers continue to provide strong justification for the study, design, and implementation of the TVP.

Table 10. Participation in UOHD Induced by TVP by Industry Sector

Shaded boxes indicate the top industry sectors that are committed to using, interested in using, and would potentially use a certified Trusted Vendor.

Source: (Holguín-Veras et al., 2017a)

NAICS (Obs.)	Description	FTG%	Committed (Completely Likely)	Interested (Completely/ Very Likely)	Potential (Completely/ Very/Neutral)	Range
72 (37)	Accommodation and Food Services	12.4%	13.51%	13.51%	16.22%	14-16%
42 (53)	Wholesale Trade	14.6%	5.66%	11.32%	13.21%	6-13%
48-49 (20)	Transportation and Warehousing	4.7%	5.00%	10.00%	10.00%	5-10%
44-45 (55)	Retail Trade	29.9%	3.64%	7.27%	12.73%	4-13%
31-33 (97)	Manufacturing	6.0%	2.06%	3.09%	8.25%	2-8%
51 (20)	Information	9.1%	0.00%	5.00%	15.00%	0-15%
61 (14)	Educational Services	5.1%	0.00%	7.14%	14.29%	0-14%
71 (22)	Arts, Entertainment, and Recreation	4.4%	0.00%	4.55%	13.64%	0-14%
54 (24)	Professional, Scientific, Tech.	4.2%	0.00%	0.00%	12.50%	0-13%
52 (11)	Finance and Insurance	2.4%	0.00%	9.09%	9.09%	0-9%
56 (22)	Administrative, Support, Waste	2.2%	0.00%	4.55%	9.09%	0-9%
53 (12)	Real Estate and Rental	2.1%	0.00%	0.00%	8.33%	0-8%
23 (29)	Construction	0.8%	0.00%	3.45%	6.90%	0-7%
62 (15)	Health Care and Social Assistance	0.8%	0.00%	6.67%	6.67%	0-7%
81 (7)	Other Services	0.7%	0.00%	0.00%	0.00%	0.00%

The next step is to identify in more detail which establishment types offer the largest payoff. To this effect, the chief findings of the model in Table 8—which identified the most promising establishment types—and the FTG results of Table 9, were put together to create Table 11. The table shows the commodity types in the columns, which have been sorted from left-to-right in descending order

of WTA. The last two columns represent the commodity types associated with opposition to the idea of accepting UOHD. The rows show the various industry sectors, sorted top-to-bottom in descending order of FTG (at the level of two-digit NAICS). The upper left corner of the space below the commodity types—for each of the NAICS groups listed—qualitatively represents the industry sectors that offer the largest payoff.

The table suggests that the most attractive targets for the TVP are the industry sectors Food and Beverage Stores (NAICS 445), Merchant Wholesalers/Nondurable Goods (NAICS 424), Food Services and Drinking Places (NAICS 722), and Accommodation (NAICS 721).

Table 11. Top Commodities Received by Industry Sector

The respondents were asked to name the top three types of commodities received. The ticks indicate the type of commodities received by the respondents in descending order of willingness to accept.

Source: (Holguín-Veras et al., 2017a)

NAICS	Description (Top to bottom, descending order of FTG)	Food	Alcoholic beverages	Non-alcoholic	Plastics & rubber	Wood & lumber	Machinery	Computer & electronics	Petrol & coal	Furniture	Metals
445	Food and beverage stores	√	√	√				√	√		
441	Motor vehicle and parts dealers				√		√			√	√
442	Furniture, home furnishings stores					√		√		√	
453	Miscellaneous store retailers				√	√	√			√	
444	Building material, garden equip.					√				√	
443	Electronics and appliance stores						√				√
446	Health and personal care stores						√				
452	General merchandise stores							√			
424	Merchant wholesalers, non-durable	√			√		√		√		
423	Merchant wholesalers, durable				√	√	√			√	√
454	Non-store retailers										√
722	Food services and drinking places	√	√	√				√	√		
721	Accommodation	√	√				√				
237	Heavy and civil engineering const.	√									√
236	Construction of buildings				√	√		√			
238	Specialty trade contractors				√	√	√	√	√		√
311	Food manufacturing	√					√				√
312	Beverage/tobacco product manuf.		√	√							
325	Chemical manufacturing	√			√		√		√		√
326	Plastics and rubber products manuf.				√				√		

Table11 continued

NAICS	Description (Top to bottom, descending order of FTG)	Commodities (left to right, descending order of WTA)									
		Food	Alcoholic beverages	Non-alcoholic	Plastics & rubber	Wood & lumber	Machinery	Computer & electronics	Petrol & coal	Furniture	Metals
331	Primary metal manuf.			√	√						√
332	Fabricated metal product manuf.				√		√				√
333	Machinery manufacturing				√		√	√	√		√
334	Computer and electronic product				√			√			√
335	Electrical equipment, appliance				√		√	√			√
339	Miscellaneous manuf.				√	√	√	√	√		√
321	Wood product manufacturing					√					
337	Furniture and related product manuf.					√					
313	Textile mills							√	√		
323	Printing and related support activities								√		√
324	Petroleum and coal products manuf.								√		
336	Transportation equipment manuf.						√				√
484	Truck transportation	√	√					√	√	√	√
493	Warehousing and storage	√		√				√			
488	Support activities for transportation						√	√		√	√
485	Transit, ground passenger transp.						√				
711	Performing arts, spectator sports	√	√	√	√		√	√			
713	Amusement, gambling, recreation	√	√	√			√				√
712	Museums, historical sites					√	√				

The finding that the Food and Beverage industry—from food manufacturers to consumer-oriented establishments in accommodation and food services—is most likely to be influenced by the TVP is consistent with the NYC OHD implementation project, where 4% of restaurants and food stores have already adopted UOHD.

3.1.4 Barriers for Participating in TVP

TVP may not be suitable for large organizations that have their own list of trusted vendors. Nevertheless, these organizations could promote their trusted vendors to participate in the program and promote their successful business practices to encourage other vendors to join.

3.2 Marketing Plan

3.2.1 Marketing Goals and Objectives

The TVP marketing plan is intended both for receivers and carriers interested in TVP, designed to reach and win these establishments over to the program and build long-lasting quality relationships among partners. The goals of the marketing plan are to increase the number of certified Trusted Vendors and participating receivers in TVP and to attract receivers and carriers that are not yet familiar with the program.

The objectives for the marketing plan are as follows:

- To introduce the Trusted Vendor Program to businesses operating in NYC
- To promote acceptance of, and participation in, the OHD Program and the TVP among receivers
- To raise awareness of the benefits of OHD

3.2.2 Possible Marketing Strategies

The suggested marketing strategies for the TVP are divided into two main sections:
product and promotion.

3.2.2.1 Product

In the Trusted Vendor Program, the product is a service whereby receivers can access a list of Trusted Vendors and best practices information on OHD. To increase the program's accessibility and ease of use it is hosted on a website. The website contains a list of certified Trusted Vendors as well as OHD best practices in text and video format. In addition, the TVP offers basic training of OHD for vendors. To make TVP more user-friendly and relevant to participants, the content of the website or training programs will evolve based on receiver and vendor feedback.

3.2.2.2 Promotion

The promotion campaign started with the launch of the implementation stage. The promotion campaign focused on explaining how receivers/vendors benefit from TVP's features and the advantages not available on similar review websites.

The following is an outline of the dissemination plan:

- *Brochure*: The brochure describes how receivers/vendors will benefit from TVP's features and advantages. Brochures were distributed through receiver, carrier, and vendor business associations, such as the Trucking Association of New York and Grand Central Partnership operating in NYC.
- *Social Media Accounts*: Social media accounts will be created to disseminate OHD best practices. These accounts will be used to enhance awareness of both OHD and the TVP, and publicize future program aspects, such as the Trusted Vendor of the Month.
- *Annual Awards Ceremony for OHD*: An awards ceremony is planned to be held annually to recognize receivers and vendors that have contributed to OHD. Public and private-sector participation is critical, as the event's purpose is to promote vendors that are setting an example to the business sector and to the City. Awards could also be given, for example, to the best OHD vendor and best OHD innovation.

4   Trusted Vendor Program Design

The fundamental objective of this project is to build a collaborative partnership that develops and implements a self-sustaining Trusted Vendor Program (TVP). The program should be flexible enough to be implemented on a large scale, with a communication mechanism, liability solutions, and funding models that will support a lasting, quality partnership. To design the program, the team needed to answer a few questions:

- How can the program communicate with the participants and share knowledge on OHD?
- How can the program build trust with and between the participants?
- What are the program liabilities and potential solutions?
- How can the program ensure high quality over an extended period of time?
- What metrics can be collected to assess the performance of the program?
- How can the program be financially self-sustaining?

To share the list of Trusted Vendors and also disseminate information on OHD, the program is hosted on a website. A website is an ideal tool for communication, able to reach a wide variety of businesses without geographical limitations. Although the website is simply a platform to host the program, it must also communicate trust between the participants and the program. In other words, the receivers have to be confident that all information on the website is accurate and the list of Trusted Vendors provided by the program will deliver and satisfy their OHD needs.

The team's extensive literature search on trust (See section 4.1.1) suggested that it would be easier for an individual to exhibit trust-related behavior if they are generally more trusting and if there is a system that encourages their trust (McKnight et. al, 2002). Certification and recognition programs are examples of programs that are based on, and that engender, trust.

The team reviewed several certification programs and analyzed the certification design approach (see appendix A). These programs, in general, provide a number of restrictions for participating businesses, and certification often proves to be a difficult and lengthy process due to the high-quality standards that need to be met. Given that the TVP application process would not offer any additional incentives to participating vendors, and they would need to commit time and resources to upholding the high-quality standards involved, it was believed that certification might not be the appropriate program design. In discussions with the trucking association, the following were reactions from the point of view of carriers:

- "There is some interest to becoming an elite group (safe, secure and certified)… I hope they see the importance of participating in the program."
- "One major aspect to consider in a certification program is safety. With regard to safety, drivers would at least need to have a background check; we do that all the time."
- "One concern I have for the carriers is on prices, will the "trusted" brand bring up the prices?"

As the TVP program is new, without an established reputation, it first needs to be recognized among vendors and receivers in order to be accepted in the future as an elite certification program. For this reason, a recognition or survey-based approach was suggested. Web-based recognition programs were analyzed for different types of industries, not only those related to freight transportation vendors (see appendix B). The analysis was performed based on the access restrictions, information required for participants, types of reviews or recognitions received, technical requirements, insights on liabilities, arbitration process, funding model and inputs on the TVP. The research team and partners found recognition-based programs more promising than certification-based programs for the TVP. On the carriers' side, there is an added-value in becoming recognized as a Trusted Vendor. As our partner at TANY noted, the experience with SmartWay proved that participation is plausible and can be encouraged and promoted. He stated, "The businesses were encouraged to become part of it (SmartWay) earlier this year and I was surprised to see how many companies have already joined."

The adoption of a recognition-based program was considered very interesting by the receivers, and overall, they were willing to rate vendors based on their performance, agreeing to identify themselves in their reviews and noting that "one should stand up for their reviews." As such, the program was designed as a recognition program with the potential of conversion to a certification program in the future.

Regardless of whether the program is based on recognition or certification, the participants must be able to trust the program, and each other. Prior to designing the TVP (section 4.2), the team reviewed current practices, and conducted focus groups with the receivers to establish the qualifications and criteria for becoming a Trusted Vendor (see section 4.1). The team also reviewed the liabilities associated with the program (section 4.3), discussed the approaches in maintaining the program, and developed a program evaluation tool to monitor and improve the program outcomes (section 4.4).

4.1 Qualifications and Criteria for Trusted Vendors

This section presents research developed to gain insight on the key qualifications and criteria that vendors should display when they are recognized as Trusted. The team performed a literature review on ways to build "trust" as well as attributes that could be used to assess trust in organizations. This provided insights into how relationships could be built and appropriate qualifications and criteria that could be applied to the program. The research team also gained insight from current programs that assess trust and the recognition of trust in organizations and/or individuals, both available in appendices A and B. A third component of the research was based on insights obtained from receiver focus groups, available in appendix C. Key highlights from the research findings are included in this section.

4.1.1 Literature Review

Trust is a central construct in the value chain that leads to consumer commitments toward the firm as well as positive patronage behavior and the development of long-term relationships (Doney and Cannon, 1997; Pavlou, 2003). Others have argued that trust has an effect on loyalty (Corbitt et al., 2003; Ribbink et al., 2004; Herington and Weaven, 2007). In earlier marketing research, it was stated that a retailer's trust in a vendor affects the long-term orientation of a retailer because it reduces the perception of risk associated with vendor behavior (Ganesan, 1994).

According to Moorman et al. (1992) trust is seen as the willingness to rely on an exchange with whom one has a confidence partner. In other words, the consumer has "confidence, certainty and faith" that their supplier will deliver and satisfy their needs. The consumer's "confidence, certainty, and faith" are based on background and constitutive expectation. Background expectations are basic norms of behavior that people take for granted until violation (Garfinkel, 1967). An example of background expectation is that the supplier is expected to be paid for the products that are delivered to the consumer. These form a standard set of rules shared and understood by any individuals or organizations identified to be members of the same community. On the other hand, constitutive expectations are expectations that are situational or contextual (Garfinkel, 1963). An example of constitutive expectations is the relative roles of the "delivery person" and the "receiver." When the delivery person asks the receiver if the receiver would like the product to be placed in the fridge or the kitchen, the receiver will have to determine which alternatives are acceptable. The level of trust is an aggregation of the amount of background and constitutive expectations.

While expectations may explain one of the reasons why a party can have confidence and trust in another, they are unable to explain why an individual or organization has the intention, or willingness to trust and exhibit trust-related behaviors. Trust-related behaviors are actions that show reliance on the trusted party, which include sharing personal information or making purchases. It is especially difficult to trust if one does not have previous experience with the other party. Based on the Theory of Reasoned Action (Fishbein and Ajzen, 1975), for a behavior to be exhibited, there must be an intention. Trust intention is simply the willingness to rely on the other party. According to (McKnight et al., 2002) the intention to trust may be explained by one's disposition to trust, institution-based trust, and trust belief.

Figure 6. Web Trust Model

The web trust model proposed that individuals would exhibit trust-related behavior if they are likely to trust (disposition to trust) and if there is a system that encourages their trust (institution-based trust). This combination of factors will form beliefs within the individual that someone or something is trustworthy. Hence this belief could be converted to an intention to trust, which then would enable trust-related behavior.

Source: (McKnight et al., 2002)
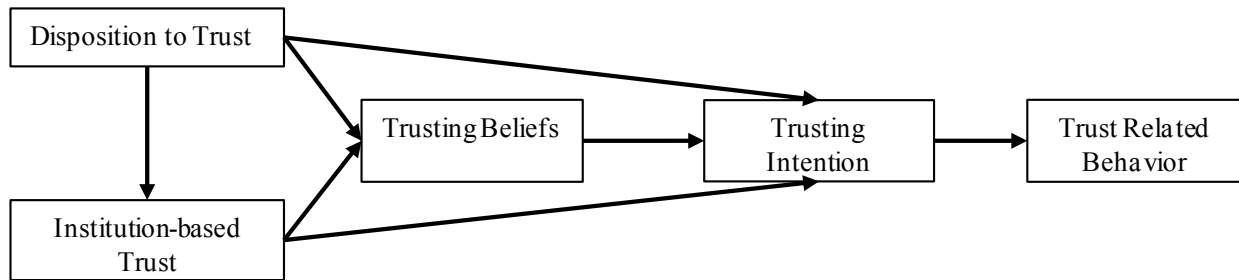
Disposition to trust is the general tendency of a trusting party to rely on another across a wide variety of situations and actors (McKnight et al., 2002). It will not only influence the trusting party's belief and intention towards the trusted party, but will also influence institution-based trust, which reflects beliefs about the situation or the perception of the internet environment in the case of web-based institutions. Institution-based trust is the belief that the presence of structural conditions, such as legal protections or guarantees, enhances the trustworthiness of the environment (Zucker, 1986). Trust beliefs are the perception of the attributes of the trusted party. Positive trust beliefs also imply that the trusted party has an attribute that the trusting party believes will be beneficial, and the trusting party is confident about the trusted party. Although there are many types of trust belief constructs that are available in

the literature, the common trust beliefs used are competence, benevolence, and integrity (McKnight et al., 2002). Competence is related to the ability of the trusted party to deliver the needs of the trusting party. Benevolence is related to the trusted party's ability to care, and its motivation to act in the trusting party's interest. Integrity relates to the trusted party's honesty and its ability to keep a promise.

Other trust-related research has indicated key attributes that measure trust among stakeholders in any type of business. "Unlike reputation, which is the sum of perceptions of past behaviors, trust is a leading indicator of how stakeholders believe a business and/or its leaders will behave in the future" (Vandermolen, 2013). According to the 2013 Edelman Trust Barometer—a 2013 survey of more than 31,000 respondents in 26 markets around the world to explore trust among institutions, industries, and leaders—there are 16 attributes that contribute to trust in an organization (Edelman, 2017). As explained by Tucker (2013), these findings indicate that stakeholders want to see engagement behaviors such as frequent communication and transparency in their transactions, integrity in their business practices, quality in their products and services, and a great deal of responsibility to protect the environment, address societal needs, and impact the community. Some research on trust has been addressed among e-service and e-commerce delivery businesses, where an important aspect of the development of the web as a marketing tool has been consumer trust (Carlson and O'Cass, 2010). Another recent study explored the behavioral factors influencing partner trust in logistics collaborations, in which the team did a systematic literature review to reveal the underlying trust factors. Their findings indicated that information sharing, incentive alignment, decision synchronization, and opportunism are key behavioral factors (Daudi et al., 2016). Cao and Zhang (2012) also argue that logistics collaboration requires trust based on rationalism and the assumption of trustworthiness, fair play, and responsibility.

According to Halliburton and Poenaru (2010), trust is the most important criterion when trying to achieve a successful business relationship, especially for those businesses or activities with a high level of risk or vulnerability. It will typically take a period of time and interaction to build trust between entities. If trust is at a relatively low level, some formal framework is needed to substitute for the time and guide the relationship to an expected level (Dawes, 2003). Halliburton and Poenaru (2010) also mentioned that trust was built both from rational and emotional bonds. Rational trust refers to the "customer's willingness to rely on a service provider's competence and reliability." Emotional trust is a confidence that arises from the customer's "feelings generated by the level of care and concern the partner demonstrates." Its implications can be acted upon by organizations that have the commitment and resources to do so.

The way to assess trust varies depending on the type of industry and the specific need to become trusted. A common theme concerning trust is the building of a long-term relationship and interactions with the customer. If customers don't yet have a long-term relationship with a business, one way of assessing the business' trustworthiness is through a rating system. A rating system is based on performance metrics such as response rate and speed as well as customer ratings. Customers are encouraged to provide feedback regarding their overall experience as well as to present any issues such as lateness, unreliability or concerns about damaged/missing items. In shipping, for example, the rating system would motivate deliverers to provide better service and build trust between customers and delivery firms. As the face of the delivery company, drivers/deliverers would also be instructed by the company to ensure high-quality service. Peer-to-peer rating schemes to assess trust among individuals are another example of sharing-economy platforms to anticipate the level of trust in organizations. Stanford University conducted a study where research participants were introduced to different Airbnb profiles and asked to rate their trust levels based only on the information provided in the profiles. Their findings have shown an inverse relationship between risk aversion and trust in those with positive reputations (Abrahao et al., 2017).

The literature revealed that trust can be built and assessed among organizations. Yet, trust among organizations is not easy to build unless there is constant interaction among the businesses that results in better and more reliable performance and more transparent business transactions. Assessing trust is also difficult unless data is being collected about how the relationship has resulted in a higher business performance. The next section provides a summary of how current recognition programs have addressed trust and the features considered when recognizing businesses in their programs.

4.1.2 Review of Current Practices

Web-based certification and recognition programs were analyzed to understand current practices for different types of industries, not only those concerning freight deliveries (see appendices A and B for the complete review).

Key findings applicable to the TVP qualifications and criteria as well as the recognition process follow:

- Reviews are generally offered for any business that has a contact name and email.
- Customer reviews are a popular form of evaluation and some ratings have a star rating scale for the recognition of top sellers.
- A few programs offered self-report surveys to get input on the business performance and to provide some customer feedback.
- Several programs offered an elite status of vendor (i.e., "Top Rated Seller" at eBay or "Super Host" at Airbnb)

- For a number of programs, the vendor had to create an account and provide some minimum contact information. Other programs had longer questionnaires that addressed the type of business, capacity, certification available, years of experience, size of fleet (for truckers), technical information about the vehicles (for truckers) among other requirements.
- To provide reviews online, some programs had customers create an account and others offered free access to the public to develop the ratings.

### 4.1.3 Recognition of Vendors: Insight from Receiver Focus Groups

It is important to understand the types of vendor information necessary for receivers to build trust with the vendor to perform off-hour deliveries. The team facilitated discussions with receivers in focus groups organized by Grand Central Partnership to understand the specific needs of the receivers. Five aspects were considered during the receiver focus groups (see complete report in appendix C): contact information, corporate information, OHD experience, general performance of the vendor, and OHD training.

4.1.3.1 Contact Information

Contact information is important as it proves a business' authenticity. Four attributes were provided to the receiver participants—registered business name, address, contact number, and website. In general, most participants felt that the registered business name, address, and contact number should be required. In particular, participants highlighted the need to have the contact information of the people directly involved in making the deliveries, including the operation liaison and driver.

Figure 7. Attributes of the Vendor's Contact Information Needed for Trustworthiness

The respondents were asked to state if it is "must have," "very good to have," "good to have," "nice to have," or "not required" to have the vendor's contact number, address, registered business name, and/or website location made available.
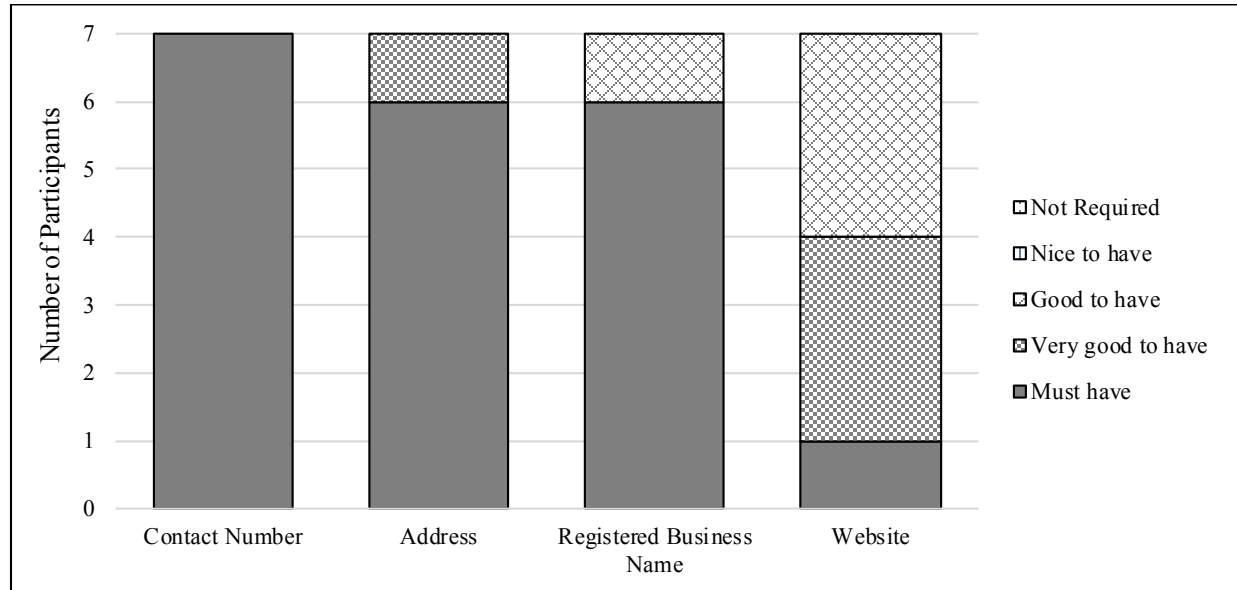
4.1.3.2 Corporate Information

The corporate information offers insight into the vendor's ability to fulfill its promises. The participants were provided with five attributes: size of business, specialization, years of experience, workforce belonging to a union, and accreditation from an organization. The attribute that receivers valued most was the specialization of the vendor, as it provides an idea of the vendor's capabilities in relation to the receiver's expectations. Although knowing the vendor's specialization in terms of types of services, industry, and area of service could be helpful, participants were more interested in knowing that the vendor has trained people or has equipment required for special operations (e.g., refrigerated trucks, trucks that contain lift gates, and trucks with trailers). As the city is very crowded, there may not be the luxury of space for loading/unloading activities. Hence, different trucks might facilitate or hinder loading/unloading activities at the receiver's establishment, depending on the layout of the site. For example, some sites would require lift gates on the trucks to enable loading and unloading activities, as they may not have sufficient space to put a temporary ramp in place to bring the goods to and from the truck.

Figure 8. Attributes of the Vendor's Corporate Information Needed for Trustworthiness

The respondents were asked to state if it is "must have," "very good to have," "good to have," "nice to have," or "not required" to have the vendor's information on: years of experience in the business, size of business, type of accreditation from an organization, specialization, or if their workforce belongs to an union made available.

The majority of participants felt that knowing the size of the business minimally affects decisions related to trusting the vendor or not. A large organization may have the capacity to take larger risks and be able to respond more effectively to difficult situations. On the other hand, smaller firms tend to offer more personalized service to their customers, which is highly valued.

The participants also felt that it is not necessary for vendors to have union employees. One of the participants, with union employees, suggested that having a workforce belonging to a union might impede the operation of OHD. If the employee's shift changes to accommodate OHD, the unions might fight it as affecting the employee's welfare. In that case, only employees hired for the off-hour shift would be able to participate in OHD activities.

In general, the majority of the participants felt that it would be beneficial to have information on the vendor's specialization, and the years that the vendor has been in business. Some of the receivers value knowing the size of business, but it is high on their list. Having accreditation from an organization, such as BBB, is favorable, but not compulsory for any of the respondents. Knowing that the vendor's workforce belongs to a union will not increase their trust in relation to performing OHD.

4.1.3.3 OHD Experience

In terms of OHD experience, the participants were provided with four attributes: years of OHD experience, number of drivers with OHD experience, background checks on drivers, and insurance coverage for OHD. The most desired attribute in this section was the vendor's insurance coverage on OHD. One of the participants shared that their OHD vendors carry at least 5 million dollars umbrella liability insurance coverage. Another participant mentioned that their company bought insurance, hence background checks on drivers were not important for them. However, they do conduct reference checks on the vendors. They felt it was not their responsibility to ensure that the driver's background has been checked. However, through the survey, other participants indicated the importance of background checks and showing they have been done. This coincides with aspects mentioned by TANY, where background checks are common and frequently performed among truck drivers. In general, information on years of OHD experience, number of drivers with OHD experience, and background checks on drivers are highly desired by the receivers.

Figure 9. Attribute of Vendor's OHD Experience Needed for Trustworthiness

The respondents were asked to state their preference regarding the availability of the following information on vendor OHD experience by indicating "must have," "very good to have," "good to have," "nice to have," or "not required to have:" (a) the vendor's records of insurance for OHD, (b) the number of drivers with OHD experience, (c) records of drivers' backgrounds, or (d) years of OHD experience.
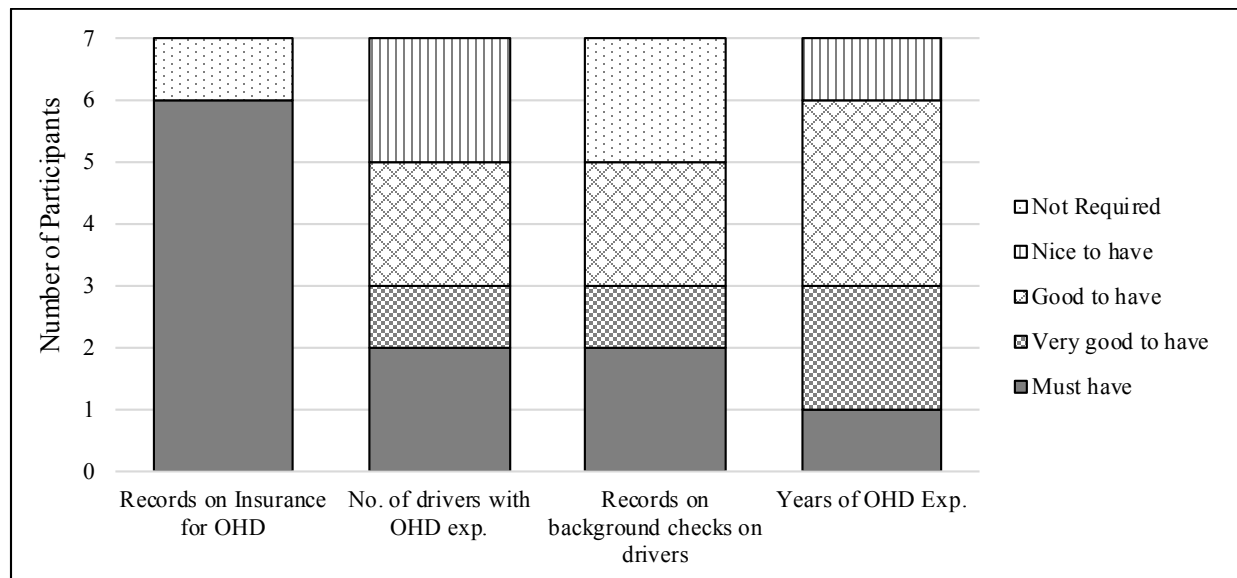
4.1.3.4 Performance

In terms of vendor performance, the participants were provided with five attributes: on-time delivery record, damaged goods record, record of consistent driver, incident record and customer service evaluation. In general, the participants' key concern was the vendor's performance. The participants shared that the vendor will be assessed based on their ability to meet the receiver's expectations and ability to react to unplanned events. According to the survey, performance indicators such as on-time delivery and damaged goods records were the most important, followed by customer service evaluations which provide receivers with an idea of the vendor's ability to react to unplanned events.

Figure 10. Attributes of Vendor's Performance Record Needed for Trustworthiness

The respondents were asked to state their preference regarding the availability of the following information on vendor performance by indicating "must have," "very good to have," "good to have," "nice to have," or "not required to have": (a) the vendor's on-time delivery record, (b) damaged goods record, (c) customer service evaluation, (d) incident record, or (e) record of having a consistent driver attached to a receiver.
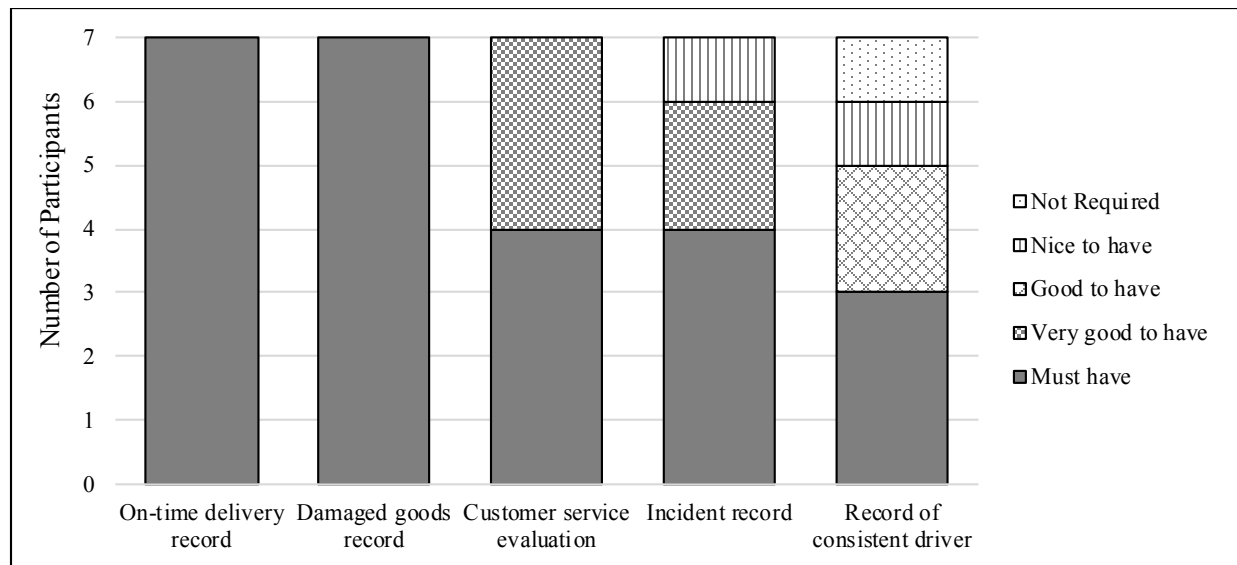
The participants had mixed responses regarding the need for a consistent driver for their deliveries. The participants favoring a consistent driver were also wanted evidence of driver background checks. Similarly, the participants that did not require a consistent driver for delivery did not require background checks on the drivers.

4.1.3.5 OHD Training

Based on the survey, 86% of the participants thought it was important for the vendor to be formally trained in off-hour deliveries. Additionally, results show that the receivers were more focused on the outcome of the training rather than the process or the organization administering the training.

Most of the participants felt that to be trusted in OHD, it was necessary for the drivers to go through a basic "What is OHD and how to conduct OHD" training. During the discussion, they also highlighted they were most concerned with the drivers' ability to perform their expectations, rather than the training itself. Hence, receiver-specific training is also important. For hotels, noise is a key concern as guest comfort is a priority. The drivers are also expected to be professional and courteous when they chance upon any guest, as any bad impression left by the drivers will negatively impact the reviews and business of the hotel. For food service establishments, food safety is the key concern. Hence, appropriate delivering methods and placing the delivered products in the right locations are of utmost importance. For example, a tub of ice cream should be delivered in a refrigerated truck and stored in the freezer when delivered instead of left at the entrance. As the layout of every establishment and its security requirements are different, the participants highlight the drivers' need to familiarize themselves with the environment at the delivery spot. One of the participants noted they trained drivers on where to place the products and how to navigate around the establishment to make it easier for the driver to meet expectations in the future.

Figure 11. Training Courses That Enhance the Trustworthiness of Vendors

The respondents were asked to state their preference regarding the availability of the following information on types of vendor training by indicating "must have," "very good to have," "good to have," "nice to have," or "not required to have" vendors trained (a) in basic OHD, (b) security technologies, (c) low-noise deliveries, or (d) receiver-specific training.
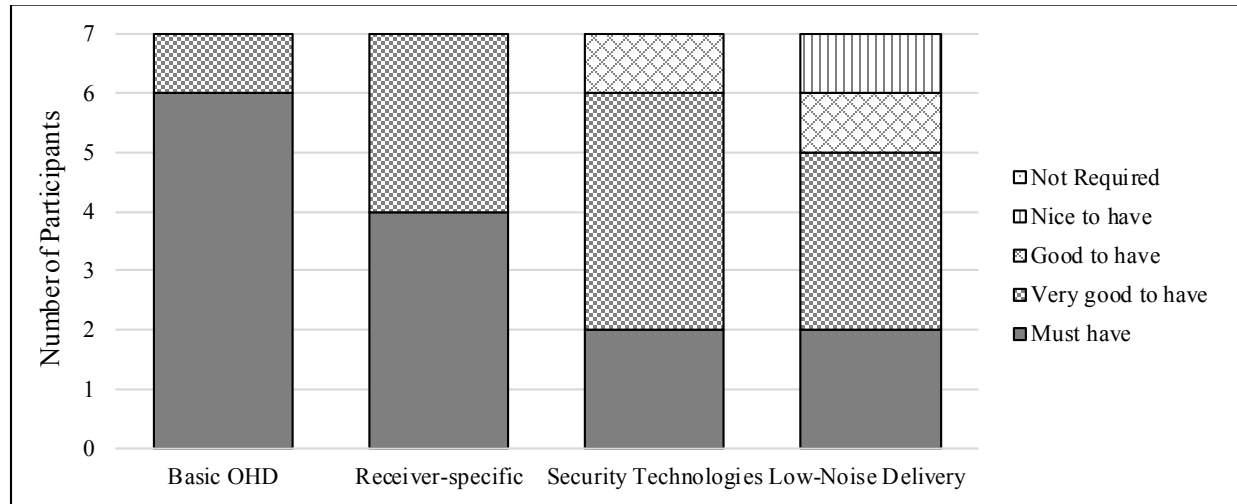
4.1.4 Evaluation System for TVP

Following the input provided by focus groups, it was clear that the key concern when hiring a vendor was vendor performance. The receivers shared that the vendor should be assessed based on the ability to meet receiver expectation and to react to unplanned events. The vendor, on the other hand, would be motivated to become recognized as a Trusted Vendor as business acumen makes them inclined to meet the requirements of the receiver. However, qualifications should not be set so high that small businesses with excellent track records cannot be recognized. Finding a balance for both small and large businesses was crucial when defining the qualifications of a Trusted Vendor.

The team also shared with receivers and the vendor representatives two approaches to differentiate the trustworthiness of vendors: a badge system and a rating/review system. The badge system would classify Trusted Vendors into a few levels of trustworthiness, such as a bronze, silver, or gold level. In general, both the receivers and the vendors' representative had no key concerns about the nature of the evaluation system. Both systems seemed promising and could be implemented to provide levels of trust as qualifications increase among vendors.

Regardless of the type of evaluation system, the receivers' representatives were more concerned about the organization administering the TVP. They felt that the administrator should be drawn from a third-party group rather than receiver or vendor representatives. A trade group managing the program is likely to skew the assessment matrix of a Trusted Vendor to benefit themselves. For the program to be reliable, the administration should be neutral, and the metrics need to be transparent and fair to all stakeholders.

4.1.5 Minimum Requirements of a Trusted Vendor

In defining the minimum requirements of a Trusted Vendor, the research team highlighted the program's objective as encouraging deliveries at night, making it important to stipulate the overnight hours in the requirements. To start, the TVP will recognize businesses well-known for their OHD practices. Following feedback from the partners the project team also felt it was important to keep the definition flexible to encourage applications from as many businesses as possible, including businesses interested in, but new to OHD. Further, to support the element of trust, the program requires businesses to be nominated or recommended to ensure the reliability and transparency. NYCDOT brought up the issue that there are vendors interested in conducting OHD and joining the program but have no experience. The team addressed this in the minimum requirements by providing an avenue for vendors without OHD experience to join the program through a nomination based on their best practices. Thus, the applicant profile was defined as the following:

- Any vendor delivering to customers between 7 p.m. and 6 a.m. (OHD)
- Any vendor delivering to customers between 7 p.m. and 6 a.m. without staff receiving the goods (unassisted OHD)
- A business that has been recommended as a Trusted Vendor and has manifested their intention to start delivering cargo overnight

The latter condition implies that a business does not need to be practicing OHD when applying to the program but must have the intention to start OHD practices in the near future.

4.2 Recognition Program Design

To design the TVP, the team conducted an investigation that examined the characteristics of existing certification programs. A number of certification programs were chosen from the internet to provide further initial inputs on the program's structure (see appendix A). According to this first round of reviews, the recommendations applicable to the TVP included (1) the design should highlight the concept of "trusted" as a "brand seal" for carriers and receivers that are part of the program, (2) applications should be facilitated through an electronic application (preferably web-based), but

also physical (mailed) applications should be allowed, (3) a fee should not be charged to companies participating in the program, (4) an evaluation process should accompany the application, and this should be done by a third-party auditor or a committee that is both neutral and experienced, and (5) certified vendors should be required to adopt noise reduction technologies.

Recognition and survey-based approaches were also considered, which also provided key insights into the design of the program (see appendix B). After rounds of internal discussions, in-person meetings with partners as well as focus group meetings with business representatives from the receivers, the final design of the program was developed. The main focus of the TVP was to promote the businesses that were already performing off-hour deliveries, engaging customers in the process of recognition and guaranteeing a sustainable program. Although this program is open to all vendors (shippers that directly send products to their customers as well as the carriers that perform the actual deliveries), the process needed to ensure that the vendors are qualified and trusted by their customers. In this way, the program is both flexible and reliable, promoting vendors that have built a "trustful and trustworthy" relationship with their customers.

Table 12. Features Analyzed for TVP Design

Main Characteristics of the Trusted Vendor Program (TVP)	Level of Risk	Certification Program	Recognition Program	Self-Report	Notes
Information Provided					
General Company Details	***	R	R	R	Minimum information required: name and email address
Relevant OHD Experience	**	V	V	V	OHD experience will be considered a plus
OHD/UOHD Courses or Programs	*	V	V	V	Programs developed and given through TVP
External Assessment					
• Verification of Credentials					
Creating an Account Online	***	V	R	V	Issue with false reviews
Filling an Application	**	R	V	V	Companies may be demotivated by longer process
In-Person Interviews	*	V	NA	R	Companies may be unwilling to receive visits
• Customers Experience					
o Customers Review					
Providing them online	***	V	R	NA	Issue with false reviews
Survey sent to customers	**	NA	V	NA	Makes the process less dynamic
o Customer Feedback Received by Company					
Vendor provides them to TVP	***	R	V	V	Companies may be unwilling to provide data from clients
Survey sent to customers	**	NA	V	NA	Makes the process less dynamic
• Dissemination of Results					
Information Made Public	***	NA	V	V	Privacy and security issues increase risk
No Information is Released	*	R	NA	V	Privacy and security are highly ensured
At Discretion of Vendor	**	V	V	V	Process cannot allow warped perceptions
• Appeals					
No Appeal	***	V	V	NA	The program will have no entity to resolve complaints
Dispute Resolution	*	V	V	NA	Resolve complaints participants may have
Recognition Opportunities					
Quality and Quantity of Reviews	***	V	R	V	Could be an issue with false reviews
Characteristics of OHD Experience	**	V	V	V	Supply list of procedures, check if followed
Time and Participation in Program	***	R	R	NA	Possible "First Vendors"
Certification Opportunities					
UOHD Learning Programs	***	R	V	V	Successful completion of program(s)
SmartWay	*	V	V	V	Possible inclusion in SmartWay
Star Recognition per Level of Performance	**	R	R	NA	General descriptive statistics avoid ranking companies

Note: Level of risk is indicated by asterisks (low*, medium** and high***), initials R, V and NA represent Required, Voluntary and Does Not Apply, respectively.

Table 12 provides a summary of the different approaches considered for the TVP design, which were shared with the partners and, during focus groups, with the businesses. The table provides the nature of the program, information provided, external assessment issues, and recognition and certification opportunities, as well as the comments provided.

4.2.1 Design Phases

The Trusted Vendor Program was designed as a recognition program to foster OHD in urban areas. It is currently hosted on a website, where a nomination process is available online and offline, as explained in the following section. Three logical phases have been identified for the TVP, as summarized in Table 13. This project focuses on Phase 1, or the pilot test of the TVP. The progression of the other phases depends on the participation rate of receivers and vendors. Figure 12 shows the process detailed for each of the phases.

Table 13. Trusted Vendor Program Implementation Phases

	Phase 1/ Pilot (Current Project)	Phase 2 (Future Project)	Phase 3 (Future Project)
Vendor Account	No	Yes	Yes
Receiver Account	No	Yes	Yes
Provision of TV List	Yes	Yes	Yes
Aggregated Review Rating	No	Phase 2A: Only for account holders	Yes – Open to all
		Phase 2B: Open to all	
Full Review Rating	No	Phase 2A: No	Yes – Open to all
		Phase 2B: Only for account holders	
Types of Recognition for TV	TV List	TV List	Badges for vendors with large number of good OHD reviews, etc.
			Award Ceremony
Training Material	Basic OHD Manual (open to all)	Basic OHD Manual (Open to all)	Basic OHD Manual (Open to all)
		Training Courses (Account Holders Only - Free)	Training Courses (Account Holders Only - Free)
			Certification and Consulting Services (Paid)

Figure 12. Procedures to Join the Trusted Vendor Program in the Three Phases
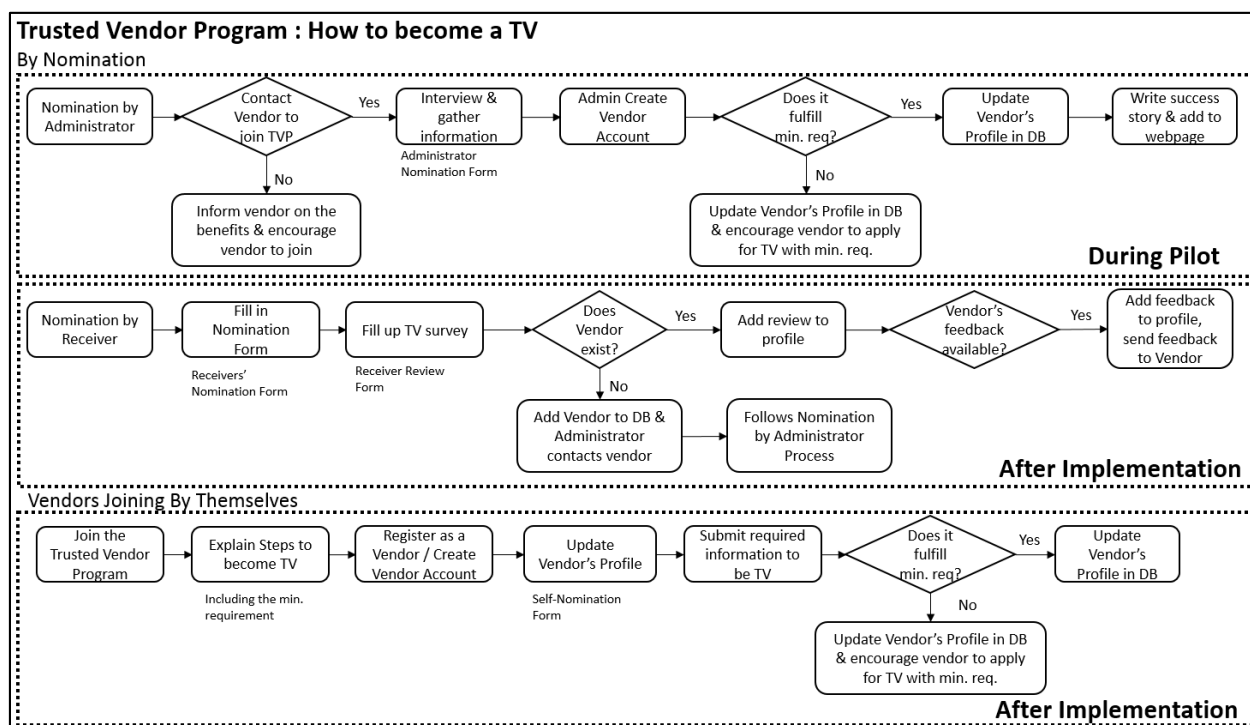
4.2.1.1 Phase 1

Phase 1 consists of recognizing vendors through a nomination process and displaying a Trusted Vendor List with the names and logos of accepted vendors.

Administrator Role: The administrator maintains the website and manages the Trusted Vendor List. The administrator has to review all of the applications and update the relevant information on the website. Training materials on basic OHD are also provided on the website as resources available to everyone.

Receivers Role: The receivers have passive roles in the Trusted Vendor Program, referring as necessary to the website for information on Trusted Vendors and OHD best practices. However, receivers are encouraged to take a more active role by nominating their vendor(s) to be Trusted Vendors through the Trusted Vendor website under the Join Us page. After making a nomination, the receivers will get emails updating them on the status of their nomination(s), such as an acknowledgment of the nomination's receipt and approval.

Vendors Role: The vendors have passive roles in the Trusted Vendor Program. They refer as necessary to the website for information on trusted vendors and OHD best practices. Vendors are able to take a more active role by nominating themselves through the website. Similar to the receivers, vendors would get email updates regarding the status of their nomination.

The Trusted Vendor Program administrator, vendors, and receivers also have an important role in promoting the program. While the administrator has an active role in publicity and marketing, receivers and vendors are also encouraged to promote the program and the benefits they realize to other businesses that might be interested in applying. Receivers are encouraged to promote their involvement in the program to customers as a sign of their commitment to sustainability and to encourage any/all of their vendors to apply to the TVP. Vendors that are selected as Trusted also play a crucial role in the publicity and success of the program. Soon after selection, they are provided with a TVP logo of membership that can be incorporated into their company documentation, including invoices and publicity. Through follow-up emails and program correspondence the vendors will be encouraged to provide feedback and testimonials on how participating in the TVP has increased their participation in OHD and any other business efficiencies or benefits realized. The administrator takes the lead in collecting this data, and providing feedback is optional for vendors.

4.2.1.2 Phase 2

The main development of Phase 2 is that online accounts will be created for both vendors and receivers that provide access to specialized training courses related to OHD. In addition, these accounts will serve as a database of businesses participating in OHD and allow identifiable interactions between vendors and receivers.

Phase 2 will retain the nomination process of Trusted Vendors. Through their accounts, vendors and receivers can check on the status of their nomination(s). As part of the nomination process, vendor performance metrics will be collected from the receiver in the case of third-party nominations, and from the vendor when it is a self-nomination. The information will be stored in the relevant receiver and vendor accounts. In this phase, receivers' "customer" reviews will be introduced, and receivers will be able to rate the performance of their vendors. Vendors will receive the full response from their receivers and both parties will be able to interact using the messaging system in the Trusted Vendor Program. Assessment criteria will be reviewed regularly by the administrator to ensure it continues to fit the needs of both the receivers and vendors.

To test the usability of the system, and the acceptance of the assessment criteria, this phase will include two sub-phases. In phase 2A, only the receiver and vendor account holders will be able to view the aggregated review ratings of the vendors. The public will not have access to the reviews. In phase 2B, the receiver and vendor account holders will be able to view the full ratings and reviews of the vendor, while the public will only have access to the aggregated review ratings.

Administrator Roles: The administrator will continue to maintain the website and manage the Trusted Vendor List. Training materials will be updated by the administrator, and training courses will be provided for receivers and vendors that have access to an account.

The administrator will continue to review all of the applications for Trusted Vendor. The performance assessment criteria of the vendor will be developed based on the experience from the pilot during phase 2A. In phase 2B, the administrator will be able to make full ratings available to receiver and vendor account holders.

Receivers Role: The receivers can create an account to evaluate the performance of their vendors through an online survey. The account will store the receivers' basic information, such as the organization name and contact details. This information will not be shared with the public. Aggregated review results will be available to account holders in phase 2A and to the public in phase 2B. The full review results will be available only to account holders. With the review results, the receivers will have a better understanding of the vendors performing OHD.

Vendors Role: Vendors can create an account to store the vendors' basic information, such as the name of the organization and contact details. Vendors will be able to manage the information that is displayed on the TVP website and available to the public. The rating will be tagged to the vendor's account. Even though the vendors have control over the basic information, they have no control over the display of ratings. Vendors will be able to receive the receiver's full review privately through the account, and they will be able to respond privately.

4.2.1.3 Phase 3

Phase 3 enhances the level of recognition provided by TVP. In this phase, a badge system will be introduced to further distinguish between the good and the extremely good vendors, and an award ceremony will be organized to recognize good and innovative OHD practices.

Administrator Role: The administrator will continue to maintain the website, manage the Trusted Vendor List, and review all of the applications. The performance assessment criteria will be reviewed based on experience from previous phases.

Training materials and courses will be updated by the administrator. The administrator will organize the award ceremony to recognize to those that perform good OHD practices and motivate the rest of their peers to follow.

Receivers Role: The public will have access to the full review results and will provide receivers a better understanding of the vendors that perform OHD.

Vendors Role: The public will have access to the full review results, allowing vendors to respond to the receiver's review on their public account page, the site all reviews are consolidated.

Currently the program is implemented at Phase 1, which is the pilot test of the Trusted Vendor Program. The progression of the other phases depends on the participation rate of the receivers and vendors, as explained previously.

4.2.2 Recognition Process

The recognition of vendors is currently available online and offline through a nomination process. Applicants can be either a vendor wanting to become a Trusted Vendor or an individual/organization looking to be nominated as a vendor. The application can be completed and submitted online through the Trusted Vendor Program website,[2] or filled out offline and mailed to the following address: 110 8th Street, Troy, NY, 12180-3590. Figure 13 exhibits the schematic of the nomination process, as displayed on the TVP website.

Figure 13. Schematic of the Nomination Process

This schematic provides the three simple steps in applying for the Trusted Vendor status: (a) select a role (as a vendor or external party), (2) fill out a nomination form, and (3) submit online or send by mail.

The administrator of the program will evaluate the Self-Nomination Form (appendix D) or the Online Third-Party Nomination Form (appendix E) and, depending on the case, will take up to three calendar weeks to provide a response to applicants.

The recognition program's three possible responses are as follows:

1. *Acceptance:* The applicant fulfills the requirements of the program. The administrator of the program recognizes the vendor as a Trusted Vendor. The vendor's name and logo will appear on the list of Trusted Vendors on the home page. The administrator follows up with the vendor and develops a short survey (see appendix F), where the vendor provides key performance criteria and improvements evidenced by doing OHD.
2. *Acceptance with conditions:* The applicant only partially fulfills the requirements of the program as depicted in the Qualifications and Criteria list but shows potential as a Trusted Vendor. The administrator of the program will recognize the vendor as a Trusted Vendor after vendor follows recommendations from the administrator. These usually include taking the courses available in the training materials section and/or providing additional information.
3. *Rejection:* The applicant does not fulfill the requirements to qualify as a Trusted Vendor, therefore, is not recognized as a Trusted Vendor. The administrator will provide feedback to the vendor and encourage them to fulfill the requirements and apply again.

As vendors are recognized, they will receive an email noting their acceptance to the program and will be provided with a member logo as shown in the following figure. The vendors will be asked permission to access and publish the company logo along with the company name on the TVP website.

Figure 14. Trusted Vendor Member Logo

The logo designed for businesses that become Trusted Vendors follows. This logo is sent to businesses as a digital image once they are accepted in the program. The vendors may include this logo on their website, company documentation, and promotional materials.

4.3   Liabilities

The TVP has been designed to promote interaction mainly between vendors and their customers, but it can also be used among businesses or individuals with an interest in the TVP, OHD, and sustainability practices. The web-based platform hosting the program was also developed to facilitate the recognition process of vendors and ultimately to create a pool of trusted vendors that are able to perform OHD without major issues. Data collection always involves privacy and safety concerns, especially if this data is collected online. Additionally, other problems may result from the recognition of Trusted Vendors that fail to continue to perform well. This section provides a discussion of the liabilities of TVP from two angles: (1) privacy and safety of data collection through the TVP website and (2) warranties related to OHD.

4.3.1   Privacy and Safety of Data Collection through the TVP Website

4.3.1.1 Vendors (Shippers/Carriers)

The vendors are the shipping or carrier businesses that nominate or get nominated through the Trusted Vendor Program. When applying to the program and when responding to the surveys, the vendors are responsible for providing accurate and truthful information. They reserve the right to withhold personal information and/or any other information and are allowed to deny the right to publish their own information at any point in time. As a Trusted Vendor, they are responsible for maintaining the status of "trusted" in their daily performance and for providing accurate information to the administrator when required.

4.3.1.2 Third-Party (Businesses/Public Sector)

The businesses or individuals other than vendors—including the public sector—that nominate vendor businesses are considered third-party. When nominating a vendor, third-party individuals have the right to withhold personal information. Contact information will be necessary to get feedback on the nomination process, but information is initially withheld and not publicly shared. As per their request, the third-party nominator may remain anonymous during the nomination process. Nevertheless, they have the responsibility of providing accurate and valid information about the vendor and their relationship to the organization. The third-party nominator is also able to disclose their contact information and appear publicly on the site if they so choose.

4.3.1.3 Administrator

The Trusted Vendor Program is a web-based recognition program, and as such, it must consider the privacy of the information collected.

In accordance with the Privacy Act of 1974, all personal information collected and published in the website requires prior authorization and permission. Further, an amendment by the Computer Matching and Privacy Protection Act of 1988, "regulates the use of computer matching agreements by Federal agencies when records in a system of records are matched with other Federal, State, or local government records. Among other things, it requires Federal agencies involved in computer matching agreements to publish a notice in the Federal Register regarding the establishment of the matching program" (Government Publishing Office, 2011).

The Trusted Vendor Program website may collect personal information (name, email address, address) for specific purposes (nomination forms, Contact Us forms, etc.), but all the information submitted is voluntary. Further, all information collected through Nomination Forms may be stored and used only for academic purposes. The information may only be shared in aggregated form, in partial or edited form, or verbatim, with the permission of the provider. All electronic mail messages received that may contain personal information will be retained only as long as the administrator responds to the subject matter of the email. The website further provides users with a note regarding communicating sensitive information through methods other than email.

4.3.1.4 Methods of Dispute Resolution

The Trusted Vendor Program provides a public space to showcase vendors as Trusted Vendors in accordance with the information submitted by nomination and survey data collected through the program. Conflict among parties involved may result from (1) unauthorized release of information of businesses by the administrator, (2) inaccurate information provided about a vendor business by a third-party, or (3) inaccurate information provided by a vendor business concerning a third-party individual.

If unauthorized information is released by the administrator, the program assumes full responsibility and is obligated to remove the information from the online portal and database. If inaccurate information is provided that affects a third-party and/or vendor, the administrator will remove the information in conflict and encourage the two parties to resolve the difference amongst themselves. The administrator assumes no responsibility for actions undertaken by the parties involved.

4.3.2 Warranties Related to Off-Hour Deliveries

4.3.2.1 Vendors (Shippers/Carriers)

During the nomination process, the vendors are asked if they are performing OHD. The application is a single process and does not require on-site verification. The references from others and a business's own input is evaluated in the application review process. Vendors recognized for performing OHD have to fulfill best delivery practices that may or may not be warranted by their customer's contract, but any violation of these may generate issues in the community and among other stakeholders. These vendors, when recognized, must guarantee the following:

- They are adopting low-noise technologies and practices
- Their performance in deliveries has improved (i.e., fewer number of trucks on the road and less time making the deliveries) as a result of performing off-hour deliveries

4.3.2.2 Receivers

During the nomination process, Trusted Vendor receivers are asked to reference their vendors for doing OHD in a safe and secure manner. Apart from acknowledging their vendors' performance, they should be updated on best OHD practices and infrastructure adaptations and safety procedures that would further facilitate receiving OHD without staff involved. These may include the following:

- Installing virtual cages
- Setting up surveillance cameras on site
- Providing staging areas with locks

4.3.2.3 Public Sector

To foster OHD, the public sector has an important role to play in encouraging all stakeholders to change behaviors while providing the infrastructure and city planning to further enable night deliveries. By funding pilot tests, promoting focus groups between all agents in the supply chain, and implementing demand-driven strategies, the public sector encourages vendors and receiving establishments to participate in the program. Further, by publicly recognizing the participants that perform OHD, the agencies are recognizing the value of the program to all parties involved, including the community affected by night deliveries.

These warranties are established for New York City, given that the New York City Department of Transportation supports and promotes the OHD.

4.4 Program Maintenance and Evaluation Plans

4.4.1 Program Maintenance Plan

The success of any recognition program is highly dependent on three major factors: (1) quality standards established for the recognition process, (2) regular monitoring of the performance, dispute resolution and maintenance of the participating vendors, and (3) an efficient periodic evaluation process. The major goal of this program is to promote unassisted OHD by providing receivers with a platform and criteria by which to choose potential vendors that can be trusted in making deliveries during the off-hours. As the program progresses and becomes well-known, receivers will be keen to engage Trusted Vendors as potential suppliers. Vendors, on the other hand, will be interested in becoming more effective and trustworthy to attract new clients. Since the quality of the deliveries could affect both parties—vendors and receivers—this program is very sensitive to unanticipated problems. Thus, maintenance and monitoring of the program is crucial for its success. The following sections provide a wide range of possibilities for the regular maintenance and monitoring process of the TVP.

Maintenance of the review process involves periodic checking for compliance in data collection and dispute resolution efforts to address unexpected situations among vendors and receivers. Key tasks in the maintenance plan include the following:

- *Brochure*: The brochure describes how receivers/vendors will benefit from TVP's features and advantages. Brochures were distributed through receiver, carrier, and vendor business associations, such as the Trucking Association of New York and Grand Central Partnership operating in NYC.

- *Dispute resolution*: In this program, there could be situations where participating vendors or receivers have grievances about the information provided on the recognition scheme. It is vital to have a body to address any dispute that may arise and to evaluate disputes on a case-by-case basis.

Maintenance and monitoring for this program should ensure that all aspects of the recognition scheme are maintained in proper order, and that the recognitions are fair. Special attention should be placed on facilitating dispute resolutions for participating firms to ensure a reliable and trustworthy program for participants.

4.4.2 Program Evaluation Plan

Program evaluation is a valuable tool to monitor and improve the outcomes of any program, to ensure that objectives are being met and that all stakeholders and participants are accruing benefits. This evaluation plan lays out a road map to answer questions about the program's effectiveness and outlines pertinent evaluation data that should be used to continually improve program services. This plan is focused on evaluating outcomes as detailed in the program objectives.

The Trusted Vendor Program has the overarching goal of increasing the participation of receivers and vendors in OHD. This goal is to be achieved by building a collaborative partnership that recognizes and is involved in sustainable delivery practices. Once implemented, the program will be self-sustaining. Therefore, the evaluation plan will also assess membership management and funding goals for the program.

This document presents the program evaluation plan for the Trusted Vendor Program, which should be performed on a yearly basis.

4.4.2.1 Evaluation Goal

The goal of this evaluation is to determine the effectiveness of TVP in fostering off-hour deliveries among carriers and receivers operating in New York City. This evaluation will investigate those components of the program that are performing optimally and should be expanded and replicated in future initiatives. In addition, this evaluation will help determine aspects of the program not serving the overall program goals that need to be improved or eliminated. The evaluation process will also help determine the funding needs of TVP for the following year.

4.4.2.2 Evaluation Team

The evaluation team will be composed of representatives of each stakeholder group, and each member will review the plan's outcomes and ensure that information needs are met. Other community members outside of the program stakeholder group could also be asked to join the evaluation team to provide insights into areas of interest for future program development. Table 14 presents the roles and responsibilities of the evaluation team members.

Table 14. Roles and Responsibilities of the Evaluation Team Members

This table provides the list of key stakeholders involved in the program's evaluation process as well as their roles and responsibilities.

Stakeholder	Evaluation Role	Responsibilities
Third-Party Auditor	Lead Evaluator	Oversight of all evaluation activities to ensure the evaluation is conducted as planned
		Coordinate meetings for the team
Managing Partner	Data Analysis	Analyze quantitative data
		Coordinate the analysis of qualitative data
		Ensure implementation of findings
Evaluation Committee Member	Data Collection	Gather and review data
Advisory Committee Member	Stakeholder/Advisor	Provide support and guidance and dissemination of results

4.4.2.3 Objectives

The goal of the Trusted Vendor Program is to increase participation in off-hour deliveries by freight carriers in the region. To achieve this goal several objectives have been established as metrics to assess the program's progress. At the program's design stage, the following objectives (see Table 15) have been identified. As the program implementation progresses these objectives may be revised to align with the relevant stages of the program's development. For each of these objectives, the program evaluators will provide an overview of the current status, collecting the relevant appropriate data to assess the metrics, and set the target for the next evaluation period.

Table 15. Program Objectives and Evaluation Metrics

This table presents the key indicators to evaluate the TVP and the objective involved in the evaluation.

Objective	Indicators
Increase the adoption of OHD	Number of businesses in the region that participate in off-hour deliveries
	Number of freight trips that have been switched from regular hours to off hours

4.4.2.4 Program Tasks

To set the program's course and provide direction, the managing partners will outline a series of tasks to be accomplished in order to achieve the overarching objectives. These tasks can span multiple evaluation periods depending on their scope and can be broken down into assignments that should be completed within an evaluation period. These tasks will serve as tools for communicating the program's progress with stakeholders. With task milestones, stakeholders will be able to follow the program's progress and provide feedback as to whether or not it is moving in the expected direction.

At the program evaluation, a summary of all ongoing and recently completed tasks should be presented, in a format that covers the following aspects:

- Stage of development
- Resources and inputs from stakeholders
- Activities
- Outputs
- Outcomes

4.4.2.5 Analysis of Findings

At the end of the evaluation process, the team will produce an analysis of the findings. The results will use both quantitative and qualitative methods to analyze the data collected to assess the evaluation metrics. The data from the evaluation will then be compared to the targets established for each metric, and stakeholders will be provided with insights to interpret the findings and make recommendations accordingly.

4.5   TVP Training Materials

4.5.1 Off-Hour Deliveries

This training program provides an introductory look at off-hours deliveries (OHD), including types of OHD and the various strategies and technologies that can be used to ensure low-risk deliveries.

- *Staffed Off-Hours Deliveries*: In this type of OHD, staff is available at the delivery location to receive deliveries during the off-hours.

- *Unassisted Off-hours Deliveries*: For this type of OHD, no staff is present to receive deliveries during the off-hours. The carrier is provided with access to the receiving establishment by way of a key, code, or third-party security service to complete deliveries. The main concern for receivers in accepting UOHD is the security of their property. There are various modes of security that can be used alone or together to provide increased security. Levels of security for the receiver location are the following:
  - Surveillance:
    - Access Cameras—to view entry to the establishment.
    - Internal Cameras—to view activity inside the establishment.
  - Access Control:
    - Restricted Access—these methods restrict access to only a specific space for delivery drop-off, e.g. delivery lockers, double doors, two-stage deliveries.
    - Full Access—these methods allow full access to the receiver's establishment (i.e., key deliveries, keyless entry, and electronic doorman service).
    - Insurance Coverage—carriers should consider assuming additional coverage to compensate for the higher perceived risk for the receiver.

Table 16 lists the material available for the training course on OHD.

Table 16. Reference Materials for OHD Course

The table presents a list of the reference materials related to the OHD course, including presentations and papers on the subject matter.

Reference	Material Type
Holguín-Veras, J. Why Should We Implement OHD Programs? The Good, the Bad, and the Ugly.	Presentation
Holguín-Veras, J. (2011). Urban delivery industry response to cordon pricing, time–distance pricing, and carrier–receiver policies in competitive markets. Transportation Research Part A: Policy and Practice, 45(8), 802-824.	Paper
Holguín-Veras, J., Silas, M., Polimeni, J., & Cruz, B. (2007). An investigation on the effectiveness of joint receiver–carrier policies to increase truck traffic in the off-peak hours. Part I: The behavior of carriers. Networks and Spatial Economics, 7, 277-295.	Paper
Holguín-Veras, J., Silas, M., Polimeni, J., & Cruz, B. (2008). An investigation on the effectiveness of joint receiver–carrier policies to increase truck traffic in the off-peak hours. Part II: The behavior of receivers. Networks and Spatial Economics, 8(4), 327-354.	Paper
Holguín-Veras, J., Polimeni, J., Cruz, B., Xu, N., List, G., Nordstrom, J., & Haddock, J. (2005). Off-peak freight deliveries: Challenges and stakeholders' perceptions. Transportation Research Record: Journal of the Transportation Research Board, (1906), 42-48.	Paper
Holguín-Veras, J., Campbell, S., Kalahasthi, L., & Wang, C. (2017). Role and potential of a trusted vendor certification program to foster adoption of unassisted off-hour deliveries. Transportation Research Part A: Policy and Practice, 102, 157-171.	Paper
Holguín-Veras, J., Wang, X. C., Sánchez-Díaz, I., Campbell, S., Hodge, S. D., Jaller, M., & Wojtowicz, J. (2017). Fostering unassisted off-hour deliveries: the role of incentives. Transportation Research Part A: Policy and Practice, 102, 172-187.	Paper
Holguín-Veras, J., Hodge, S., Wojtowicz, J., Singh, C., Wang, C., Jaller, M., ... & Ukegbu, C. (2018). The New York City Off-Hour Delivery Program: A Business and Community-Friendly Sustainability Program. Interfaces, 48(1), 70-86.	Paper
Holguín-Veras, J., Wang, C., Browne, M., Hodge, S. D., & Wojtowicz, J. (2014). The New York City off-hour delivery project: lessons for city logistics. Procedia-Social and Behavioral Sciences, 125, 36-48.	Paper
Holguín-Veras, J. The Off-Hours Delivery Project in New York City	Presentation
Holguín-Veras, J. The New York City Off-Hour Delivery Project: Lessons for City Logistics.	Presentation
Off Hour Deliveries can be a win-win.	Presentation
Holguín-Veras, J., Silas, M. A., & Polimeni, J. (2006). On the overall performance of comprehensive policies to manage truck traffic in congested urban areas.	Paper

4.5.2 Low-Noise Deliveries

This training program educates on the noises associated with deliveries, strategies, and technologies that may be used to mitigate these disturbances. The component is essential to OHD in order to keep noise emissions to a minimum during the night hours when the ambient noise level is significantly lower and, as a result, making sounds more impactful to residents in the surrounding community. The training will cover the following:

- *Noises associated with deliveries*: An introduction to typical noises associated with deliveries and the range of approximate noise levels that these activities can cause.
- *Low-noise strategies*:

- o   Training driver/staff in low-noise behaviors.
- o   Application of noise absorption materials to a variety of high-noise level sources, such as the truck body, engine compartment, and inside the delivery location warehouse.
- o   Physical changes to delivery location—physical adjustments can be made to the delivery location to decrease the potential for noise. Examples include paving driveways to have a smoother surface that will cause less noise and creating enclosed loading docks.

- *Low-noise technologies*:

- o   Low-noise trucks—electric trucks, natural gas trucks, hybrid trucks.
- o   Low-noise truck accessories—refrigeration units, tires, tail lifts.
- o   Low-noise cargo handling equipment.

Table 17 lists the material available for the training course on low-noise deliveries.

Table 17. Reference Materials for Low-Noise Deliveries Course

The table presents a list of the reference materials related to the Low-Noise Deliveries course, including presentations and papers on the subject matter.

Reference	Material Type
McManus, B. (2006). Low Noise Solutions for Night Deliveries	Paper
Goevaers, R. (2010). SUGARPIEK: Low noise solutions night time deliveries	Presentation
Holguín-Veras, J., Marquis, R., Campbell, S., Wojtowicz, J., Wang, C., Jaller, M., ... & Goevaers, R. (2013). Fostering the use of unassisted off-hour deliveries: operational and low-noise truck technologies. Transportation Research Record, 2379(1), 57-63.	Paper
Wojtowicz, J., Campbell, S., Wang, X., Holguin-Veras, J., Zhou, Y., & Goevaers, R. (2015, August). Noise reduction technologies to facilitate off-hour deliveries in urban areas. In INTER-NOISE and NOISE-CON Congress and Conference Proceedings (Vol. 250, No. 1, pp. 5889-5903). Institute of Noise Control Engineering.	Paper
Wang, C., Zhou, Y., Goevaers, R., Holguin-Veras, J., Wojtowicz, J., Campbell, S., Jaller, M. & Webber, R. (2013). Feasibility of installing noise reduction technologies on commercial vehicles to support off-hour deliveries. Submitted to NYSERDA and NYSDOT.	Report

4.5.3   How to Foster Trust

This training program educates on ways to foster trust between the shipper, carrier, and the receiver.

It will be based on strategies used by businesses to foster trust with customers, or with other businesses.

- The role of trust in business relationships.
- Components of trust (i.e., emotional and rational trust).
- Factors that influence trust.
- Trust as it relates to reviews (online and in-person reviews).
- The role of trust in UOHD.

Table 18 lists the materials available for the training course How to Foster Trust.

Table 18. Reference Materials for Course on How to Foster Trust

The table presents a list of the reference materials related to the course How to Foster Trust, including presentations and papers on the subject matter.

Reference	Material Type
Holguín-Veras, J., Wang, X. C., Sánchez-Díaz, I., Campbell, S., Hodge, S. D., Jaller, M., & Wojtowicz, J. (2017). Fostering unassisted off-hour deliveries: the role of incentives. Transportation Research Part A: Policy and Practice, 102, 172-187.	Paper
Holguin-Veras, J. Update on the NYC-OHD Program:Trusted Vendor Program Research	Presentation
Holguin-Veras, J. Development of Trusted Vendor Program to Support the Off-Hour Delivery Program	Presentation
Holguin-Veras, J. Role and Potential of a Trusted Vendor Certification Program to Foster Adoption of Unassisted Off-Hour	Presentation

4.5.4 Other Training Courses in Consideration

Other topics considered by the team for future training courses include the following:

- *Best Practices for Unassisted Off-Hours Deliveries (UOHD):* including concepts that have been tried and tested throughout the actual pilots and implementations of UOHD internationally, and feedback from focus groups of various agents regarding aspects of UOHD.
- *Legality and Responsibilities of Unassisted Deliveries*: a more detailed look at the roles of each party in insurance coverage and dispute resolution.

Table 19 lists the materials available for other training courses.

Table 19. Reference Material for Other Courses

The table presents a list of the reference materials related to other potential courses.

Reference	Material Type
Zambrano, A., Martinez, S. & Ballesteros, F. (2016). Off-Hour Delivery Pilot Project in Bogotá	Presentation
Yoshizaki, H., da Cunha, C., Frank, C. & Kolsstrup, K. (2016). Off-Hour Delivery Pilot Project in Sao Paulo and Copenhagen.	Presentation
Holguin-Veras, J. & Hodges, S. (2013). Lessons from the off-hour delivery program.	Presentation
Holguin-Veras, J., Shorris, A., Ozbay, K., Kornhauser, A. & Ukkusuri, S. Integrative freight demand management in the New York City Metropolitan Area.	Presentation
Rensselaer Polytechnic Institute & Center of Excellence for Sustainable Urban Freight Systems. NYCDOT training seminars	Presentation
Holguin-Veras, J. 1. Freight and service activity, generation of traffic and decision making. Urban Freight Policy and Management Training Seminars for NYCDOT.	Presentation
Holguin-Veras, J. 2. Public sector initiatives. Part I: infrastructure and parking/loading areas. Urban Freight Policy and Management Training Seminars for NYCDOT	Presentation
Holguin-Veras, J. 3. Public sector initiatives. Part II: vehicle related strategies and traffic management. Urban Freight Policy and Management Training Seminars for NYCDOT	Presentation
Holguin-Veras, J. 4. Public sector initiatives. Part III: pricing, logistics and demand management. Urban Freight Policy and Management Training Seminars for NYCDOT	Presentation

5   Trusted Vendor Program Website

The TVP operates through a website hosted by the administrator of the program.[3] The website plays a critical role in creating synergy and interactions among vendors, receivers, and the administrator. The website is currently divided into five sections in addition to the homepage. The following figures take the reader through the interface of the website. The program's homepage includes a brief description of the program and its benefits, including a series of pictures from research work on off-hour deliveries in New York City, the potential benefits of becoming a trusted vendor, testimonials of Trusted Vendors, news headlines related to the program, and a list of program sponsors. Figure 15 shows the upper part of the homepage, which includes a scroll of pictures with different testimonies related to the TVP and OHD, a brief definition of the program and the Trusted Vendor List. A key feature of this page is that it dynamically updates the list of vendors as they become accepted by the administrator. Images of vendor logos are also displayed. Figure 16 shows the lower portion of the homepage, which describes the principal aspects of the program, including a schematic of the benefits for vendors and receivers, testimonials, and the list of sponsors and supporters.

Figure 15. TVP Homepage (1)

This figure illustrates the TVP homepage, which includes a brief definition of the TVP and the benefits to the vendors, receivers, and community. On the right side, the logos of the selected Trusted Vendors are displayed as well as the logo and link to the OHD webpage on the NYCDOT website.
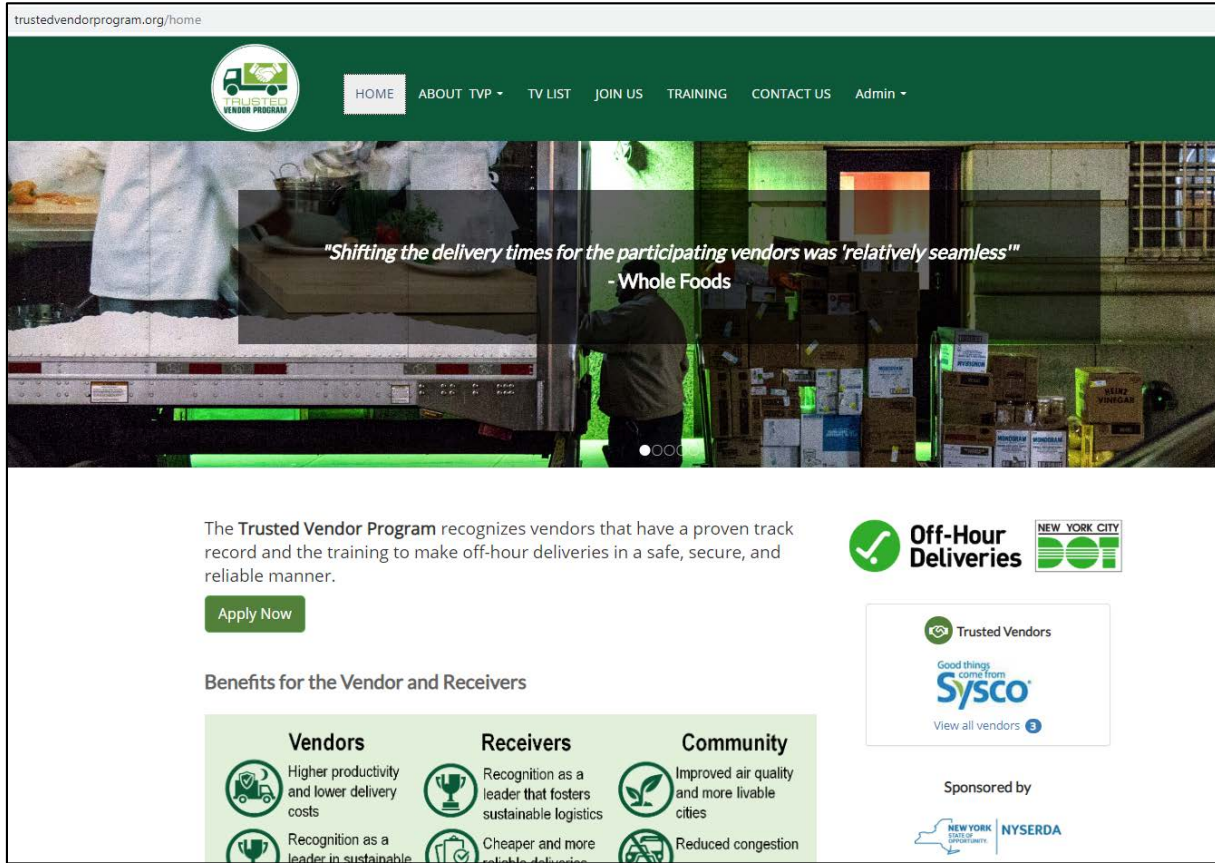
Figure 16. TVP Homepage (2)

This figure illustrates the second portion of the TVP homepage, which includes the benefits of TVP and testimonials from businesses that have benefited from OHD. On the right side, the logos of the program sponsors and collaborators are exhibited.

The About TVP section of the website is currently subdivided into four sections: (1) About Us, (2) Who Are Trusted Vendors, (3) Benefits of a Trusted Vendor, and (4) Stories of Trusted Vendors. Figure 17 shows the About Us page, which includes the story of the TVP and the funding and supporting agencies involved in the program.

Figure 17. TVP Website—About Us

This figure illustrates the About Us page, which includes a brief description of the project that sponsored the program as well as program sponsors and collaborators.

About Us

The Trusted Vendor Program is a recognition program to foster Off-Hour Deliveries (OHD) in urban areas. The program is sponsored by the New York State Energy Research and Development Authority (NYSERDA), New York State Department of Transportation (NYSDOT) and the New York City Department of Transportation (NYCDOT), in collaboration with the Trucking Association of New York, the Grand Central Partnership and Rensselaer Polytechnic Institute. When deliveries are made in the off-hours, everyone wins: with cost and reliability benefits for receivers and shippers, and environmental benefits for all urban dwellers. To make the switch, receivers need to know that deliveries will be made to their businesses safely. Experience has shown that once receivers' initial safety concerns are addressed, OHD becomes the preferred practice.

The Trusted Vendor Program provides businesses with information about "trusted" shippers and carriers and vendors that fulfill the required conditions of safe and community-friendly delivery practices. These vendor characteristics can only be measured through a proven track record with clients, business partners, and government agencies. The Trusted Vendor Program provides an initial reference for receivers, and supports all participants with publicity for their involvement in OHD and future sustainability initiatives.

Sponsored by

New York State Energy Research and Development Authority (NYSERDA)

New York State DOT

New York City DOT

VREF Center of Excellence for Sustainable Urban Freight Systems

Rensselaer Polytechnic Institute

Supported by

Trucking Association of New York

Grand Central Partnership

Figure 18 presents the Benefits of a Becoming a Trusted Vendor page, which includes a schematic that explains the main benefits of becoming a Trusted Vendor, particularly for the main stakeholder groups: vendors, receivers, and the community.

Figure 18. TVP Website—Benefits of a Trusted Vendor

This figure highlights how everyone benefits from the TVP: vendors enjoy increased referrals and the time and cost savings of making off-hour deliveries, receivers enjoy the security of knowing their vendors are reliable and trained in OHD, and the community can identify and support businesses that value sustainability.

The Trusted Vendor List is also included as a separate page of the website. The TV List page will include the names and logos of all of the vendors enrolled in the program and the date they were accepted as Trusted Vendors, as shown in Figure 19.

Figure 19. TVP Website—Trusted Vendor List

This figure illustrates the Trusted Vendor List page, which includes the name of the business enrolled as a Trusted Vendor, and the date of its acceptance into the program. (Trusted Vendor logos are included on the homepage.)
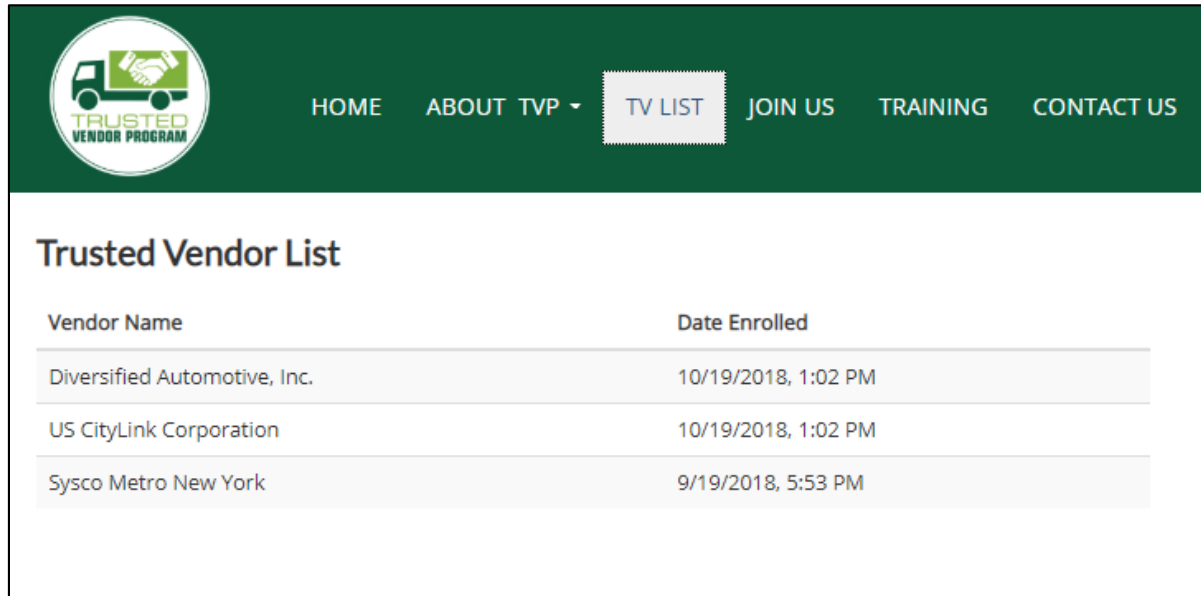
Figure 20 illustrates the Join Us section of the webpage, which explains the three-step process for becoming a Trusted Vendor. This section explains the role of the nominator (vendor or third-party) and has the corresponding links for the Self-Nomination Form for vendors, and the Third-Party Nomination Form for businesses.

Figure 20. TVP Website—Join Us

This figure illustrates the Join Us page, which describes the way to apply to the program and includes access to the online and downloadable nomination forms.

Figure 21 exhibits the general training materials sections. Three main topics have been considered as part of the TVP training courses: (1) Off-hour deliveries, (2) Low-noise deliveries, and (3) Fostering trust. An Others section is also included with additional training materials related to OHD, such as safety and reliability in performing OHD.

Figure 21. TVP Website—Training Materials

This figure illustrates the Training page of the program, which provides a link to the different courses offered. Currently, these links provide access to a detailed description of each of the proposed courses.
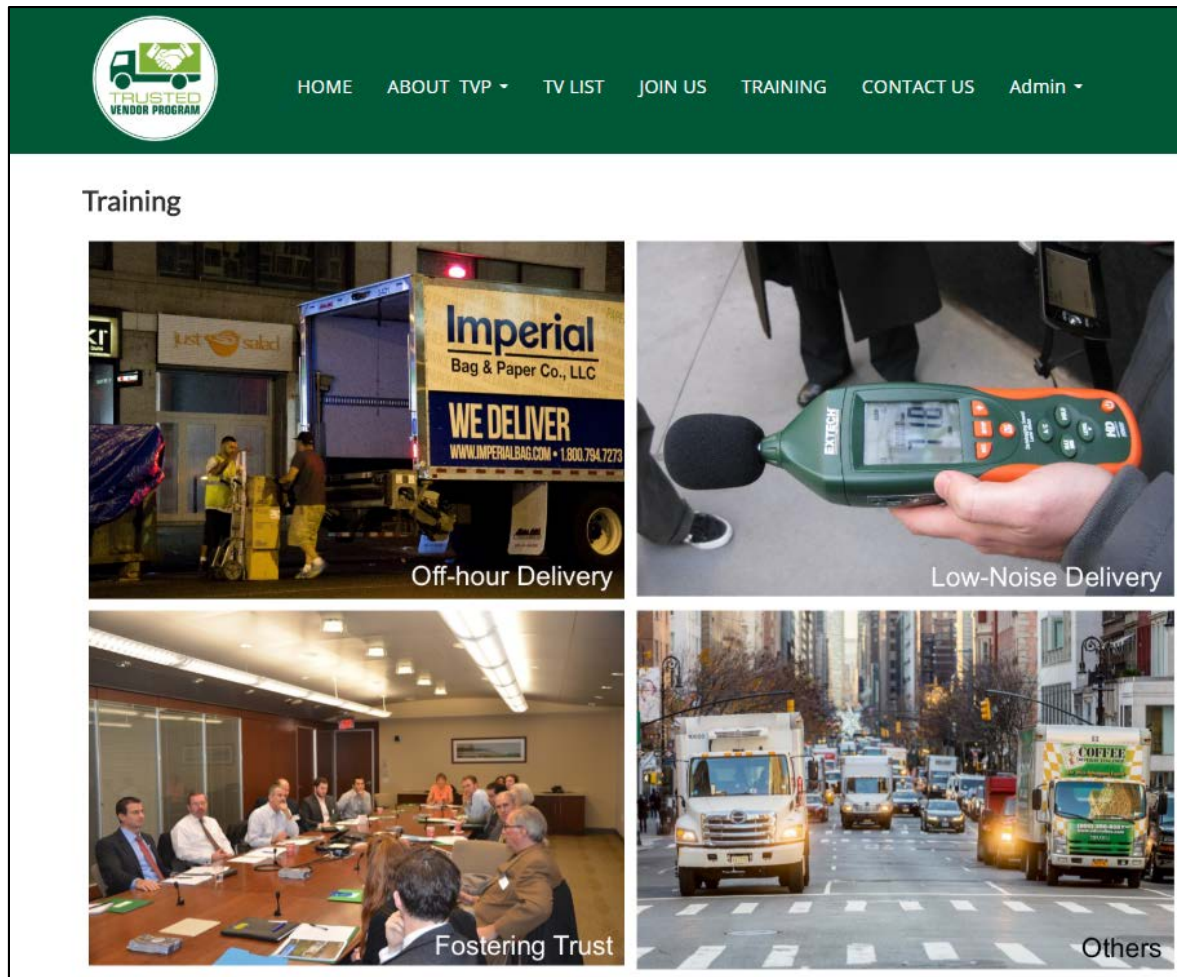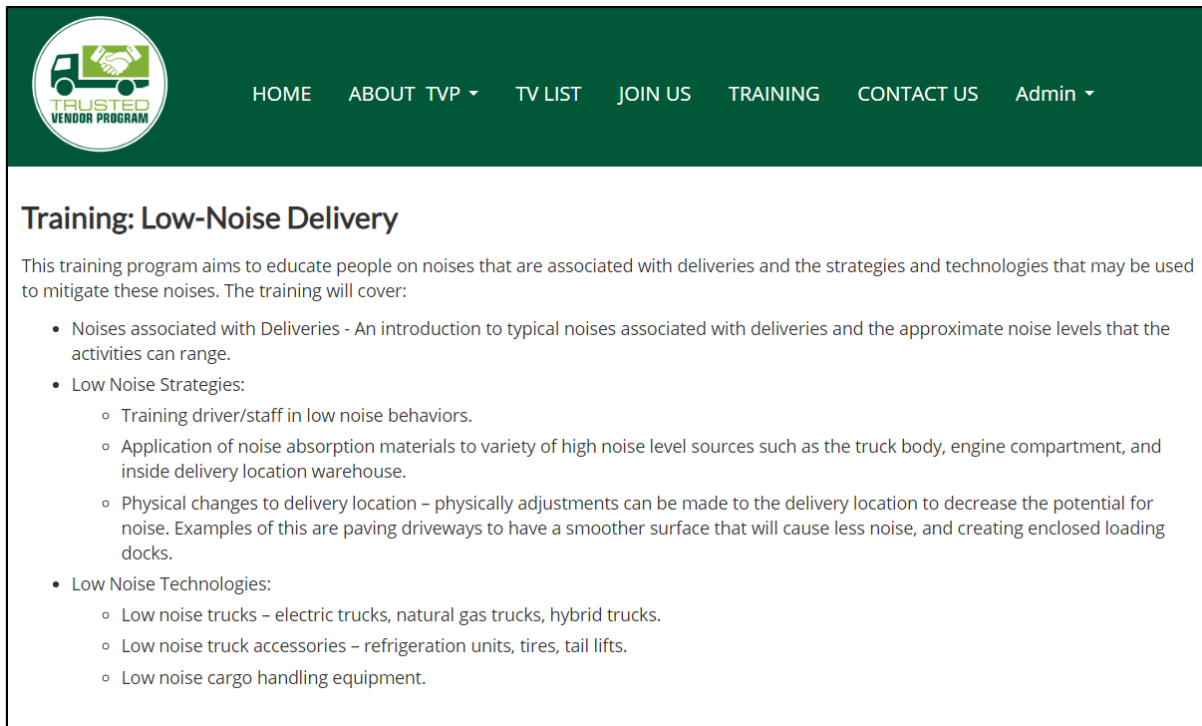
Figure 22 presents the outline of the materials covered in one of these sections: Low-Noise Deliveries. Also see appendix G with an example of the content for this specific course.

Figure 22. Training Courses—Low Noise Deliveries

This figure illustrates one of the training courses, the Low-Noise Deliveries course, with a detailed description.

Lastly, Figure 23 presents the Contact Us section of the webpage, which includes a form that anyone can fill out with questions/suggestions/inquiries on the program. All inquiries will be received by the administrator.

Figure 23. TVP Website—Contact Us

This figure illustrates the Contact Us page of the program, which provides an online form that can be used to contact the program administrator, and the program contact information (mailing address and email link).

6 Implementation of the Trusted Vendor Program

Throughout the Trusted Vendor Program (TVP) project, a strong network of partners has been developed, with relationships built primarily through previous completed phases of the team's off-hour delivery (OHD) work. The core Trusted Vendor Project team includes researchers from Rensselaer Polytechnic Institute (RPI), the New York City Department of Transportation (NYCDOT), the Trucking Association of New York (TANY) and the Grand Central Partnership (GCP). Throughout the project, the team would meet to discuss the project's progress and next steps. For the implementation phase, each team member was responsible for reaching out to certain user groups to identify potential Trusted Vendors. In addition to the core team, other trade groups and organizations such as the New York State Restaurant Association, Manhattan Chamber of Commerce, and other business improvement districts (BID) were used to spread the word of the Trusted Vendor Program (TVP) launch.

6.1 Outreach

In September 2015, the project team began conversations with the core partners on potential legal issues/concerns involved in creating and operating a trusted vendor program. By December 2015, the team had had individual face-to-face meetings with both the GCP and TANY to define action plans for moving forward. By the first quarter of 2016, the team was developing the design of the program and met with project partners to gather input. By June 2016, the team worked on several approaches to the TVP in terms of the nature of the program, the platform on which it would operate, the information that would need to be collected from vendors/carriers, the conditions/qualifications involved in becoming a Trusted Vendor, the external assessment that would be provided by the vendor's customer, and ongoing program maintenance and evaluation. The team reached out to partners on a more regular basis to gather feedback on the concepts developed to date.

Once the general idea was fleshed out with the core partners, focus groups were held with carriers and receivers to gather their input on the program as a whole, and to gauge interest in a TVP. By September 2016, the research team finalized the design of the program, and further engaged local businesses through a number of focus groups to gather receivers' feedback. More specifically the team, with the support of GCP, was able to reach out to 150 businesses of various sizes, including a mix of businesses that are currently doing OHD and those that are not. Initial focus group meetings were developed, where local businesses from the retail, food, and accommodation sectors provided important feedback based on their experience and expectations on the program design in terms of the attributes that should define a Trusted Vendor. As a result of these focus groups, the team made modifications to the program.

After these receiver-based focus groups, RPI enhanced the TVP by incorporating suggestions and feedback into the program. Following these enhancements, TANY and their members were engaged to solicit carrier and shipper perspectives. During these conversations it became clear that while carriers and shippers are in favor of the TVP, the program is not their top priority. They want to ensure their current operations are successful, which includes focusing on current customers and making sure they are satisfied.

6.2   Implementation

In early 2018, the project team began introducing the formal TVP to selected companies as part of the initial program rollout, which coincided with the release of the program website.[4] In addition to the website, an informational flyer was created, along with nomination forms. The flyer is shown as Figure 24, and the nomination forms are shown in appendices D and E. The initial rollout was intended to be a slow, one-on-one process with companies that already had good relationships with the core research group from prior off-hour, delivery-related work. These companies represented both carriers and receivers. Many of the companies expressed an interest in the program but were reluctant to participate in the first round of implementation. By mid-2018 several receivers were eager to nominate their trusted vendors to the program; however, this was not a straightforward process. Their vendors wanted to learn more about the program. Ultimately some of the contacts left their positions and the process started over again. Unfortunately, when their replacements were named, they were focused on learning their new positions and did not have time for this program. In mid-2018, GCP and TANY made a larger solicitation to notify their members of the launch of the TVP. In August 2018 RPI talked to representatives from the SmartWay program and briefed them on the TVP. The SmartWay representatives were fully supportive of the idea, and eager to help get businesses sign up. In late September 2018, they included information on the TVP in one of their monthly email blasts to the SmartWay community. Figure 24 shows a screenshot of the solicitation that appeared in the newsletter. Additionally, several other groups have expressed interest in disseminating information on the TVP but have not yet done so. These groups include the New York State Restaurant Association and several of the business improvement districts in New York City.

NYCDOT was an active partner during the implementation phase of the TVP. However, due to several staff changes within the NYCDOT, the program implementation experienced some delays as new staff had to be brought up to speed and fit the program meetings and activities into their schedules. Throughout all of these staff changes, NYCDOT was eager to support the program, and increased the number of businesses receiving OHD. As NYCDOT re-launches their entire OHD campaign, they have indicated they will be offering TVP as a key tool to potential participants. In their website, the TVP has been added as a strategic partner of the OHD program in NYC.[5]

Figure 24. Trusted Vendor Flyer

The Trusted Vendor Flyer was designed to promote participation in the program. It was sent through email to partners and businesses, printed, and delivered to people at conferences and workshops.

Figure 25. EPA SmartWay Newsletter Announcement about TVP

Screenshot of SmartWay's newsletter in which they promoted the Trusted Vendor Program to their subscribers. This promotion had positive resonance among carriers, as some of the program's current Trusted Vendors acknowledged having heard for the first time about TVP through this email.

6.3 Trusted Vendor List

Due to the nature of the program, the list of Trusted Vendors is not static but rather an evolving register of businesses that have been identified as trustworthy. While businesses are interested in nominating vendors and in becoming accepted in the program, it can take time for them to actually act on this interest. In some cases, it took over six months for businesses to officially accept an invitation to become a Trusted Vendor. Table 20 shows the list of the current approved vendors.

Table 20. Current List of Trusted Vendors

The current list of Trusted Vendors, the industrial sector they belong to, and the website of the company.

Trusted Vendor	Sector	Website
Sysco, Metro New York	Food Service	www.sysco.com/Contact/Contact/Our-Locations/Metro-New-York
Baldor	Food service	www.baldorfood.com
UNFI	Food service	www.unfi.com/
US City Link Corp	Produce/other food	www.uscitylinkcorp.com
The Beverage Works	Beverage	www.thebeverageworks.com
New England Motor Freight	General cargo	www.nemf.com/
Salson	General cargo	www.salson.com/
Anheuser-Busch of New York	Beverage	www.anheuser-busch.com
Diversified Automotive, Inc.	Automobile	www.diversifiedauto.com/

6.3.1 Sysco Metro New York

Sysco Metro is the premier food service distributor in the metropolitan area of New York. The company distributes to restaurants, delis, schools, institutions, sports venues, and business feeders, covering the markets of Central New Jersey, Manhattan, The Bronx, Staten Island, and Westchester County, NY. Sysco Metro New York was one of the pioneers in unassisted off-hour deliveries in the City. They were part of the successful pilot developed in 2008 along with 32 other vendors, during its implementation in 2011 with more than 400 vendors. Moreover, they are still successfully developing overnight delivery routes.

6.3.2 Anheuser-Busch Sales and Service of New York

A leader in the U.S. beer industry, Anheuser-Busch is home to several of America's most recognizable beer brands, including Budweiser, Bud Light, Michelob ULTRA, and Stella Artois as well as a number of regional brands. Today, the company employs 30,000 people nationwide and participates in programs that promote social wellbeing and environmental sustainability, such as the emergency drinking water program and the responsible drinking program. Their New York City location employs 300 people, services 7,100 accounts, and distributes almost nine million cases of beer a year to Manhattan, Staten Island, Queens, and Bronx boroughs. The branch already operates off-hour deliveries. In 2018, they had one route for three months and in 2019 are starting two new routes, hoping to grow the off-hour deliveries even more with the Trusted Vendor Program.

6.3.3 Diversified Automotive, Inc.

In business for over 30 years, Diversified Automotive delivers automobiles to dealers outside of business hours. Since its inception, off-hour deliveries have become a staple of the business. All of the drivers value the ability to perform OHD and are well versed in proper procedures and perform them in a productive manner. Dealerships also have protocols for OHD, such as where to park cars and what to do with the keys. This way, the company is able to deliver high-end Mercedes as well as all other products throughout the entire state of New York.

6.3.4 US City Link Corporation

US City Link Corporation provides transportation and logistics services to California, Florida, Georgia, Alabama, Mississippi and other northern states throughout the year. The company relies on highly trained professionals and the use of technology, such as real-time online monitoring, to achieve excellence in service. All drivers are certified, licensed, and experienced with freight. They have been performing off-hour deliveries for over 10 years.

6.4 Implementation: Current Stage and Moving Forward

The implementation phase of the Trusted Vendor Program, which included recruiting potential participants, began in the early spring of 2018 with a small-scale rollout. The wider rollout took place during the summer months. It became clear that although private-sector businesses are generally in favor of the TVP, they typically do not have the immediate time to nominate trusted vendors. Similarly, when they do, the nominated vendors often cannot immediately accept, as they have to gain internal company approvals, which can sometimes take several months. Although both carriers and vendors are interested in TVP, it is not necessarily their top priority. Their main concern is to ensure that daily operations are on track and customers are satisfied. The carriers noted it is often difficult to devote time to new programs while keeping their existing operations moving forward, especially with the current lack of truck drivers in labor market. Transportation managers—typically the personnel who participate in the TVP—spend the bulk of their time and effort carefully scheduling shipments with fewer drivers than they could ideally use. During the implementation phase, the team relaxed the constraint that businesses had to fill out the nomination forms. If a receiver verbally identified trusted vendors, the project team would evaluate the nomination and reach out to the vendor with additional information. This helped reduce the nomination process time and provided flexibility for busy vendors and carriers.

Based on experience to date, within the busy and competitive world of urban freight, new sustainability programs are not quickly embraced. But while it will take some time to build momentum on the TVP, in expanding the reach of OHD, TVP will gather its own momentum and eventually reach its tipping point of self-maintainability. In promoting the critical carrier/receiver relationships at the core of OHD, the TVP facilitates ongoing OHD expansion. Carriers and receivers that switch to OHD and word of mouth will be the program's best publicity, more effective than its brochures and website. OHD is a new sustainability program, but one with clear operational benefits for carriers and receivers: ensuring faster and more reliable deliveries. The TVP will gradually interest new carriers and receivers in OHD, and the operational benefits they experience through OHD will sustain their interest and involvement.

The research team intends to continue to support the TVP. This includes keeping the website active and current as well as soliciting and vetting new program participants. The team will continue this effort for the foreseeable future with support of the Volvo Research and Educational Foundations Center of Excellence for Sustainable Urban Freight (CoE-SUFS) at RPI. It should be noted that if additional funding is provided, the program can develop and prosper because additional resources such as advertising and staff support can be devoted to advancing the program. This includes future outreach with various BIDs, trade groups, and receivers operating in the New York City area. It is expected that the list of approved Trusted Vendors will continue to grow as word spreads, since more businesses want to be recognized for offering sustainable freight transportation options.

7   Cost Benefit Analysis

Independent from the current status of implementation, the research team defined metrics to assess the benefits and costs of the different stages of implementation. The following sections provide the overall assessment of benefits and costs for vendors, receivers, and the community.

7.1   Design of Evaluation Metrics

To be comprehensive, the team designed an evaluation plan that quantifies the key impacts of the Trusted Vendor Program on a wide range of stakeholders, including the estimation of impacts on vendors, receivers, and the community. The costs of administering the program will be accounted for under program costs and will not be part of the evaluation metrics for the stakeholders.

For the key stakeholders, the costs and benefits differ from stakeholder to stakeholder. As the key objective of the Trusted Vendor Program is to encourage the adoption of OHD, the expected outcome would be to increase the number of off-hour deliveries. Hence, the assessed costs and benefits of the program should be based on the estimated increase in off-hour deliveries and reductions in regular hour deliveries for receivers, vendors, and the community. Table 21 summarizes this evaluation matrix. Section 7.2 discusses in detail the costs and benefits of the key stakeholders.

Table 21. Evaluation Matrix

The evaluation matrix includes the impacts of OHD for each of the three stakeholders (community, vendors, and receivers), and the metrics used to evaluate these impacts.

	Impacts	Metric
Community	Regular hour traffic condition	Average user travel time
		Congestion
	Off-hour traffic condition	Average user travel time
	Air pollutants	Key pollutant emission levels
	Noise	Noise measurement
	Safety	Number of truck-related crash counts
Vendors	Productivity	Service Time
		Average miles traveled and number of delivery/tour
		Driver stress
	Parking Fine	Average parking fines/tour
	Operational Costs	Itemized costs: fuel, labor, toll
Receivers	Reliability of delivery times	Percentage of deliveries within the expected delivery window
	Delivery errors	Counts of events
	Costs of doing OHD	Initial costs; Operational costs
	Property damage	Count of events; Total amount of loss
	Productivity	Average time used to receive delivery (including waiting, unloading, unpacking, etc.)
		Time gained for other duties, such as customer interaction

7.2 Impact of Trusted Vendor Program

The impact of the Trusted Vendor Program is analyzed using three scenarios: base case, short-term, and long-term. In the base case, it is assumed that all businesses would conduct operations as usual. Based on the team's previous survey, approximately 30% of establishments already had trusted vendors (Holguín-Veras et al., 2013) at implementation. In the short-term, it was assumed that the Trusted Vendor Program would increase public recognition of receivers and vendors performing OHD while the proportion of establishments with trusted vendors would remain unchanged. In the long-term scenario, with public recognition, it was assumed that the proportion of establishments with trusted vendors would increase from 30% to 50%. The behavioral models developed by RPI suggest that market participation in UOHD would increase from 3.9% in the base case to 4.5% in the short-term scenario, and 6.5% in the long-term scenario. Based on the 2016 County Business Patterns, the number of establishments in New York City is estimated to be 239,174. Hence, it was estimated that the number of establishments conducting OHD is 32,156 during the base case, 37,103 during short-term, and 53,595 during the long-term. Table 22 shows the expected number of regular hour deliveries (RHD) and OHD deliveries within the three scenarios.

Table 22. Daily Deliveries and Routes Switched to the Off-Hours for Each Scenario

The different scenarios (base case, short-term, and long-term) are analyzed in terms of the number of establishments performing OHD, number of daily deliveries made (both in the regular and in the off-hours), and the tours considered for each time of delivery.

Scenario	Base Case	Short-term	Long-term
Percentage of Establishments with Trusted Vendors	30%	30%	50%
Market Share	3.90%	4.50%	6.50%
Establishments performing OHD	9,328	10,763	15,547
Deliveries from OHD establishments	35,372	40,814	58,955
Regular-hour deliveries (RHD) per day	896,168	894,510	888,979
Off-hour deliveries (OHD) per day	10,784	12,443	17,974
Regular-hour Tours	448,084	447,256	444,490
Off-hour Tours	8,295	9,572	13,826

The average number of deliveries for a receiver is approximately 18.96 per week (Holguín-Veras et al., 2013). Assuming that there are five working days per week, the average number of deliveries per day would be 3.79. Out of these deliveries, 70% are regular-hour deliveries (RHD) while 30% are OHD. Establishments that do not perform OHD would receive 100% of their deliveries during regular hours. The OHD is estimated to increase in these establishments by 15% during the short term, and 67% during the long term. Based on GPS data, the average number of delivery stops per tour was found to be 2.0, and 1.3 for deliveries during the regular hours and off-hours, respectively. The estimated number of tours are shown in Table 21.

7.2.1 Impacts on Receivers

As the number of OHD deliveries increases during the short-term and the long-term scenarios, receivers would be able to observe benefits through increased reliability of delivery times, reduction in delivery errors, and increases in productivity. On the other hand, the receivers might encounter property damage and operational cost increases due to shifting to the off-hours.

Reliability of delivery times: According to the survey, on average, the previous OHD participants received five deliveries during daytime hours and two during off-hours every day. For daytime, the frequency of deliveries that were delayed by at least 30 minutes is 2.67 times per day. In contrast, the number of OHDs that arrive late was only 0.55 per week (about 0.08 per day), presenting a dramatic improvement in

delivery time reliability. In addition, due to improved delivery reliability, safety inventory can be reduced from 1.5 days to 1 day. Essentially, due to unreliable regular-hour deliveries, receivers are forced to keep an extra half day of inventory on hand. With OHD, receivers only need to have on hand goods they plan on selling the next day.

Delivery errors: The number of errors committed during the OHD is comparable to RHD. If there are delivery errors during OHD, the correct item can be ordered and replaced the same day. However, if there are delivery errors during RHD, the correct item can only be replaced the following day or days.

Productivity: The receivers would experience time savings as a result of switching to OHD and increased store operation efficiency because they "are able to stock shelves earlier and avoid interrupting customers with products in the aisles" (Holguín-Veras et al., 2013).

Property damage: Property damage may occur when an inexperienced or unreliable vendor makes the delivery. Vendors that are part of the Trusted Vendor List have experience with OHD and are vouched for by their receiver or by a third-party. Hence, property damage is unlikely to happen in most cases.

Cost of operation: For unassisted OHD, the receiver can invest in a number of technological and operational practices that reduce the associated risk or costs. The list includes, among others, (1) door locks (keyed and electronic keypads), (2) the use of electronic doormen to ensure that only authorized individuals enter the establishment, (3) double-doors that allow deliveries to be made without anyone entering the actual establishment, (4) delivery cages/lockers, where deliveries could be securely stored outside the establishment, and (5) virtual delivery cages that define an area using laser beams or other electronic means, where deliveries are securely made only by authorized individuals.

7.2.2 Impacts on Vendors

Vendors benefit from faster and more reliable travel times, reductions in delivery costs, reductions in parking fines, and less stress on delivery crews, among others.

Productivity: The productivity of vendors performing OHD would be enhanced when compared to RHD. Previous analysis indicated that if deliveries are shifted from mid-day and afternoon to the night period, 93% of the analyzed trips can be performed with shorter travel times. The delivery service time and travel times between the warehouse and the delivery stops were reduced. As a result, OHD helps to dramatically reduce fuel consumption and emission rates (by over 20%, in general). For deliveries on roads with

significant traffic disruptions such as toll roads or urban arterials, the reductions can be over 50%. In addition, according to the survey analysis of drivers and fleet managers, vendors also benefit from several other aspects. The average time spent finding or waiting for parking at each delivery stop is reduced from 30.3 minutes in the daytime to 8.75 minutes at night. The typical walking distance from the parking spot to the delivery location reduces from seven minutes to 5.4 minutes. The percentage of times the driver is able to park within one block of the delivery location increases from 39.5% to 60%. The average time spent at the loading dock decreases from 33.8 minutes to 24.7 minutes. It was found that driver stress levels decrease when delivering at night. With one representing the least stressful, and five representing the most stressful, the average stress level for drivers polled reduces from four in the daytime to 2.78 in the nighttime.

Parking fine: The parking fines in New York City average about $750/truck-month. Since it is easier for truckers to find legal parking spaces near their delivery locations during the off-hours, the typical number of parking tickets reduces from 7.3 tickets per week to 0.125. For every OHD route that replaces a regular hour route, the vendor is expected to save about $9,000/year/OHD-tour in parking fines alone.

Operational cost: Research reported in Holguín-Veras et al. (2011) and interviews with drivers indicate that switching a delivery route from RHD to OHD saves on average 2.5 hrs. Assuming a value of time of $85/hr, one could estimate for every delivery tour that switched from RHD to OHD saved $212.50 per day or $42,500/year/OHD tour (assuming 200 days/year). The total savings to vendors, including parking fines, amounts to about $51,500/year/OHD-tour. The estimated savings per year would be approximately $65 million and $285 million for the short-term and long-term scenarios, respectively, when compared to the base case.

7.2.3 Impacts on Community

This program encourages the shift of deliveries from the regular hours to the off-hours. The communities could benefit from the reduced congestion realized through lower freight traffic in the daytime hours. There are three main effects: travel time reductions, reductions in total vehicular emissions (pollutants and noise), and reductions in conflicts and crashes between delivery vehicles and other vehicles, pedestrians, and bicyclists.

Traffic condition: The reduction in regular-hour deliveries contributes to congestion reduction. Each diverted (i.e., shifting from daytime to off-hour delivery) truck reduces the network-wide vehicular hours traveled (VHT) by at least 6.2 hours in the day, while only increasing it by 0.07 hours for the entire network during the night.

Pollutant emissions: OHD also benefits communities through the reduction of air pollutants. Each diverted truck reduces the network-wide emissions by 0.028 ton per hour in the daytime, while it increases them by a mere 0.0016 ton per hour during the nighttime. The increased OHD activity could potentially lead to a slight increase in emissions during the off-hours, which could be mitigated or eliminated with hybrid/electric trucks. However, taken together, the substantial emission reductions during the regular hours leave no doubt that OHD programs are on balance largely positive for the environment.

Noise emissions: The noise measurement at multiple delivery sites from previous OHD studies suggested that noise caused by most of the delivery operation falls under the permitted limits, and the peaks only last for a couple of seconds. However, the engine noise does go over the limit and could be perceived by residents as noise pollution if the driver does not adequately manage the acceleration of the truck. In the long term, noise control devices and driver training may be necessary, especially for OHD in residential locations.

Noise at night, a major concern if not addressed, could be largely mitigated, and even eliminated. The Trusted Vendor Program has a section that educates vendors and receivers on low-noise delivery practices and technologies to drastically reduce the chance of offending noise events when conducting OHD.

Safety: It was found that each 1% increase in truck volume is related to a 0.235% increase in the non-severe truck crash occurrence rate, and a 0.273% in severe crashes in the daytime. The numbers are 0.238% and 0.281%, respectively, for nighttime. Based on the simulation of the short-term and long-term scenarios, it can be concluded that the off-hour delivery program does not significantly increase the risk of truck-involved crashes.

7.3   Analyses on the Impact of OHD in GHG Emissions

At this early stage of the TVP, it is important to consider how impactful off-hour deliveries have been in the reduction of GHG emissions. GPS data was used to produce the emissions analyses in NYC for a typical route from one of our current Trusted Vendors to show how OHD significantly reduces GHG

emissions. Data was divided in two sets, labeled "original" and "shortened." The available data contains routes that are significantly longer (as shown in the original values, ranging between 128 to 448 km) than typical delivery routes. To correct this situation, a simulated origin was selected closer to the delivery area, and a second set of data was generated by eliminating the first. The resulting data are labeled "shortened," and the rest of the route remains the same, resulting in a delivery route that is more representative of typical routes. See Figure 26 with the routes used for the study.

Figure 26. Routes Studied per City

Two routes were analyzed to evaluate OHD impacts on GHG emissions for (a) the original route that starts farther away at a warehouse in Pennsylvania and (b) the simulated tour that starts at a warehouse in New Jersey.

Source: Holguín-Veras et al. (2018b)

(a) New York City, USA (original)   (b) New York City, USA (shortened)
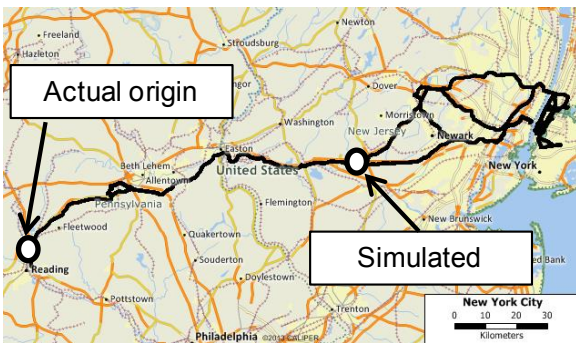
Two routes were simulated for each case, and each route was analyzed during regular hours and during off-hours. Table 23 shows the statistics for distance traveled in kilometers.

Table 23. Distance Traveled in Kilometers (km)

Statistics in terms of distant traveled for the two routes analyzed.

Source: Holguín-Veras et al. (2018b)

City	Mean	Standard Deviation	Minimum	Maximum	Number of Routes	
					RHD	OHD
NYC, USA (Original)	352.36	79.68	128.00	447.93	1	4a
NYC, USA (Shortened)	234.70	71.25	109.61	336.87	2	5

Table 23 shows the results for city average emissions in NYC per route (grams/route) for both regular and off-hour deliveries as well as the savings in GHG emissions when delivering during the off-hours. As shown, the total savings are 26.4% when performing OHD. In particular, the savings in CO_2 emissions are 9%, while NO_x emissions are reduced by 18%, and the rest of the indicators show savings with a range of 30 to 33%.

Table 24. City Average Emissions in New York City per Route (gram/route)

Results for average GHG emissions in gram/route for the two routes analyzed, comparing regular and off-hour deliveries as well as the savings derived from switching deliveries to the off-hours.

Source: Holguín-Veras et al. (2018b)

Time-of-day	ROG (g)	TOG (g)	CO (g)	CO2 (g)	NOX (g)	PM10 (g)	PM25 (g)	Total GHG (g)
Regular-hours	33	37	478	209291	78	11	11	209939
Off-hours	22	25	322	190088	64	8	8	190536
OHD Savings	32.92%	32.92%	32.68%	9.18%	17.58%	29.63%	29.63%	26.4%

Reduction can also be observed per kilometer traveled. Table 25 shows the results for city average emissions per kilometer in NYC (gram/km) for both regular and off-hour deliveries, as well as the savings in GHG emissions when delivering during the off-hours. As shown, the total savings are even more significant, representing 55.2% when performing OHD. In particular, the savings in CO_2 emissions are 55%, while NO_x emissions are reduced by 60%, and the rest of the indicators show savings of approximately 66%.

Table 25. Average New York City Emissions per Kilometer

Results for average GHG emissions per kilometer for the two routes analyzed, comparing regular and off-hour deliveries as well as the savings derived from switching deliveries to the off-hours.

Source: Holguín-Veras et al. (2018b)

Time of day	ROG (g/km)	TOG (g/km)	CO (g/km)	CO_2 (g/km)	NO_x(g/km)	PM10 (g/km)	PM25 (g/km)	Total GHG (g/km)
Regular hours	0.247	0.281	3.607	1548.156	0.581	0.086	0.083	1553
Off-hours	0.081	0.092	1.190	694.450	0.236	0.030	0.028	696
OHD Savings	67.17%	67.17%	67.00%	55.14%	59.47%	65.53%	65.53%	55.2%

The analyses developed not only represent the potential GHG emission savings for all businesses that decide to switch their routes to the off-hours, but also what is actually occurring with the program's Trusted Vendors. Sysco, for instance, has more than 20% of their routes during off-hours. Anheuser-Busch of New York had one route performing OHD last year, and they will have two this year. Thus, as these vendors increase their routes to OHD the expected savings are as shown in this analysis.

7.4   Program Cost

The administrator has been designated to initiate, develop, and maintain the program. At the conclusion of this NYSERDA-funded project RPI will continue administering the TVP for the foreseeable future. If the administrative role is transferred to another party, such as the public sector or an independent organization, the costs and benefits may vary. The cost to the administrator, based on the current design, would include website hosting and staff, among others. Table 26 shows the cost breakdown.

Table 26. Cost Breakdown for Administrator

Cost breakdown for each phase of the program, with Phase 1 or the pilot being current phase. Phases 2 and 3 are future phases considered for the program.

Name	Phase 1/ Pilot	Phase 2	Phase 3
One-time cost			
Website design	$15,000	$30,000	$15,000
Recurring cost (per year)			
Staff	$35,000	$105,000	$175,000
Program maintenance cost (e.g., website maintenance, equipment, marketing, etc.)	$30,000	$40,000	$150,000

Website design: Website design is typically a one-time cost. There is a significant upgrade between Phase 1 and Phase 2. Additional functions, such as the creation of accounts, the account holders' ability to view the reviews and ratings, and also to respond to reviews, are included in Phase 2. The second upgrade, between Phase 2 and Phase 3, is not as major as the first upgrade. Badges are expected to be awarded in Phase 3 to vendors with a large number of positive OHD reviews, the changes mainly relate to the way information is presented on the website. The website design costs shown in Table 26 are estimated based on the improvements needed from the previous phase. The cost to upgrade from Phase 1 to Phase 2 is estimated to be $30,000, and the upgrade from Phase 2 to Phase 3 is estimated to be $15,000. If the program is upgraded from Phase 1 to Phase 3, there might be some cost savings on the web development and maintenance.

Staff: It is estimated that 0.5, 1.5 and 2.5 full-time staff members would be required for Phase 1, 2 and 3, respectively. It is also assumed that the cost for a full-time staff equates to $70,000/annum, which includes overhead, insurance, salary, and taxes, among others.

Program maintenance cost: Program maintenance costs may include website maintenance, equipment, marketing cost, content production cost, and travel, among others. It is assumed that the coverage of the Trusted Vendor Program is limited to New York City, and traveling would be limited within New York State.

7.5   Program Funding Plan

The idea of the TVP is to encourage all vendors considered to be trusted to join the program, and by being recognized they would encourage others to be part of the program. This is the main reason why the program does not plan to collect any membership fees from the vendors. Nonetheless, the program requires some start-up and maintenance costs that must be covered to support the program. As part of the design, the research team has considered a number of funding strategies that could be considered at each program stage. Table 27 shows these strategies, actions to implement, and the phases where they would apply.

Table 27. Suggested Strategies and Actions to be Implemented Based on Program Phases

Strategies and actions suggested for funding the TVP, with timing according to the different phases of the program.

Major Strategy	Actions to be Implemented	Phase
Funding from governmental agency	Request direct funding from agencies	1
Receivers pay for membership	Provide best practice reference	1,2
	Newsletters	1,2
	Discount for training	2
	Annual conference	3
Receivers and vendors pay to access reports	Access reports on aggregated reviews	2
Receivers and vendors pay for a certification to conduct UOHD	Provide background check	3
	Go through training	3
	Go through examination	3

The first strategy involves obtaining funding the program through public-sector agencies. This project was able to provide the seed funding for the start-up of the program. To guarantee the continuation of the program, additional funds should be considered, including grant opportunities or social impact bonds.

The second strategy considers the possibility of asking receiving establishments to pay for membership. If promoted well, the program could operate from the fees received from the business sector. The aforementioned benefits could be distributed in four different actions:

- *Provide best practice references*: The membership would provide case studies, references, and guidelines for receivers and carriers on how they can use the OHD program to be more efficient. These best practice references would be given to receivers periodically as they are updated on the latest trends and would be made available in the training section of the program.
- *Newsletters*: By joining TVP, newsletters would be delivered to receivers with the latest information presented by the media. This would also keep the businesses updated on OHD and other best business practices.
- *Discount for training*: In further stages there is the potential for having actual paid training courses. Discounted or cost-free courses may be attractive to businesses that are interested in adopting and improving OHD practices.
- *Insurance discounts*: Offering insurance discounts on vendors' vehicles on the basis of best business practices. This would require engaging the public sector and insurance companies.
- *Annual conference*: At the third stage, the program could develop annual conferences where public recognition of businesses provide free publicity and new opportunities for business improvement.

The third strategy considers the possibility of asking vendors to pay for specific performance reports. Even though they are not paying to participate in the program, they could be offered the optional reporting of their reviews for a fee.

The fourth strategy considers offering certification to vendors for their performance on unassisted off-hour deliveries. This can only be done after the program has gained momentum and is able to provide official certification of OHD through training courses and validation of best OHD practices.

7.6   Summary of the Cost Benefit Analysis

The Trusted Vendor Program supports and enhances the off-hour delivery program and provides new ways of encouraging trust among receivers and their vendors. Receivers are able to experience better reliability of delivery times and reduced delivery errors. If there are errors during OHD, receivers could get an order replenished during the day, instead of waiting for the next due date. Due to the overall increase in reliability of quality delivery, they are able to reduce safety inventory. As there are reduced deliveries during the daytime, the receiver is able to spend more time during the day interacting with customers instead of receiving deliveries. To enhance the security of their establishments or products, the receivers can invest in a number of technological and operational practices to ensure that only authorized individuals enter the establishments or designated secure delivery areas.

Vendors benefit from TVP through enhanced productivity and reduced operational costs. The estimated savings per year for all vendors would be approximately $60 million and $260 million for the short-term and long-term scenarios when compared to the base case. Vendors participating in the program also have the potential to increase business as they are being advertised as a participant in this program.

From the perspective of the community, the reduction of regular-hour deliveries effectively contributes to congestion reduction without increasing VHT significantly during the nighttime. With the overall reduction in VHT, communities also benefit from reduced air pollutants. From the previous study, noise pollution peaks only last for a couple of seconds and engine noise may go over the permitted limit. Residents may be aware of the increased noise disturbance if the driver does not adequately manage the acceleration of the truck. The TVP provides a section on the website to educate vendors and receivers on low-noise delivery practices and technologies to drastically reduce the chance of offending noise events when conducting OHD.

Based on its current design, RPI will administer the program for the greater good, and some funding strategies have been considered to cover the costs of administration for the different phases of the program. However, if the administrative role is transferred to another party, such as the private sector or trade organization, the cost-benefit analysis may be different.

Overall, the benefits of the program outweigh the costs. The team's recommendation is to continue with the current setup (Phase 1) for the foreseeable future, and then move on to Phase 2 when the program gains more momentum. The focus of the present phase is to enroll vendors considered to be trusted to perform OHD, and in turn, to encourage other vendors to join the program and adopt OHD in a reliable, efficient, and sustainable way. By increasing the number of Trusted Vendors recognized, the overall benefits would increase substantially and prove feasibility for the next phase of the program.

8 Conclusions

The successful implementation of an OHD program in NYC and other large cities across the United States and abroad has proven that freight traffic can be improved if deliveries, even a fraction, are made overnight. However, in the long term, one major challenge for the implementation of OHD is the provision of cost-effective incentives to promote OHD participation among establishments. In the case of carriers and shippers, the cost and time savings are sufficient reasons to change. Yet, on the receiver's side, it takes additional initial time and costs for receivers to obtain cargo in the overnight hours, costs they may be unlikely to accept without counteracting incentives. Unassisted OHD, or deliveries received outside of the regular hours without the assistance of the receivers' staff, have been proposed to tackle this issue. To ensure participation, several incentive mechanisms were provided to receivers that accepted staffed OHD and also to those that accepted unassisted OHD. The findings produced by the team's previous research confirmed that receivers conducting Unassisted OHD—as opposed to those performing staffed OHD—were willing to continue OHD without incentives (Holguín-Veras et al., 2017b). Moreover, the research also found that having a trusted vendor is valued the highest by responders when asked about factors that would be most conducive to switching to OHD. The most important asset in the equation was "having a trusted vendor," which was assigned a subjective monetary value ranging from $1,741 to $36,538 (Holguín-Veras et al., 2017a).

Clearly developing a Trusted Vendor Program that certifies qualified vendors will foster participation in OHD. The research described in this report was focused on designing and implementing a self-maintainable TVP, a recognition program for vendors that are able to conduct OHD in a reliable, trustworthy and safe way. This program was built through research and feedback obtained from the study of existing certification and recognition programs, roundtable discussions with partners, and focus groups with the business community. Major findings from the research indicated that a trusted vendor should be rewarded for their performance and their ability/potential to conduct OHD. This provided a basis for the key qualifications and criteria of a trusted vendor, with recommendations from clients (receivers) as the basis of demonstrating these qualifications. In consultations with receiver establishments, the team found them very receptive to the idea of nominating their vendors and providing vendors with online customer reviews. In this way, as the program gains momentum, it can be self-sustained, as vendors are recognized by customer reviews for their excellent track records.

The design proposed for the TVP is a web-based platform that enables vendors to be recognized online, and businesses to access a list of trusted vendors that would be capable of their safe and community-friendly delivery practices. Three phases were proposed with the purpose of starting over-night deliveries through a simple nomination process that would encourage vendors to participate in the pilot. As the program progresses, recognition will rely on customer reviews to guarantee transparency and programmatic maintainability. Currently, vendors are selected based on their performance and experience in OHD, and a nomination process was developed and implemented online. The website where the program is hosted displays program characteristics, provides nomination forms, and includes a Trusted Vendor List. [6] The Trusted Vendor List includes the businesses that have been recognized as Trusted Vendors. Recognized Trusted Vendors provide an initial reference for receivers, while promoting the vendors' involvement in OHD and future sustainability initiatives.

The implementation phase of the Trusted Vendor Program began in early spring of 2018 with a small-scale rollout. The wider rollout took place during the summer months. It has been a slow process, but the outcomes have shown potential for the program to prosper in the future. The experience has indicated that private-sector businesses are generally in favor of the TVP, but they typically do not have the time to immediately nominate trusted vendors. Similarly, when they do, the nominated vendors often cannot immediately accept, as they have to gain internal company approvals, which can sometimes take several months. Insight gained from the conversations with carriers have shown that while carriers and shippers are also in favor of the TVP, it is not necessarily their top priority. They want to ensure that their current operations are on track, and that current customers are satisfied. During the implementation phase the team relaxed the constraint that businesses had to fill out the nomination forms. If a receiver verbally identified trusted vendors, the project team would evaluate the nomination and reach out to the vendor with additional information. This helped reduce the nomination process time in the first month or so, and further self-nominations were received online as well. As a result, a number of potential applicants have been reviewed, and an initial list of Trusted Vendors has been published on the website.

Another part of the study developed in parallel with the implementation of TVP was the cost benefit analyses. The results from the analyses have shown so far that the program should continue with its current design, and that RPI should be the administrator for the greater good. This current design costs approximately $65,000 per year to maintain, with a $15,000 investment. Future stages will increase the cost significantly to over $100,000 per year, with a minimum of $30,000 investment. Thus, while

there are some feasible funding mechanisms that could be put in place, the program still needs to gain recognition among stakeholders and be attractive for the community to be adapted at the full-scale model. Nevertheless, as highlighted in this report, the program is beneficial in directly motivating more companies to switch deliveries to the off-hours, thereby reducing the negative impact that daytime traffic and congestion bring to the vendor, the business community, and society as a whole.

The research team intends to keep the TVP moving forward for the foreseeable future. This includes future outreach with various BIDs, trade groups, and receivers operating in the New York City area. It is expected that the list of trusted vendors will continue to grow as word spreads and more businesses want to be recognized for offering OHD and other sustainable freight transportation options.

9   References

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Appendix A: Certification Program: Analyzing Liability Issues and Possible Funding Mechanisms

This report analyzes liability issues and possible funding mechanisms that could be applicable to the Trusted Vendor Program (TVP). The report is divided in two sections. The first section presents the review of selected certification programs available on the web, in which a description of the program and its structure provides insight into the characteristics of a Trusted Vendor certification, its evaluation criteria, process for applying to the program, and funding model used. Additionally, the review gathers liability issues foreseen in the specific programs to compare its applicability to TVP. The second section presents key features noted in terms of liabilities and funding models, and the third presents a summary of this report.

1. Review of Certifications Programs

1.1 Comodo Internet Security (CIS)—Trusted Vendors

Overview: Comodo Internet Security (CIS)—Trusted Vendors (Comodo 2015) is a certification program offered by Comodo aimed at software providers and websites to ensure authenticity and integrality. Software vendors can apply to this program, and, if accepted, win acceptance and are placed on the Trusted Vendor List. With this software provider certification, users are protected from malicious software and CIS will not display any alerts or warnings during the installation or operation of the software. The service is free of charge and is open to all vendors that have a code signing certificate from any certificate authority (CA).

Benefits: Helps protect users from accessing or downloading malicious software and improves customer confidence in relation to software providers.

Process to get certified: To be included in the Trusted Vendor List, a form is filled out and submitted and the following requirements are satisfied:
- Software is available for download by Comodo's technicians
- Software is code signed with a certificate from a trusted CA—self-signed code signing certificates are not acceptable
- The "Company Name" provided in the form matches the name of the signer on the certificate
- Software vendor provides a valid email address
- Application is submitted to Trusted Vendor Program (TVP)
- The concept of "trusted" has been incorporated

Open to all vendors.

Insights into Liability:
Comodo has a legal repository on its website. Legal documents register Comodo as a CA, which entitled it to issue, revoke, and renew digital certificates. An example of one of the documents follows:

Comodo is a Certification Authority (CA) that issues high quality and highly trusted Extended Validation digital certificates ("EV Certificates") to private organizations, government entities, and other business entities in accordance with this EV CPS. In its role as a CA, Comodo performs functions associated with public key operations that include receiving requests, issuing, revoking and renewing a digital certificate and the maintenance, issuance and publication of Certificate Revocation Lists (CRLs) for users within the Comodo PKI. In delivering its PKI services Comodo complies in all material respects with high-level international standards, including those on Qualified Certificates pursuant to the European Directive 99/93, the relevant law on electronic signatures, the CA/Browser Forum Guidelines for Extended Validation Certificates and all other relevant legislation and regulation. Comodo may extend, under agreement, membership of its PKI to approved third parties known as Registration Authorities. The international network of Comodo RAs share Comodo's policies, practices, and CA infrastructure to issue Comodo digital certificates, or if appropriate, private labeled digital certificates.

Some important liability insights are observed to protect information submitted to Comodo for external users:

I request the issuance of EV Certificates for the domains listed herein and certify that the information submitted is accurate and complete. I will immediately bring any changes or inaccuracies in the information to Comodo's attention. I agree that my failure to do so may result in either or both of (1) Comodo revoking the Certificate or (2) Comodo commencing litigation against me and/or my company.

Funding Model:
From Comodo's website: "This service is 100% free of charge and is also open to vendors that have used code signing certificates from any Certificate Authority."

Application to Trusted Vendor Program (yes or no and why):
Not applicable, this program is a state program, defined by law and is designed for businesses by legal rights, not by specific qualities or needs from the market.

1.2   The Unified Disadvantaged Business Certification Program

Overview: The Unified Disadvantaged Business Certification Program was created as part of the Wisconsin State Legislature (2015) and issued by the State of Wisconsin. Any business that applies to the certification and falls into the definition (84.072, Section 1) of a "disadvantaged business" can obtain the certificate. The state keeps a directory of businesses certified under this category, which is updated annually. The information is available to anyone at no charge.

Review Body: The State of Wisconsin or any certifying authority delegated.

Certification Process and Requirements: From Comodo's website:

A business certified as a disadvantaged business shall, within 30 days after a change in the business's size, disadvantaged status, ownership, or control that could preclude its certification as a disadvantaged business under 49 CFR 26, notify the department of that change by sworn and notarized statement. A business certified as a disadvantaged business shall submit annually to the department a sworn, notarized statement attesting that there have been no changes to the business's size, disadvantaged status, ownership or control, or its gross receipts, that would preclude its certification as a disadvantaged business under 49 CFR 26. The notice shall include a statement that the business meets the size and gross receipts criteria for certification and shall include documentary evidence supporting that statement. The department shall remove the certification of any disadvantaged business that fails to provide the statement within 13 months after certification under this section, or within 13 months after it last submitted to the department the information required under this subsection, whichever is later.

Insights into Liability:
The entire program is provided according to the Wisconsin State Legislature.

Funding Model:
It is a legal right and free of charge.

Application to Trusted Vendor Program (yes or no and why):
Not applicable, this program is a state program, defined by law and is designed for businesses by legal rights, not by specific qualities or needs from the market.

1.3   SmartWay Program by the United States Environmental Protection Agency

Name of Certification Program: SmartWay Program by the United States Environmental Protection Agency (EPA 2015).

SmartWay program was developed by EPA and Charter Partners represented by industry stakeholders, environmental groups, American Trucking Associations, and Business for Social Responsibility. This is a public-private initiative launched in 2004, aimed at increasing fuel efficiency and reducing greenhouse gas emissions and air pollution by the transportation supply chain industry. In 2012, the program was initiated in Canada.

Review Body: United States Environmental Protection Agency

Targeted Sectors:
- Freight Shippers
- Logistics companies (including third-party logistics providers)
- Truck carriers
- Rail carriers
- Barge carriers
- Multi-modal carriers

Benefits:
This program helps firms reduce freight operation costs by the following:

- Providing tools to assess and compare the fuel efficiency and carbon footprint of the supply chain operations with respect to the latest available strategies and technologies, giving firms the ability to make better economic and environmental decisions.
- Promoting the use of technologies and equipment that could reduce the emission of greenhouse gases and pollutants.
- Providing a SmartWay logo (internationally recognized brand), acknowledging the firm as a company that applies "cleaner and greener logistics."
- Ranking the performance of the partners and recognizing the efforts toward sustainable logistics through SmartWay Excellence Awards, announced annually.

From the United States Environmental Protection Agency website: "From 2004 to 2014, this program has saved about $20.6 billion worth of fuel, 61.7 million metric tons of carbon dioxide emissions by assisting a partner base of about 3,000 firms across the U.S." (EPA 2015).

Certification Process and Requirements:
Firms submit a tool known as SmartWay Shipper/Carrier Tool (different tool for carriers depending on the mode of transportation, such as truck, rail, barge, multi-modal, or air) along with basic company information. The firms are approved by the EPA as the "SmartWay Shipper Company Partners." The certification is free of cost.

Agreements/Obligations (of Partner Firms):
- Shippers/carriers in this program agree to the condition that they will report the emission performance of their company annually to the EPA.
- The shippers/carriers allow EPA to post the performance result on their website/database.
- Firms provide any supporting documentation requested by the EPA.

Agreements/Obligations (of EPA):
- EPA holds the right to post the participants names and related promotional and media materials on the website. For posting any other material EPA obtains written permission from the participant.
- EPA provides tools, assessments, and performance data and assists firms in achieving emission goals.

Insights into Liability:
- EPA holds the authority to suspend any firm that does not comply with specific standards
- The exclusion of any partner is not publicly made available
- Partner should not claim EPA support or endorsement of products or services
- Either party can terminate the agreement anytime

Application to Trusted Vendor Program (yes or no and why):

- Promotes the company's performance with respect to providing greener, cleaner, and sustainable logistics by providing branding and recognition
- Off-hour deliveries can be a part of improvement in environmental and sustainable logistics

1.4   Integrating the Healthcare Enterprise—USA 2014 Cycle Certification Program

Overview: Integrating the Healthcare Enterprise (IHE) is a global nonprofit organization that enables collaboration among healthcare providers and industry leaders to work together to improve interoperability and exchange of health information. In 2012, IHE with the help of International Computer Security Association (ICSA) Labs developed a program to test and certify the performance and compliance of the health IT systems providers with respect to prescribed standards. This certification is valid for two years. Currently, the certification cycle is for 2014 (ICSA labs 2014).

Benefits:
- Helps the health IT system providers to distinguish themselves from other vendors in providing optimal patient care
- Helps purchasers to identify the health care providers that comply with specific standards

Review Body: Integrating the Healthcare Enterprise (IHE) and International Computer Security Association (ICSA).

Targeted Sectors:
- Healthcare IT systems and application providers
- Health Information Exchange (HIE) products
- Patient Care Device (PCD) providers

Certification Process and Requirements:
- Vendor products go through a rigorous testing process for IT infrastructure and Patient Care Device (PCD) domains
- Testing is conducted in an authorized testing facility by qualified personnel
- Test results are reviewed by an independent expert before issuing a firm the IHE USA certification

Fee is variable. IHE does a pilot evaluation to determine fees for certification. The certification is valid for two years.

Agreements/Obligations:
Firms certified must keep a logo on all products, advertising materials, or any material related to the certified products.

Insights into Liability:
- Firms certified must manufacture the products in the same way, with the same features, as in the testing process
- In case of any changes or failures in the product, the firm must immediately revoke the certification and inform the IHE

- For changes or new products, the firm can apply for a new certification
- ICSA Labs does surveillance of the certification process, which includes:
    - Correct usage of logo
    - Review statements about the certification to ensure there is nothing misleading
    - Check products for compliance in the field
    - Address any complaints on product quality or change in features

Application to Trusted Vendor Program (yes or no and why):
- This program certifies healthcare providers based on their performance, such as the Trusted Vendor Program.

1.5   Historically Underutilized Business Program

Overview: Historically Underutilized Business (HUB) Program, Controller of Public Accounts (Office of the Secratary of State 2011) is a program to encourage the use of historically underutilized businesses (small and minority- or women-owned businesses) by state agencies in Texas and to help such agencies to foster their businesses irrespective of race, ethnicity, and gender. The program is part of the goals set up by the Texas Disparity Study.

Benefits:
- Provides equal opportunities for HUB approved businesses concerning contracts and purchase agreements
- Increases exposure to the public as well as other entities
- Enhances business opportunities with state agencies for HUB certified firms
The certification is free of cost.

Review Body: Comptroller of Public Accounts—Texas Procurement and Support Services.

Targeted Sectors: All sectors

Certification Process and Requirements:
- Businesses seeking HUB status apply to the comptroller with all supporting materials
- Comptroller reviews the application and approves or rejects within 90 days
- Approved businesses are added to the HUB list
The HUB certification is valid for four years.

Agreements/Obligations:
- The certified firm must comply with all standards of HUB set by the comptroller
- The comptroller may also approve the existing certification of any firm from the local government or any nonprofit organization as a HUB if the standards set by the existing certification meets or exceeds the standards of comptroller
- For all approved agencies the comptroller, in addition to the certificate, sends an orientation package, list of agency purchasers, and information regarding electronic commerce

Insights into Liability:
- Businesses certified by the local body must provide an efficient way for the comptroller to update their HUB database
- The comptroller does not accept any certification from local body or nonprofit organization that charges for certification
- For HUBs certified via local body or nonprofit organization (not by the comptroller directly), the comptroller can terminate the certificate anytime, but the agency holds the HUB status until the end of that fiscal year. The agency can reapply to the comptroller for HUB status if terminated

Application to Trusted Vendor Program (yes or no and why):
Similar to the trusted vendor program, this certification identifies and promotes the businesses that meet certain qualifications.

1.6 TRUSTed Downloads Privacy Certification

Overview: TRUSTed Downloads Privacy Certification (TRUSTe 2015) is a certification program offered to websites to ensure that anything downloaded from webpages are "trusted" in the sense that the program abides to industry best practices. Certified applications are published on a safe-software whitelist, a list that content and search providers, anti-spyware vendors, and online advertisers use to send advertising.

From TRUSTed Downloads website:
> TRUSTed Downloads certification combines strict standards, thorough review, ongoing monitoring, enforcement mechanisms and powerful market incentives to ensure secure downloads. TRUSTed Downloads-certified companies provide consumers with explicit disclosures and control mechanisms, easy uninstall, and respect for their personal information.

Process to get certified: Follows a comprehensive and proven multistep process to ensure regulatory and industry standards are met by the software's privacy practices:
- Data collection and discovery: Evaluation of data privacy management
- Digital Property Scanning Tools: Done to applicable websites and mobile apps, TRUSTe applies proprietary scanning technology and calculates Privacy Sensitivity Index (PSI) and insights on personally identifiable information (PII) data collection
- Privacy Findings Report and Gap Analysis: TRUSTe provides a report indicating the changes required for certification
- Certified Privacy Seal: When TRUSTe validates the changes made, the website acquires access to the TRUSTe Download Privacy Seal
- Letter of Attestation: Once certification is complete, the company receives a letter of attestation stating the company is a TRUSTe Client with exposer to customers and business partners
- Safe Software Whitelist: Company can join the safe-software whitelist when certified
- Privacy Dispute Resolution Service: Company gains access to a third-party dispute resolution service, which helps to efficiently manage privacy inquiries from customers

- Ongoing Privacy Guidance: TRUSTe provides for ongoing privacy guidance relating to certification

Insights into Liability: TRUSTe contains The Data Privacy Management Platform, which "provides control over all phases of privacy, from conducting assessments and implementing compliance controls to managing ongoing monitoring. Companies worldwide rely on TRUSTe to minimize compliance risk and protect their brand." Other liability issues are contemplated in Trusted Download Program Requirements available online.

Funding Model: TRUSTe does not comment on fees or charges on their website.

Application to Trusted Vendor Program: To become "trusted," the program has specific requirements that use technology to make an overall evaluation of the candidate website. The last part of the process must also be incorporated in the TVP since there must be an ongoing guidance to certified vendors.

1.7   DirectTrust Agent Accreditation Program

Overview: The DirectTrust Agent Accreditation Program (DirectTrust 2015) was created as part of the Nationwide Health Information Network through a collaboration between the DirectTrust community and nonprofit Electronic Healthcare Network Accreditation Commission (EHNAC). The program is directed to recognize Health Internet Service Providers (HISPs), Certificate Authorities (CAs), and Registration Authorities (RAs) as Trust Agents for the deployment and adoption of what is known as Directed Exchange, a term used for secure communication. More specifically, this program was created to develop "a simple, secure, scalable, and standards-based way" to send authentic and encrypted health information to trusted recipients over the Internet. That way, health professionals, patients, and others involved in the healthcare industry can have interoperable, secure messaging.

Review Body: EHNAC (Electronic Healthcare Network Accreditation Commission, 2015).

Certification Process and Requirements: Applicants must answer questions online in a pre-application form. After receiving email notification from EHNAC confirming the applicant's qualification for candidacy, the applicant submits the Applicant Agreement and Sentinel Events documents by fax or by uploading them in the EHNAC Portal. Upon review and qualification, EHNAC sends an electronic address to complete the accreditation application(s) for EHNAC candidate status.

Summary of the Accreditation Process:
- Complete the pre-application form on the EHNAC website
- A clarification letter is emailed to the organization
- Complete an electronic detailed application for each program applied for
- Upload to EHNAC portal or fax the signed Applicant Agreement and Sentinel Events documents as well as revenue verification and mail the application fee to EHNAC
- Pay application fees [Annual fee and site visit fee(s)]
- Upon acceptance of the completed application(s), the EHNAC Self-Assessment zip file will be made available to the organization

- The guidelines and all other documentation are available on the EHNAC website for further review
- Prepare the Self-Assessment Report and submit via EHNAC portal four months before the expiration date
- If the Self-Assessment Report contains enough satisfactory information and documentation to support the candidate's application, a site visit is scheduled to verify the information contained in the report. If the Commission or the assigned site reviewer has questions, the Self-Assessment Report may be returned for further information before a date is set for the site review
- Submit the site visit expense fee
- The Commission reviews, comments, and votes on the Self-Assessment
- The organization will be informed whether the accreditation has been approved or denied
- Accreditation Criteria is available for each entity (HISPs, CAs and RAs); visit https://www.ehnac.org/program-criteria/ in the EHNAC portal

From the EHNAC website:

> EHNAC site evaluators use a rating method to determine overall compliance with EHNAC criteria. Applicants in candidacy status must meet the requirements of all MANDATORY criteria and must achieve an overall score of at least 85% to achieve full accreditation (subject to commission approval). The site evaluator will assign a 1, 0.5, or 0 rating value to each activity in the criteria, based upon an applicant's ability to demonstrate compliance.

Insights into Liability: After submitting the pre-application form, applicants fill out the EHNAC Applicant Agreement form, which states the binding terms and conditions of applying for EHNAC accreditation. Applicants will receive access to the portal after submission of the pre-application.

Funding Model: A fee is charged according to a table based on the size of the company measured by their annual revenues. The fees are the following:
- First Year—Accreditation (includes annual fee, site visit fees, and multiple program fees)
- Second Year—Annual fee: paid every year
- Re-accreditation—Every two years from original accreditation date: (includes annual fee, site visit fees, and multiple program fees)

Application to Trusted Vendor Program (yes or no and why):
- Detailed criteria and evaluation method for eligibility are included in the application process
- An application form is filled out and submitted
- Fees are charged according to size of the company

1.8   Safe Quality Food Certification Program

Overview: Safe Quality Food (SQF) Certification Program (Safe Quality Food Institute 2015) is administered by the Food Marketing Institute (FMI) as a way to validate robust food safety control

systems among suppliers as required by their own clients. This is due to the fact that consumers have higher standards with respect to food quality, which has increased consumer demand for food safety assurances. This program is recognized by retailers and foodservice providers around the world and acknowledged by the Global Food Safety Initiative (GFSI). The program mainly connects the primary production certification to food manufacturing, distribution, and agent management certification, and is currently the only scheme that integrates both the quality and food safety component of the product provided by food suppliers.

Review Body: Certification Body licensed by the SQF Institute, a global organization.

Certification Process and Requirements:
Applicants must follow a process which involve the following:
- Attending an on-site or online Implementing SQF Systems training course to learn about the SQF Code
- Register the company with the Assessment Database, where a registration fee is charged based on the annual sales obtained the previous year (there is a specific chart for fees according to the range of annual sales)
- Designate an employee as an SQF Practitioner, an internal expert on SQF, who must fulfill the requirements set by the SQF Code, ED. 7.2
- Choose the level of certification the company wants to certify: Level 1 for low risk products, Level 2 for a certified HACCP food safety plan, and Level 3 for a comprehensive implementation of the safety and quality management systems
- Obtain proposals for SQF Licensed Certification Bodies to obtain quotes and details on the SQF Certification audit
- Conduct a pre-assessment (optional but recommended), for an SQF auditor or practitioner to identify gaps between the program and the level of certification desired
- Choose a Certification Body and schedule an audit, chosen from the Licensed Certification Body directory, which can be searched at SQF website by country
- Certification Body conducts Initial Certification Audits (document review and facility assessment)

Insights into Liability: Conditions and regulations for SQF certification are included in the HACCP-Based Supplier Assurance Code for the Food Industry and published on their website free of charge (Safe Quality Food Institute 2014).

Funding Model: There is no specific fee for applying for certification, yet there are some costs associated to becoming certified:
- Registration with the SQF database
- Certification audit, which depends on the certification auditor's quota
- Consultant assistance (optional)
- SQF Practitioner training (optional)

Application to Trusted Vendor Program (yes or no and why):

- Certification program also for vendors
- The process of certification (not as strict as SQF but process can be similar)
- A fee may be charged

1.9 Specialty Coffee Association of America Certified Home Brewer Program

Overview: The Specialty Coffee Association of America (SCAA) Certified Home Brewer Program (2015) is a program issued by SCAA, currently the world's largest coffee trade association, which has been credited for much of the growth and success of the specialty coffee industry. The program recognizes home brewers who meet rigorous and long-term technical requirements based on "proper water temperature, brewing time, and the ability to brew within the SCAA Gold Cup recommendations."

Benefits: If the brewer passes the SCAA test, the brewer is recognized as an exemplary home brewer and becomes part of an elite list of SCAA Certified Brewers. The home brewer may also use the SCAA Certified Home Brewer logo on packaging and other materials.

Review Body: SCAA is the testing and issuing body of the program.

Certification Process and Requirements: To be certified, brewers are received for testing according to the yearly schedule published in the website. These are the steps they must follow:
- Submit an annual form of the time of brewer submission
- Pay a testing fee of $750
- Submit five production-manufactured brewers (manuals, instructions and handbooks)

All brewer manufacturers that submit the brewer for testing, will receive a full testing report within two weeks upon completion, whether or not it has passed the test.

If the brewer passes all SCAA tests and enters a certification agreement with SCAA. Fees must be paid before SCAA Certified Home Brewer logo is issued. Fees are $3000 per year for three years to maintain certification.

SCAA's Minimum Certification Requirements for Coffee Brewers:
- Coffee volume
- Brewing time
- Brewing temperature
- Beverage preparation
- Uniformity of performance
- Uniformity of extraction
- Beverage clarity
- Holding receptacle and temperature
- Operating manuals and other instructional materials

Insights into Liability: If the brewer passes all SCAA tests and enters a certification agreement with the SCAA, the brewer becomes a SCAA Certified Home Brewer.

Funding Model: A fee of $750 must be paid for testing and after accredited, the company must pay for using the SCAA Certified Home Brewer logo. These fees comprise of yearly licensing fees of $3000 per year for three years.

Application to Trusted Vendor Program (yes or no and why):
- Standards must be met to become certified
- As SCAA performs the technical evaluation on the brewers, TVP can develop an evaluation to assure the vendor trucks have appropriate technologies for OHD implementation
- Certification done for a period of three years

1.10   Department of Defense Trusted Foundry Program

Overview: Department of Defense (DOD) Trusted Foundry Program (2015) is a program accredited by the Defense Microelectronics Activity (DMEA), and is a component of the Trusted Foundry Program established as a joint effort between the Department of Defense and National Security Agency. This program assures the integrity and confidentiality of integrated circuits when designed and manufactured, especially for U.S. Government applications, and thus enabling the government to have access to leading edge microelectronic technologies that are both Trusted and non-sensitive. This program is intended for "suppliers in the area of integrated circuit design, aggregation, broker, mask manufacturing, foundry, post processing, packaging/assembly, and test services … The use of the Trusted Suppliers' Trusted Flow is adequate to protect Critical Program Information as required by DODI 5200.39."

Additionally, in accordance to the DOD Instruction 5200.44—Protection of Mission Critical Functions to Achieve Trusted Systems and Networks (TSN) [(Defense Microelectronics Activity 2015)]:

> In applicable systems, integrated circuit-related products and services shall be procured from a trusted supplier accredited by the Defense Microelectronics Activity (DMEA) when they are custom-designed, custom-manufactured, or tailored for a specific DOD military end use (generally referred to as application-specific integrated circuits [ASICs]).

Benefits: Provides the U.S. Government access to leading-edge trusted microelectronic services for a reduced number of needs in the government. The Trusted Access Program Office (TAPO) is the administrator of the program and provides U.S. Government users with leading foundry services, a library of standard IP blocks, and limited packaging and test services.

Review Body: DMEA serves as the accrediting authority of this program.

Certification Process and Requirements: All companies contracting with the U.S. Government through the DMEA to provide similar technologies are required to be accredited as Trusted. U.S. Government personnel and agencies that require trusted services or technologies are required by law to use an accredited vendor. No open application is available for this program. DMEA contacts contractors according to the needs of the government.

From the National Defense Industrial Association website:
> Trusted supplier accreditation plan expanded the ranks of suppliers capable of providing trusted services for leading-edge, state-of-the practice and legacy parts by certifying that suppliers meet a comprehensive set of security and operations criteria (Ortiz 2012).

Insights into Liability: Conditions and regulations for SQF certification are included in the HACCP-Based Supplier Assurance Code for the Food Industry, published on their website, free of charge.

Funding Model: No fees published.

Application to Trusted Vendor Program (yes or no and why):
- Certification program applies to vendors but for an extremely specific niche of the market.
- This program follows a "trusted" concept, issued by law for the specific application.

1.11 Organic Certification and Accreditation Program

Overview: The Organic Certification and Accreditation (United States Department of Agriculture 2015) allows firms to sell, label, and represent their agricultural products as organic. Organic products, produce, and other organic items are grown without the use of pesticides, synthetic fertilizers, genetically modified organisms, or ionizing radiation. Organic animal products such as meat, poultry, eggs, and dairy are produced from animals that do not take antibiotics or growth hormones.

Review Body: This certification is issued by the United States Department of Agriculture (USDA) through an accredited certifying agency. The organic certification verifies that farms or handling facilities located anywhere in the world comply with the USDA organic regulations. These regulations describe the specific standards required for the use of the word "organic" or the use of the USDA organic seal on food, feed, or fiber products. The USDA National Organic Program administers these regulations with substantial input from its citizen advisory board and the public.

Certification Rewards: Allows firms to sell, label, and represent their agricultural products as organic.

Certification Process and Requirements:
- Producer or handler adopts organic practices and submits application and fees to certifying agent.
- Certifying agent reviews applications to verify that practices comply with USDA organic regulations
- Inspector conducts an on-site inspection of the applicant's operation
- Certifying agent reviews the application and the inspector's report to determine if the applicant complies with the USDA organic regulations
- Certifying agent issues organic certificate
- Operations are required to follow the same steps for the annual recertification process

Insights into Liability: Any organic operation in violation of the USDA organic regulations are subject to enforcement actions that are carried out by the USDA in conjunction with public authorities. Operations that are found violating these regulations can incur financial penalties or suspension/revocation of their organic certificate.

Funding Model: The USDA generates standards and regulations, but the certification process is carried out by accredited agents. Any operation that wishes to obtain an organic certification must contact an accredited agent and their certification costs or fees will vary widely depending on the agent engaged and the size, type, and complexity of its operation. The USDA provides federal funds to manage the accreditation processes.

Application to Trusted Vendor Program: The certification process is applicable to TVP: Every applicant must document its processes and submit documentation to the certifying body. In terms of brand management, the organic seal is such as the Trusted seal that the TVP team would like to provide to vendors and carriers.

1.12   Fair Trade Certification Program

Overview: The Fair Trade Certification (Fair Trade USA 2013) is targeted at manufacturers of retail and agricultural products. Its standards aim to bring empowerment, economic and social development, and environmental stewardship to farmers and workers around the world. The certification approach enables many different producers with a range of commodities to participate and compete in international markets in ways that are fair and equitable today—helping farmers and workers progress and acquire greater business capacity over time.

Review Body: This certification is issued by Fair Trade USA, a nonprofit organization that audits and certifies transactions between U.S. companies and their international suppliers to guarantee that the farmers and workers producing Fair Trade Certified goods are paid fair prices and wages, work in safe conditions, protect the environment, and receive community development funds to empower and uplift their communities.

Certification Rewards: Enables sustainable development and community empowerment by cultivating a more equitable global trade model that benefits farmers, workers, consumers, industry, and the environment.

Certification Process and Requirements:
- Identify the Fair Trade USA standard applicable to the operation and complete the application form
- After the initial review, applicants submit documentation to clarify the audit scope
- Once the audit scope has been defined, the applicant receives a quote for the auditing services, and then contracts are signed for the audit
- The on-site audit is conducted using three primary methods: document review, interviews, and direct observation
- An Audit Report is then sent to the client within 28 calendar days.

- When all steps are complete, the application is presented to a qualified technical staff who is responsible for final review and issuance of a certification decision. Certification decisions are made by qualified SCS personnel who did not participate in the audit process.
- Upon successful certification, the SCS provides the client with a Fair Trade USA identification number, certificate, and applicable certification label.

Insights into Liability: Certified firms are required to implement grievance procedures per defined standards and associated compliance criteria. In this case, however, the issuing body is not liable for any wrongdoing by the certified entity and is only required to investigate complaints made as they pertain to the certified firm's status.

Funding Model: The program is funded by the fees applicants pay in the several stages of the certification process. This nonprofit organization is also funded by donations along with consulting and contracting work. The revenue and support are made up of 80% service fees, and 20% donations and other sources.

Application to Trusted Vendor Program: The funding model is applicable to TVP in the long term, as the program is by funded by the fees that applicants pay in several stages of the certification process.

1.13 Project Management Professional Certification

Overview: The Project Management Professional Certification (PMP) [Project Management Institute 2015] is issued to individuals in the project management field. It is an industry-recognized certification. PMPs operate in nearly every country and, unlike other certifications that focus on a geography or domain, PMP has global reach.

Review Body: Project Management Institute (PMI), a leading not-for-profit professional membership association for the project, program, and portfolio management profession. PMI advances careers, improves organizational success, and further matures the profession of project management through its globally recognized standards, certifications, resources, tools, academic research, publications, professional development courses, and networking opportunities.

Certification Rewards: Global certification that signifies the individual has core knowledge in the field as well as professional experience in the subject matter.

Certification Process and Requirements:
Applicants should demonstrate they have completed the following prerequisites:
- A secondary degree and 7,500 hours leading and directing projects or a four-year degree and 4,500 hours leading and directing projects
- Thirty-five hours of project management education
- Pay the application fee and schedule an exam
- Upon passing the certification exam, PMP issues the applicant a certification

Insights into Liability: PMI reserves the right to revoke certification when the information provided is found to be faulty

Funding Model: The PMI Certification program is funded by the fees that applicants pay as well as the revenue obtained from administering certification exams.

Application to Trusted Vendor Program: Not applicable, this program is concerns with individuals and its key certification is an examination to measure applicants' proficiency in the subject matter.

1.14 CISCO Certified Service Provider Certification Program

Overview: The CISCO Certified Service Provider (Cisco 2015) is a widely respected IT certification program available through Cisco Career Certifications to individuals seeking work in the networking industry and demonstrating proficiency operating CISCO products.

Review Body: The Cisco Learning Network is a social learning community focused on the IT industry. Its mission is to provide learning tools, training resources, and industry guidance to anyone interested in building an IT career through Cisco certifications. The certification preparation materials offered on the Cisco Learning Network do not constitute a complete self-study program but are supplemental materials to enhance core learning programs.

Certification Rewards: This certification enables service providers to commercialize CISCO products and indicates that the individual or firm has the skills to manage and service CISCO networking products.

Certification Process and Requirements:
Applicant should pass a certification exam to obtain the certification.

Insights into Liability: CISCO reserves the right to revoke any certification and place bans on future certifications if there is noncompliance on any of the certification requirements, or if the certified party is convicted of a crime deemed harmful to CISCO's reputation.

Funding Model: This program is funded by CISCO, a publicly traded corporation.

Application to Trusted Vendor Program (TVP): Not applicable, this program certifies the skills its applicants must perform technical service operations.

1.15 Certified Child Care Provider Program

Overview: The Certified Child Care Provider Program (ChildCare Aware 2015), a program designed for people who aspire to open a child care business, helps with setup and preparation in running the business and provides local and national resources for support in becoming a successful child care provider.

Review Body: Child Care Aware of America is a nonprofit organization that promotes national policies and partnerships to advance the development and learning of children and to provide vision, leadership, and support to community Child Care Resource and Referral. The organization works with state and local Child Care Resource and Referral agencies (CCR&Rs) and other community partners to ensure that all

families have access to quality, affordable child care as well as leading projects that increase the quality and availability of child care, offering comprehensive training to child care professionals, undertaking research, and advocating for child care policies that improve the lives of children and families.

Certification Rewards: Child care licensing standards set the minimum acceptable health, safety, and program standards for the legal operation of child care programs.

Certification Process and Requirements: Applicant should contact a certifying agency operating in each state, as regulations vary by state. The certifying agency then conducts an audit of the child care operation to verify that it complies with the standards and regulations. This process is done annually.

Insights into Liability: The issuing body clearly states that it is not liable for any wrongdoing by certified members.

Funding Model: Not Applicable.

Application to Trusted Vendor Program: It is interesting to note that on a subject as sensitive as child care the certification issuing body does not incur in any liability and merely certifies that operating standards have been implemented.

1.16   Health Ethics Trust Certification Programs

Health Ethics Trust (HET) is a division of the Council of Ethical Organizations (a nonprofit, nonpartisan organization committed to promoting ethical and legal conduct in private organizations, government, and the professions). The two certification programs offered by HET are Certified Compliance Program and Certified Compliance Professionals (Health Ethics Trust 1995).

Overview: The Certified Compliance Program (CPC) assesses the compliance programs for healthcare establishments such as hospitals, health systems health plans, Centers for Medicare and Medicaid (CMS) contractors, and life science companies. The certification aims to provide homogeneity across the standards being employed because currently there are a wide variety of methodologies that are used in healthcare compliance program assessment. Organizations that have successfully completed the CPC process are entitled to display the HET Certification Mark.

Review Body: Peer reviewers are used to assessing applicants for the certification. These peer reviewers are working compliance professionals who have been trained as reviewers through the HET's Compliance Program Assessors Course. The overseeing body for the entire process for the CPC is the Fellows of the Health Ethics Trust.

Certification Process and Requirements: The program uses a peer review process based on published standards to issue certifications. The certification is based on recognized, published standards, and best practices identified at the Healthcare Best Compliance Practices Forum and published in the Best Practice Standards for Compliance Programs, which is updated annually.

Insights into Liability: No information related to legal aspects or agreements for the applicant.

Overview on second program: The Certified Compliance Professional (CCP) is a certification process for healthcare compliance professionals. The aim of this certification program is to promote professionalism and competence throughout the healthcare compliance community.

Review Body: The certification process is overseen by HET's Education Committee, which is an independent, voluntary committee of experienced compliance professionals from around the country. Members of this committee oversee changes to the certification process as well as review applications for HET certification.

Certification Process and Requirements: Compliance professionals seeking CCP certification must complete all requirements for the four categories listed below within a three-year period.
- Part I—Compliance Related Experience
- Part II—Educational Background
- Part III—Related Education
- Part IV—Essay Examination

In order to maintain certification, members need to meet the continuing education requirements over a given time period.

Insights into Liability: No information related to legal aspects or agreements for the applicant.

Funding Model: There is an application fee of $150.00 to process each certification application, which should be paid when submitting the application. The website states the following:

> This fee includes the review and evaluation of points and essays. In the event that an applicant does not initially meet the minimum point requirements for essay submission, the fee remains valid for three years to allow time for accumulation of points. There is no charge for re-submission to the Education Committee. This fee is waived for employees of organizations that are members of the Council of Ethical Organizations and the Health Ethics Trust.

Application to Trusted Vendor Program (TVP):
- The website where the program is promoted is clear and concise
- An application fee could be charged for application process expense, which guarantees sustainability, yet some waivers are given to specific types of applicants (could be given in the TVP case to businesses that are part of the team's partners)

1.17   Google Trusted Stores Program

Overview: The Google Trusted Stores increases customers' confidence in making online purchases from participating stores. The certification provides assurance that the Google Trusted Store provides a high-quality shopping and customer service experience. Merchants that meet the requirements will be able to

display the Google Trusted Stores badge on their sites as well as annotated to their Google shopping results and Product Listing Ads. Benefits include free purchase protection that provides customers with options should they have an issue with an order or transaction by calling on Google to work with the merchant to come to a resolution. Customers are also invited to provide reviews about their shopping experience (Google 2015).

Review Body: Google, Inc.

Certification Process and Requirements: In order to receive and maintain Google Trusted Store status, shipping and delivery performance and customer service are monitored. Applicants and participants are required to implement JavaScript code on all pages of their store site and be able to provide order- and item-level data on each transaction on the order confirmation page. This technical integration is one of the important components of the performance standards specified in the Google Trusted Stores Merchant Guidelines. Performance standards cover requirements such as (1) minimum transaction volume, (2) minimum percentage of shipments that should meet the estimated ship date and the estimated delivery date, (3) maintenance of overall Google Trusted Store Rating, (4) minimum number of orders that can be escalated to Google (due to an issue) over a specified time period, (5) average escalation resolution days not to exceed four calendar days, and (6) maximum aggregate monetary amount for refunds to customers that should not be exceeded in a 365-day rolling basis.

Data collected for review may be gathered from, but not limited to, the following sources:
- order data
- survey results
- products available for sale
- the merchant's customer service and return policies
- third-party reviews of the merchant's business
- end-to-end shopping experience at the merchant's store
- the merchant's marketplace sellers and policies (if applicable)
- displaying the badge: qualification period/minimum time and order volume

Insights into Liability: When the business applies, it must sign an agreement set by the program. After being certified, Google's Trusted Stores Policies details the requirements to maintain in good standing in the program to promote a safe and positive experience for all users. These contain the responsibilities of both parties involved. Consequences for violation of the requirements include probation, not being able to display the Google Trusted Stores badge, and suspension. Google offers purchase protection up to $1000.

Funding Model: There is no fee to apply for certification, but each store will likely incur some expense to complete technical integration.

Application to Trusted Vendor Program:
- Set a minimum percentage of on-time deliveries that need to be met
- Set a maximum percentage of delivery mishaps not to be exceeded (this can be assessed by customer reporting from verified customer reviews)

1.18 Gluten-Free Certification Program

Overview: The Gluten-Free Certification Program (GCFP) is a management system-based certification that is developed to review products to confirm that food, drink, and supplements meets strict standards for gluten-free safety to protect consumers with gluten-related disorders. It was first started in Canada by the Canadian Celiac Association but by partnering with the National Foundation for Celiac Awareness (NFCA), the program has now been extended to cover the United States. GFCP is run on a voluntary basis and those that achieve and maintain the required standards are required to place the NFCA certification trademark on their product(s) (National Foundation for Celiac Awareness 2015).

Review Body: Independent third-party reviewers from International Organization for Standardization (ISO) accredited auditing companies conduct annual audits. The benefit of having a separate entity conduct the reviews ensures that there is a system of checks and balances within the process that avoids any conflict of interest that may occur between the parties (manufacturers, certifying body, and/or NFCA).

Certification Process and Requirements: The GFCP approves only facilities and their products that continually meet strict, good manufacturing practices for gluten-free production. The management system-based certification utilized by the program provides a more thorough review as the entire process of the facility is included in the audit—such as ingredient sourcing, employee training, cleaning practices, cross-contamination controls, operations management, end-to-end testing plans—and not exclusively the end product.

Insights into Liability: Applicants are required to sign the Program License Agreement (PLA). This agreement is between the company (applicant) and the Allergen Control Group Inc. and requires the company to meet the standards detailed by the GFCP as well as to hold a valid Certificate of Recognition (COR).

Funding Model: Direct fees charged include: a one-time application fee of $499, annual facility license fee, and an annual royalty fee for the GFCP trademark usage. Indirect fees may include GFCP third-party audit fees payable to your auditing company, any consulting or training support, and GFCP co-op marketing fees (optional).

Application to Trusted Vendor Program:
One component of this certificate program that may be applicable to the TVP is the use of third-party auditors for the review process; this ensures neutrality in the certification process.

1.19 The Open Group Certified Architect Program

Overview: The Open Group Certified Architect (Open CA) program is an independent global certification program for qualifying the skills, knowledge, and experience of Information Technology (IT), Business and Enterprise Architects (The Open Group 2014). The program has certified over 4,000 professionals from 180 companies in over 60 countries. The unique components of the program are that it is based on skills and experience, vendor neutral, portable and globally recognized and is used by world-leading

enterprises as an objective measure of capabilities. The current focus of the certification program is on IT but in the future the program will evolve to provide applicants with three options: IT, business, and enterprise architectures. There are three levels of certification:

- Level 1—Certified
- Level 2—Master
- Level 3—Distinguished

Professionals can use the certification as a competitive tool that increases their prospects to acquire rewarding assignments, speed up salary and career advancement, enhance and validate professional skills, and increase peer recognition. A major benefit to participating organizations, the program provides an independent, global, experience-based benchmark for identifying, assessing, and selecting the most qualified individuals for critical roles and responsibilities.

Review Body: The Open Group

Certification Process and Requirements: The review process for the certification includes the submission of a comprehensive application package, including a resume as it relates to the architecture-related field, accompanied by a rigorous peer review. Unlike many professional programs there are no training courses or written exams.

Insights into Liability: Applicant enters into an agreement with the certification authority by signing a Certification Agreement. This document provides the service and legal commitment under the conditions of service.

Funding Model: A registration fee is required for the initial submission.

Application to Trusted Vendor Program:
Consideration of various levels of certification based on the applicant's experience with unassisted off-hour deliveries (UOHD).

1.20   Airbnb Verified ID Program

Overview: Airbnb is a trusted community marketplace where people can list or book accommodations online or through the application. The marketplace consists of 190 countries with accommodations in over 34,000 cities. The marketplace is able to offer a variety of accommodation types and varying price ranges as hosts are able to list their personal living spaces, allowing them an easy way to monetize extra space and advertise to an audience of millions (Airbnb 2015). Airbnb has a three-part setup to increase confidence in participation, consisting of Verified ID, Profile and Reviews, and Messaging. Verified ID was created to build trust in the Airbnb community when deciding to use the marketplace. The process allows guests and hosts to connect the Airbnb profile with other sources that are able provide identifying information. Feedback about Verified ID indicate that users find it useful, but Airbnb specifies that it is not an endorsement or guarantee of someone's identity. Completion of the Verified ID process will earn a badge on the user's profile. Many users of Airbnb seek out this badge as one of the deciding factors on whether to book accommodations or accept a quest.

Review Body: Airbnb

Certification Process and Requirements: In order to complete the Verified ID process the following items may be required: a photo or image of a government-issued ID (e.g., driver's license or passport), answering questions about host/quest identity, connecting the Airbnb profile to social networks (such as Facebook, Google+, or LinkedIn), and/or providing contact information (such as phone number and email address). The information provided during the process is encrypted and governed by Airbnb's privacy policy.

Insights into Liability: Eligible hosts receive insurance protection to $1,000,000. This is not directly associated with Verified ID, as the insurance comes with general participation for a host on Airbnb.

Funding Model: Not Applicable.

Application to Trusted Vendor Program: Consider how social media can be incorporated as a part of TVP.

2. Key Features in Certification Models Reviewed

Key features are highlighted among the different certification programs reviewed, and a summary of these findings are presented in Table 1. In general, the information provided in terms of program structures, benefits, liabilities, and funding models were examined to determine any application to and/or offer insight into TVP.

Table 1. Key Features on Certification Program Reviews

No.	Name	Website	Issuing body	Target sectors	Benefits	Insights on Liabilities	Funding Model	Inputs for Trusted Vendor
1	Comdo Trusted Vendor List	https://www.comodo.com/home/internet-security/trustedvendor/signup.php	Comodo	• Software Providers • Websites	• Protects the users from accessing or downloading malicious software's • Improves the customer confidence on the software providers	Comodo has a Legal Repository in its Website. Legal documents register the company is a CA (Certificate Authority) and thus is entitled to provide certification.	100% free of charge	• The concept of "trusted" has been incorporated. • Open to all vendors.
2	Unified disadvantaged business certification program: Wisconsin State Legislature	http://docs.legis.wisconsin.gov/statutes/statutes/84/072	The State of Wisconsin or any certifying authority delegated.	Any business that is defined, by law, as "disadvantaged"	The department keeps an updated list of the certified businesses and are available for the public	The entire program is provided according to the Wisconsin State Legislature.	It is a legal right according to the legislation and its free of charge.	Not applicable, this program is a State program, defined by law and its designed to businesses by legal rights, not by specific qualities or needs from the market
3	SmartWay Program: United States Environmental Protection Agency	http://www3.epa.gov/smartway/	United States Environmental Protection Agency	• Freight Shippers • Logistics companies (including third party logistics providers) • Truck carriers • Rail carriers • Barge carriers • Multi-modal carriers	• Helps firms reduce freight operation costs (fuel efficiency, carbon footprint of their supply chain operations, etc.) • It promotes the use of technologies and equipment that could reduce the emission of greenhouse gases and pollutants. • It provides firms a SmartWay logo (internationally recognized brand), recognizing it as a firm that applies "cleaner and greener logistics". • It ranks the performance of the partners and recognizes the efforts of firms toward the sustainable logistics through SmartWay Excellence Awards announced annually.	• EPA holds the authority to suspend any firm that does not comply with specific standards. • The exclusion of any partner is not publically commented. • Any partner should not claim that the EPA supports the partners' products or services or any sort of endorsement from EPA. • Either party can terminate the agreement anytime.	The application is free	• Promotes the company's performance with respect to performance in providing greener, cleaner and sustainable logistics by providing branding and recognition. • Off-hour deliveries could also a part of improvement in the logistics operations.

No.	Name	Website	Issuing body	Target sectors	Benefits	Insights on Liabilities	Funding Model	Inputs for Trusted Vendor
4	IHE USA 2014 Cycle Certification Program	https://www.icsalabs.com/technology-program/ihe-usa-certification	Integrating the Healthcare Enterprise (IHE) and International Computer Security Association (ICSA).	• Healthcare IT systems and application providers • Health Information Exchange (HIE) products • Patient Care Device (PCD) providers	• Helps the health IT system providers to distinguish themselves from other vendors in providing optimal patient care. • Helps the purchasers to identify the health care providers that comply with specific standards.	• The firms certified must manufacture the products in the same way, with same features as they were tested. • In case of any changes or failures in the product, the firm must immediately revoke the certification and be inform the IHE. • For changes or new products the firm can apply for a new certification. • ICSA Labs does surveillance of the certification process, which include: correct usage of logo; review statements about the certification to ensure no misleading contents; check the products for the compliance in the field; and address any complaints on the product quality or change in the features.	The fee is variable. IHE does a pilot evaluation to decide the fee for the certification.	This program certifies health care providers based on their performance; similar to trusted vendor program
5	Historically Underutilized Business Program: Texas Comptroller and Public Accounts	http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=34&pt=1&ch=20&sch=B&rl=Y	Comptroller of Public Accounts-Texas Procurement and Support Services	All sectors	• Provides equal opportunities for HUBs in the contracts and purchase agreements • Increased exposure to the general public as well as other entities. • More chances of business opportunities with state agencies for HUB certified firms.	• Businesses certified by the local body must provide an efficient way to the comptroller to update their HUB database. • The comptroller does not accept any certification from local body or non-profit organizations that charges for the certification. • For HUBs certified via local body or non-profit organizations (not by the comptroller directly), the comptroller can terminate the certificate anytime; but the agency holds the HUB status till the end of that fiscal year. The agency can apply for HUB status to the comptroller if terminated.	The certification is free of cost.	Similar to the trusted vendor program this certification identifies and promotes the businesses that meet certain qualifications.

No.	Name	Website	Issuing body	Target sectors	Benefits	Insights on Liabilities	Funding Model	Inputs for Trusted Vendor
6	Trusted Downloads Privacy Certification	https://www.truste.com/business-products/trusted-downloads/	TRUSTe	• Software Providers • Websites	• Certification program ensures that anything being downloaded from it is "trusted" in the sense that these are secure and abide to industry best practice • Certified applications are published on a safe-software whitelist (safe from content and search providers, anti-spyware vendors and online advertisers)	• TRUSTe contains The Data Privacy Management Platform. • Liability issues related to the program in a document available at the web, "Trusted Download Program Requirements".	There is no publication related to fees or charges.	• Use of technology to make an overall evaluation of the program. • Provide guidance after being certified
7	Direct Trusted Agent Accreditation Program	https://www.ehnac.org/direct-trusted-agent/	The Electronic Healthcare Network Accreditation Commission (EHNAC)	• Health Internet Service Providers (HISPs) • Certificate Authorities (Cas) • Registration Authorities (Ras)	• This program recognizes HISPs, CAs and RAs as Trust Agents for secure communication related to health information among patients, healthcare professionals and others. • Specifically are accredited to manage authentic and encrypted health information as trusted recipients over the Internet	Applicant must read and sign "EHNAC Applicant Agreement" form, which states the binding terms and conditions for EHNAC accreditation	A fee is charged according to a table, where the fee depends on the size of the company measured by their annual revenues.	• Detailed criteria are included in the application process. • An application form is to be filled out and submitted • Fees are charged according to size of the company
8	SQF Certification Program	http://www.sqfi.com/	Food Marketing Institute (FMI) administers, SQF Institute Certification Body issues	Food suppliers (those who sell retailers and/or foodservice providers)	• Validate robust food safety control systems among suppliers as it is required by their own clients • This program is recognized by retailers and foodservice providers around the world and recognized by the Global Food Safety Initiative (GFSI) • Mainly connects the primary production certification to food manufacturing, distribution and agent management certification	Conditions and regulations for SQF certification are included in the "HACCP-Based Supplier Assurance Code for the Food Industry".	There is no specific fee for applying for certification, yet there are some costs associated to becoming certified: • Registration with the SQF database • Certification audit, which depends on the certification auditor's quota • Consultant assistance (optional), and • SQF Practitioner training (optional)	• Certification program also for vendors. • The process of certification (not as strict as SQF but process can be similar) • A fee may be charged based on annual sales
9	SCAA Certified Home Brewer Program	http://www.scaa.org/?page=cert2	Specialty Coffee Association of America (SCAA)	Home brewers (issued to their manufacturers and designers)	• The brewer will be recognized as an exemplary home brewer and be part of the elite list of SCAA Certified Brewers. • It may also use the SCAA Certified Home Brewer logo on packaging and other materials.	If the brewer passes all SCAA tests and enters a certification agreement with the SCAA, it will be considered a SCAA Certified Home Brewer.	• A fee of $750 must be paid for testing. • License annual fees of $3000 must also be paid	• Standards must be met to become certified. • Technical evaluation done in TVP to assure the vendor trucks count with noise-reduction technologies for OHD implementation • Certification period of 3 years.

No.	Name	Website	Issuing body	Target sectors	Benefits	Insights on Liabilities	Funding Model	Inputs for Trusted Vendor
10	DOD Trusted Foundry Program	http://www.dmea.osd.mil/trustedic.html	The Defense Microelectronics Activity (DMEA) serves as the accrediting authority of this program.	Manufacturers and/or service providers of leading edge microelectronics	• Offers a unique way to access to the leading edge trusted microelectronics services for a reduced number of needs in the US government. • Provides the US Government users with leading foundry services, a library of standard IP blocks and limited packaging and test services	Critical Program Information (CPI) Identification and Protection Within Research, Development, Test, and Evaluation (RDT&E) are available. This document establishes Policy Regulations, Responsibilities for each one of the parties involved and references.	No fees published.	• Certification program also for vendors, but for an extremely specific niche of the market. • This program follows a "trusted" concept, issued by law for the specific application.
11	Organic Certification and Accreditation	http://www.ams.usda.gov/services/organic-certification	United States Department of Agriculture	Farms or agricultural processing facilities	Allows firms to sell, label, and represent their agricultural products as organic. Organic products organic produce and other ingredients are grown without the use of pesticides, synthetic fertilizers, genetically modified organisms, or ionizing radiation. Animals that produce meat, poultry, eggs, and dairy products do not take antibiotics or growth hormones.	Any organic operation in violation of the USDA organic regulations, therefore, organic operations are subject to enforcement actions that are carried out by the USDA in conjunction to public authorities. Operations that are found violating these regulations can incur in financial penalties or suspension/revocation of their organic certificate.	The USDA receives funds from the Federal Government to manage accreditation processes.	The certification process is applicable to TVP: every applicant has to document its processes and submit documentation to the certifying body. In terms of brand management, the organic seal that each product obtains is similar to the "Trusted" seal we wish to provide to vendors and carriers.
12	Fair Trade Certification	http://www.fairtradeusa.org/certification/standards	Fair Trade USA - Nonprofit organization	Manufacturers of retail products and agricultural products	Enables sustainable development and community empowerment by cultivating a more equitable global trade model that benefits farmers, workers, consumers, industry and the environment.	Certified firms are required to implement a grievance procedures per defined standards and associated compliance criteria. In this case however, the issuing body is not liable for any wrongdoing by the certified entity, and is only required to investigate complaints made as they pertain to the certified firms status.	The program is by funded by the fees that applicants have to pay in the several stages of the certification process. This nonprofit organization is also funded by donations, as well as consulting and contracting. The revenue and support is made up of 80% service fees, and 20% donations and other sources.	The funding model is applicable to TVP in the long term, as this certification program is mostly self-supported through service fees.
13	Project Management Certified Professionals	http://www.pmi.org/Certification.aspx	Project Management Institute	Individuals	Global certification that signifies the individual has core knowledge in the field as well as professional experience in the subject matter.	PMI reserves the right to revoke certification when the information provided is found to be faulty.	The PMI Certification program is funded by the fees that applicants pay as well as the revenue obtained from administering certification exams.	Not applicable, this program is concerns with individuals and its key certification criteria is examinations to measure applicants proficiency in the subject matter.

No.	Name	Website	Issuing body	Target sectors	Benefits	Insights on Liabilities	Funding Model	Inputs for Trusted Vendor
14	CISCO Certified Service Provider	https://learningnetwork.cisco.com/community/certifications	Cysco Systems	Individuals and IT Service Providers	This certification enables services providers to commercialize CISCO products, and indicates that the individual or form has the skills to manage and service CISCO networking products.	CISCO reserves the right to revoke any certification and place bans on future certifications if there is noncompliance on any of the certification requirements or if the certified party of convicted of a crime deemed harmful to CISCO's reputation.	This program is funded by CISCO, a publicly traded corporation.	Not applicable, this program certifies the skills its applicants have to perform technical service operations.
15	Certified Child Care Provider	http://www.naccrra.net/	National Association of Child Resource and Referral	Child Care Providers	Child care licensing standards set the minimum acceptable health, safety and program standards for the legal operation of programs.	The issuing body clearly states that it is not liable for any wrongdoing by certified members.	N/A	It is interesting to note that on a subject as sensitive as childcare the certifications issuing body does not incur in any liability and merely certifies that operating standards have been implemented.
16	• Compliance Program Certification (CPC) • Certified Compliance Professionals (CCP)	•http://healthethicstrust.com/certification/ccp/ •http://healthethicstrust.com/certification/programcertification/	Health Ethics Trust (HET)	• Healthcare establishments • Healthcare professionals	Organizations that have successfully completed the CPC process are entitled to display the HET Certification Mark.	There is an application fee of $150 to process each CCP application	Members of this committee oversee changes to the certification process as well as reviewing applications for HET certification.	• The website where the program is promoted is clear and concise • An application fee can be charged with a few exceptions (for companies that are part of our partners)
17	Google Trusted Stores Program	https://support.google.com/trustedstoresmerchant/?hl=en#topic=6063048	Google, Inc.	E-commerce merchants	• Certifies that product meets strict gluten-free standards • Protect Consumers with gluten-related disorders	Google's rules and regulations apply to Merchants certified if failing to comply to them, details are given in their webpage.	No fees charged.	• Set a minimum percentage of on-time deliveries that need to be met. • Set a maximum percentage of delivery mishaps not to be exceeded. This can be assessed by customer reporting from verified customer reviews.

No.	Name	Website	Issuing body	Target sectors	Benefits	Insights on Liabilities	Funding Model	Inputs for Trusted Vendor
18	Gluten Free Certification Program (GCFP)	http://www.gf-cert.org/	National Foundation for Celiac Awareness (NFCA)	Manufacturers of food, drink and supplements.	• Qualify for seller ratings • Showcase the status of stores on Google ads. • Offer purchase protection from Google up to $1,000. • Improve sales on the site.	Applicants are required to sign the Program License Agreement (PLA) with the Allergen Control Group Inc. which requires the company to meet the standards detailed by the GFCP and to hold a valid Certificate of Recognition (COR).	• Direct fees charged includes: a one-time application fee of $499; annual facility license fee; and an annual royalty fee for the GFCP trademark usage. • Indirect fees may include: GFCP third-party audit fees payable to your auditing company, any consulting or training support, and GFCP co-op marketing fees (optional).	The use of third-party auditors in the review process may be a consideration for the TVP, as it ensures neutrality in the certification process.
19	The Open Group Certified Architect (Open CA) Program	http://www.opengroup.org/certifications/professional/open-ca	The Open Group	Architecture professionals	Tool to demonstrate knowledge, success and overall business capabilities in the area of architecture, specifically IT Architecture	Applicant has to enter into an agreement with the Certification authority called the Certification Agreement. This document provides the service and legal commitment under the conditions of service.	A fee is required for the initial submission for registration.	Consideration of various levels of certification based on past experience of conducting unassisted off-hour deliveries (UOHD).
20	Airbnb Verified ID Program	https://www.airbnb.com/trust	Airbnb	• Providers of accommodations • People seeking accommodations	Provides background on the users of the marketplace to develop trust within the transaction	Eligible hosts receive insurance protection to $1,000,000. This is not directly associated with Verified ID. This comes with general participation as a host on Airbnb.	N/A	Consider how social media can be incorporated as a part of TVP.

3. Summary and Insights for TVP

This report contains a summary of certification programs that are related to the concept of enhancing a sense of trusted in potential users and participants. From the highlights provided in Table 1, outlining the different certification programs reviewed, the following are inputs that should be considered in developing a Trusted Vendor Program:

- The concept of "trusted" must be highlighted in the TVP as a "brand seal" for carriers and receivers that are part of the program.
- Applicants should undergo a process of submitting an electronic application and attaching or emailing the documentation required.
- A fee should *not* be charged to companies that become part of the program during the project, yet a fee must be considered for future companies that wish to be part of TVP.
- Determine criteria for certification based on technical information concerning truck performance and efficiency of deliveries (set a minimum percentage of on-time deliveries that need to be met and set a maximum percentage of delivery mishaps not to be exceeded—based on customer reporting from verified customer reviews through the use of Social Media).
- Carriers must adopt noise reduction technologies to apply to the program.
- Evaluation of the applications and the assessment of criteria should be done by a third-party auditor or a neutral and experienced committee for the review process.
- A clear and concise web page must be set up for TVP, in which all information is provided to interested applicants. This web page should highlight the benefits and provide easy access to information on the program (fees and expenses and legal documents, etc). In addition, a Frequently Asked Questions page must be included (as did most websites found in the research on certification programs).
- Liabilities must be considered for both parties involved (the certification agency and applicants). The website, therefore, should include but not be limited to statements regarding (1) terms and conditions, (2) regulations that must be followed as part of the program, and (3) a privacy policy.

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Appendix B: Review on Recognition and Survey-Based Programs

The research team's original certification design approach encountered several restrictions for participating businesses, as the application process did not offer incentives, and high-quality standards did not always promote participation. The team realized the program needed to be recognized first among vendors and receivers in order to be accepted as an elite certification program.

With this in mind, a new review was developed that considered a recognition or survey-based approach. Web-based recognition programs were analyzed for different types of industries, not only those related to freight transportation vendors. The information highlighted was the name of the program, website, access restrictions, and information required for participants, type of reviews or recognitions received, technical requirements, insights on liabilities, arbitration process, funding model, and inputs on the Trusted Vendor Program (TVP). A summary of the programs is found in Table 1.

1. PROGRAMS REVIEWED

1.1 eBay

One of the oldest online marketplaces in existence, eBay has been offering services for online shopping since 1995. Buyers and sellers on eBay are individuals who have access to an online account with the ability to link payment methods. Currently its website provides testimonials (text and video) of "successful sellers" along with a rating system that allows sellers to build up their recognition status to provide more reliability for future customers (eBay 2018). Additionally, eBay offers tutorials and classes through their Seller Center and eBay University.

1.2 Amazon

Amazon, another major marketplace that has been online for more than 20 years, has become the most important company of the time, crossing the $100 billion mark in annual revenues in 2015. As eBay, Amazon offers customer ratings online in the form of star ratings. Additionally, they have a preferred list of vendors that are displayed first when an item is selected. Vendors

that meet performance criteria are eligible for other services such as Buy Box. Amazon also supports small businesses and document small business stories on the website (Amazon 2018).

1.3 Fiverr

Fiverr is another online marketplace, but different from eBay and Amazon, it offers professional services rather than products. Fiverr uses the concept of sellers for freelancers who have specific skills offered on the website. The application for a seller is straight forward and described on the website as three steps: Create a Gig, Deliver Great Work, and Get Paid. The website displays buyer stories, which are reviews recognizing sellers in the online platform. In terms of promoting the freelancers, Fiverr has a Fiverr Pro category that guarantees the work of these "top-quality sellers." As the website explains, they are hand-picked and "trusted by the world's biggest brands" (Fiverr 2018).

1.4 FORS-Fleet Operator Recognition Scheme

As stated on the FORS-Fleet website, "The Fleet Operator Recognition Scheme is a voluntary accreditation scheme for fleet operators which aims to raise the level of quality within fleet operations, and to demonstrate which operators are achieving exemplary levels of best practice in safety, efficiency, and environmental protection" (FORS 2018). Although a certification program for truckers, FORS-Fleet offers membership and provides a platform open to all stakeholders, so they may also benefit from the program (suppliers, operators, and public sector). In the website, the roles of the businesses are clearly identified ("operators" are the equivalent to TVP "vendors"). FORS-Fleet provides a Logo that businesses can display as a supporter of FORS or as a FORS Supplier. Stakeholders also have access to newsletters and discounts on FORS events and workshops. For their accreditation system FORS-Fleet has the concept of "champions" to distinguish excellence and offer stories (testimonials) on the website to promote fleet operators as well as training to help fleet operators raise their level of accreditation.

1.5 ECO Stars

Located in the UK, ECO Stars is similar to FORS in that it is a scheme that "provides recognition for best operational practices, and guidance for making improvements…(ECO Stars's) the ultimate aim is to reduce fuel consumption which naturally leads to fewer vehicle emissions and has the added benefit of saving money!" (ECO Stars 2018). Unlike FORS, the

program awards one star to members when they first join, and they start gaining more stars based on subsequent operational and environmental performances. The ECO Stars assessment is based on six pillars that make up fleet operational efficiency: Fleet Composition, Fuel Management, Driver Skills Development, Vehicle Specification and Preventive Maintenance, IT Support Systems, and Performance Monitoring and Management. As their website explains, this program is applicable to "any fleet of HGVs, buses, coaches, vans or taxis which is based in or operates regularly in locations where there is a local ECO Stars scheme" (ECO Stars 2018). There is no online application system. Prospective candidates call or email to get the process started.

1.6   SmartWay

The SmartWay program was created by the United States Environmental Protection Agency to promote supply chain sustainability among establishments by measuring, benchmarking and improving efficiency in freight transportation. The program is open to U.S. shippers, logistics companies, truck, rail, barge, and multimodal carriers. In addition, organizations that do not ship goods directly but want to support the program may be eligible to participate as a SmartWay Affiliate. Apart from numerous benefits, one of the most attractive is the SmartWay Brand, which marks the gold standard in freight efficiency accounting. By wearing the SmartWay Brand, the members are "demonstrating their commitment to more sustainable shipping strategies" (Environmental Protection Agency 2017).

1.7   Yelp

Yelp is a large and respected online marketplace for recommending great local businesses. The company is famous for its star rating system that produced 163 million reviews by the end of the third quarter, 2018. Yelp uses automated software to recommend reliable reviews for the Yelp community. The website was created in 2004 and has since been creating a community, where reviews from local establishments all over the United States are sought after and posted for recommendation. The website includes a "Yelp for Business Owners," which supports small businesses in getting advertised and recommended through Yelp. To apply for this support, businesses that are already in Yelp may claim for their business page and there they can manage (respond to) reviews and update information (Yelp 2018).

1.8   Mind My Business

Mind My Business NYC is an online platform that helps promote and recommend start-ups. More than a recognition program, the platform enables a business community through blogs, providing opportunities for entrepreneurs to accelerate growth in their ideas through articles that introduce new concepts and others that offer small business tips (Mind My Business NYC 2018). This program may be applicable to TVP in terms of webpage design, use of blogs, and use of social media.

1.9   Townsquared

Townsquared is an online platform, similar to Mind My Business, that helps individuals and businesses connect with like-minded groups. More than a recognition program, the platform assists a business community through blogs. On the website, users can also browse for local business owners and managers, join groups that might be interesting, get advice from members in groups, and attend and organize events. Similar to Mind My Business platform and helpful for the TVP, there is no recognition scheme but enables a build of trust among organizations through the creation of potential business networks and opportunities. The platform requires a Google account to sign in and review local businesses. Reviews are updated in the online platform and testimonials shown throughout the website (Townsquared 2018).

1.10   Airbnb

Airbnb is an online platform dedicated to providing accommodation throughout the world. The platform is unique in that the hosts are not licensed businesses but individuals who own homes and apartments and want to rent them out at a nightly rate. Anyone can become a host if they have a place to rent, meet the requirements for renting spaces through Airbnb, and have set an "experience page" of the space. In the Airbnb website, the user is able to browse for accommodation at literally any part of the world and browse for both standard and verified homes ("Airbnb Plus" experience). Using star ratings and online reviews to rate spaces, help to advertise the homes for future customers. Airbnb also has a recognition scheme for hosts through the category of "superhost," recognizing home owners known for creating excellent experiences and high ratings (Airbnb 2018).

2. KEY INSIGHTS FOR TVP

Through the review of recognition programs and online platforms, the team was able to obtain key insights for the design, recognition process, and criteria for the TVP. Findings include the following:

- Generally, reviews are provided for any business that has a contact name and email.

- A popular form of evaluation is based on customer reviews and some platforms offer a star ratings scale for the recognition of top sellers.

- To write the reviews, a few programs gleamed information from self-report surveys to get performance input from the businesses and added information from customer feedback.

- Several programs offered an elite status (i.e., "Top Rated Seller" at eBay or "Super Host" at Airbnb) to create an accreditation system.

- For a number of programs, the vendor had to create an account and provide minimum information.

- For customer reviews online, some programs had customers create an account and others offered free access to the public to develop the ratings.

- Websites for the majority of these programs provide a platform that enables the creation of networks for individuals and businesses, in which experiences, advice, and good practices are shared.

- Several of the programs had an arbitration process, and liabilities were considered in some cases in the form of "Terms and Conditions."

Table 1: Review of Recognition and Survey-Based Programs

No.	Name	Website	Access	Info Required	Reviews	Technical Requirements	Insights on Liabilities	Arbitration Process	Inputs for TVP
1	Ebay	http://www.ebay.com/	Open	Credit/debit card or bank information, public feedback profile	"Top Rated Seller" if certain criteria are met. Reviews have several	None	Terms and Conditions	be resolved exclusively through final and binding arbitration, rather than in court	Has tutorials and classes: "Seller Center" and "ebay University"
2	Amazon	http://www.amazon.com/	Open to Amazon customers	Business name, address, contact info. Credit card and billing info. Phone number. Tax identity information	Product Reviews/Vendor Reviews, sorted and prioritized by "helpfullness"	None	Buyers are covered for up to $2,500 by Amazon	A-to-Z Guarantee, where if vendor does not deal with a claim to the satisfaction of a customer then Amazon will intercede	Vendors that meet performance criteria are eligible for other services such as Buy Box
3	Fiverr	https://www.fiverr.com/	Offered and available to users who are 13 years of age or older	Name, email address, user name, password	Customer reviews, reviews can be looked at by customer service at request of seller	None	Are not liable for any shipping issues.	Encourage buyers and sellers to try and settle conflicts amongst themselves; if fails, users can contact Fiverr's Customer Support for assistance	Has articles under the section of Selling on Fiverr-Managing Gigs
4	FORS-Fleet Operator Recogntion Scheme	https://www.fors-online.org.uk/cms/	Based on the role: Operators, Suppliers, Champions and Visitors	Contact name, company name, address, postal code, country, landline phone, mobile phone, email, # of vehicles to register (according to size)	N/A	Businesses need to follow an audit process where they must meet specific standards (systems, procedures, and documentation)	Terms and Conditions and Privacy Statement included in the registration form, and the user is prompted to read and agree the terms and conditions	N/A	• Website and roles of the businesses involved • Concept of "Champions" and the idea of different levels of accreditation • Training and Case Studies available at website

No.	Name	Website	Access	Info Required	Reviews	Technical Requirements	Insights on Liabilities	Arbitration Process	Inputs for TVP
5	ECO Stars Fleet Recognition Scheme	htttps://www.ecostars-uk.com/	Any fleet of HGVs, buses, coaches, vans or taxis which operates in locations where ECO Stars scheme, in the UK.	The information is not available online. It says to join one must call or send an email requesting to apply to the program.	They use a 5 STAR ratings. Also, their website includes a section of testimonials, called "What Our Members Say", which provides quotes of members about the program.	N/A	N/A	N/A	• Recognition process • Star Ratings • Case Studies available at website
6	SmartWay Program: United States Environmental Protection Agency	http://www3.epa.gov/smartway/	Open to US shippers, logistics companies, truck, rail, barge and multimodal carriers.	Sign in with an email address and submit freight activity data in a free, downloadable tracking and assessment tool.	Only reviews on the program itself but not on specific companies.	Only ask to provide technical information about their efficiency information.	Must review and agree on Partnership Agreement (see Appendix).	N/A	• Promotes the company's performance (greener, cleaner and sustainable logistics) by providing branding and recognition. • OHD could be likewise recognized to vendors at TVP
7	Yelp	http://www.yelp.com/	must be 18 years or older, personal use only	full name, email address, zip code; optional: gender and birth date	Yelp uses automated software to recommend the most helpful and reliable reviews for the Yelp community among the millions we get.	None	(…) limited to the greater of (1) the amount paid, if any, by you to the yelp entities in connection with the site in the 12 months prior to the action (…)	(…) for any claim brought by either party, you agree to submit and consent to the personal and exclusive jurisdiction in, (…)	Content Guidelines including general guidelines and additional guidelines

No.	Name	Website	Access	Info Required	Reviews	Technical Requirements	Insights on Liabilities	Arbitration Process	Inputs for TVP
8	Mind my business	http://www.mindmybusinessnyc.com/	Open	• Email. • Business location. • Business name. • Street Address. • ZipCode. • Borough.	Public access to the app for the city they live in and make comments/complaints from establishment in the city.	None, only have access to internet, through smart phone or computer).	None	N/A	• Its webpage and downloadable app could be used for TVP. • Customer access to comment on Off-hour deliveries performance.
9	Townsquared	https://townsquared.com/	Open	• Business name. • Street Address.	Google account to sign in and review local businesses.	None, only have access to internet, through smart phone or computer).	Terms and Services posted on their website.	N/A	• Its webpage and downloadable app could be used for TVP. • Customer access to comment on Off-hour deliveries performance.
10	Airbnb Verified ID Program	https://www.airbnb.com/trust	• Providers of accommodations • People seeking accommodations	• To become a host providers must include home type, room type, accomodates and city. • Customers sign up with a Facebook, Google, Amex or Email account.	• Only can write a review if it has a confirmed reservation on site. • Provide star ratings (up to 5)	None, only have access to internet, through smart phone or computer).	Eligible hosts receive insurance protection to $1,000,000 (…) Superhost Terms and Conditions.	the guest may be eligible for a refund in accordance with our Guest Refund Policy	• Creating a profile. • Making referrals. • Airbnb host is the "Vendor" for accomodation, but a Superhost is the "Trusted Vendor".

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Appendix C: Receiver Focus Groups Report

Focus Group Approach

Focus groups were organized by Grand Central Partnership with local businesses operating within their business improvement district (BID) in New York City. On October 5, 2016, two focus group meetings were held at Grand Hyatt New York (109 East 42nd Street, New York, NY 10017, U.S.A)—between 10:00 a.m. and 12:00 p.m. and 1:00 p.m. and 3:00 p.m. The objective of conducting the focus groups was to understand the following:

- Key attributes of the vendor the receiver would like to know about in order to trust the vendor for the off-hour delivery (OHD) program
- The type of training program beneficial for vendors in conducting OHD
- Key elements of the program

As part of the focus group, a presentation and compatible questionnaire were prepared to facilitate the discussion.

Participants and Their Freight Delivery Experience

There were seven participants representing six organizations belonging to the NAICS 72—Accommodation and Food Services sector, and NAICS 55—Management of Companies and Enterprises. All participants receive deliveries daily and have multiple vendors delivering a variety of goods, from perishables to laundry/linen. In addition, all participants accept one to five off-hour deliveries per night currently. Many participants allow unassisted off-hour deliveries, with exception to two establishments from accommodation and food services sector. There was a general agreement among the participants that OHD is feasible for goods that have a longer shelf life (e.g., canned food, beer, etc.), non-perishables (e.g., paper, merchandises, linen, etc.), and services such as garbage pickup and laundry delivery. A representative from the food service sector mentioned that produce generally requires the chef to check and receive the goods.

Key Attributes of Vendors

To build trust between vendors and receivers, the selected attributes should be able to reduce the expectation of risk during OHD. Four types of information were presented during the focus group: (1) contact information, (2) corporate information, (3) OHD experience, and (4) general performance of the vendor.

Contact Information

Contact information is important to prove the authenticity of a business. Four attributes were provided to the participants—registered business name, address, contact number, and website. In general, most participants felt that the registered business name, address, and contact number must be made available.

The participants highlighted the need to have the contact information of pertinent people such as the person in operations or the person making the delivery instead of the office number. Conversely, websites did not factor in their decision making. A representative from a management of companies and enterprises stated:

> They do need to have a business with an address and a way to get in touch (…) and
> more importantly, responsiveness (…) a number, an email address, an account in an
> office who has no actual direct correlation with the operation, if that's our main contact

with the business we are sure to have disparity. So, having the right contact information for us would be crucial.

Figure 1: Attributes on Vendor's Contact Information for Trustworthiness
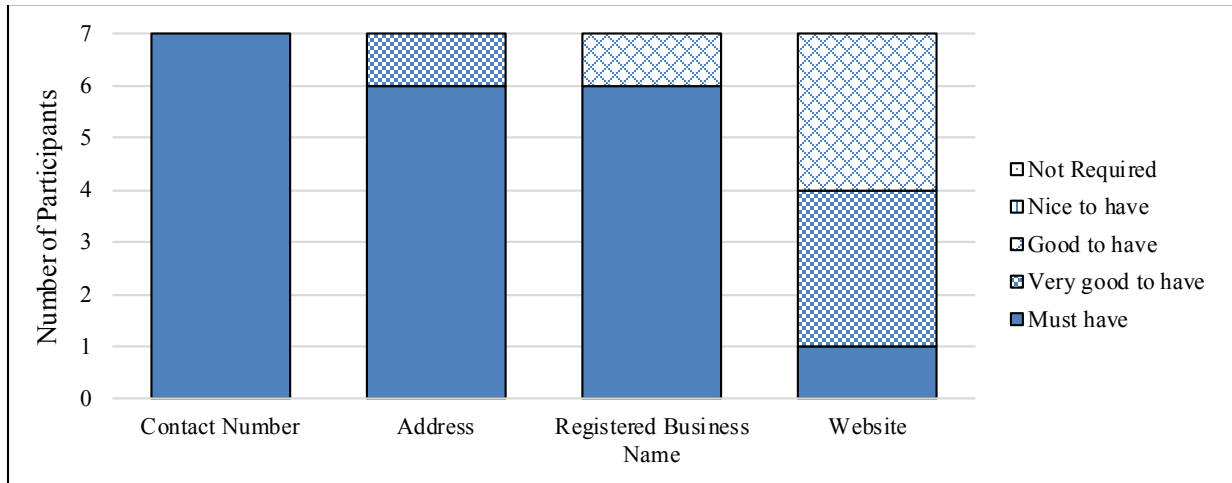

Corporate Information

The corporate information offers insight into the ability of the vendor to fulfill its promise. The participants were provided with five attributes—size of the business, specialization, years of experience, workforce belonging to a union, and accreditation from an organization.

Specialization of the vendor could provide the receiver with information on the vendor capacity to fulfill the task and is the most desired information the receiver would like to have under corporate information. Although knowing the vendor's specialization in terms of types of services, industry, and area of service may be helpful, participants are more interested in specialization, such as specification of trucks that vendors use (e.g., refrigerated trucks, trucks that contain lift gates, and trucks with trailer). As the city is very crowded, space is scarce for loading/unloading activities. Hence, different trucks might facilitate or hinder loading and unloading activities depending on the layout of the site. For example, some sites would require lift gates on trucks to enable loading and unloading activities, as receivers may not have enough space to put a temporary ramp to bring the goods up or down the truck.

Figure 2: Attributes of Vendor's Corporate Information for Trustworthiness
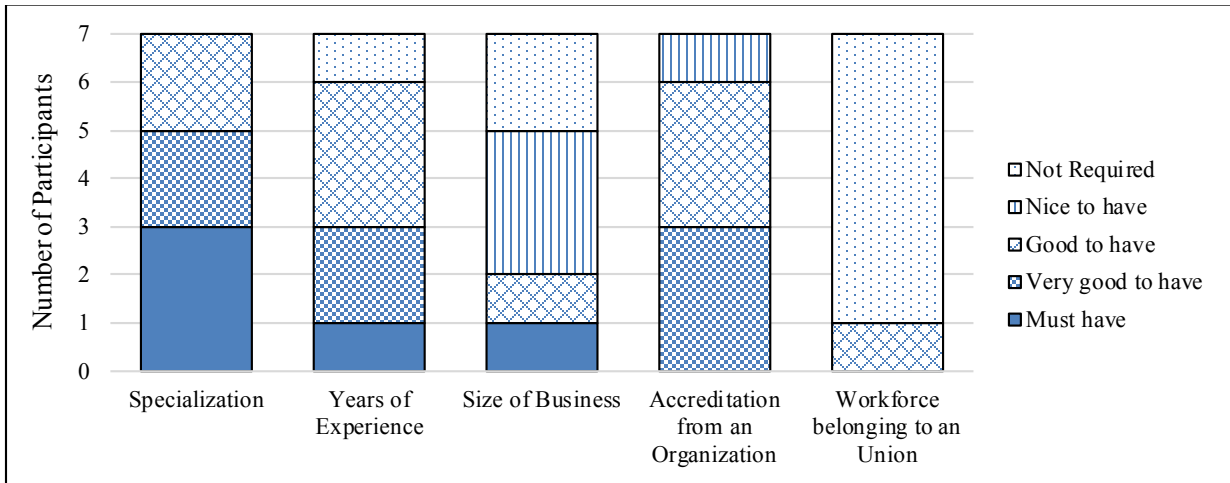
Most of the participants felt that knowing the size of the business minimally affects the decision on whether to trust the vendor. Although a large organization may have the capacity to take on a larger risk, the smaller firms tend to provide personalized services for the customers that most receivers value.

The participants also felt that union employees for vendors was not necessary. One of the participants, who engage union employees, suggested that a workforce belonging to a Union might impede the operation for OHD. Unions fight for employees if their shift changes, hence only the employees hired for the off-hour shift could conduct OHD.
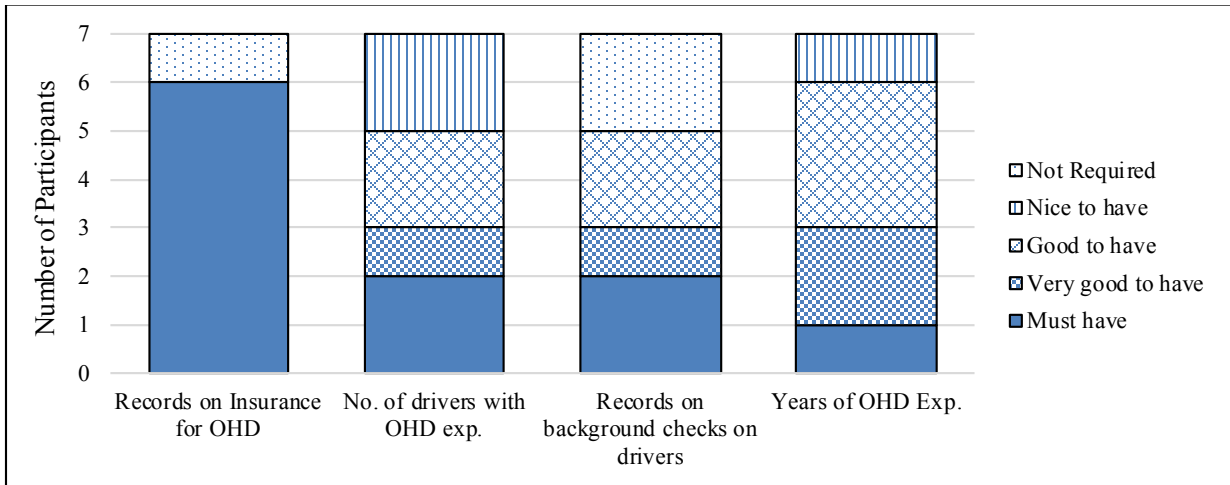
In general, the participants felt information on the vendor's specialization and the years the vendor has been in business was desirable. Some of the receivers valued knowing the size of the business, but this information was not high on their list. Accreditation from an organization, such as BBB was considered an attribute but not compulsory for many of the responders. And knowing that the vendor's workforce belongs to a union did not increase responder's trust in OHD.

OHD Experience

In terms of OHD experience, the participants were provided four attributes—years of OHD experience, the number of drivers with OHD experience, background checks on drivers, and insurance coverage for OHD.

The most desired attribute in this section was the record on the vendor's OHD insurance coverage. One of the participants shared that in his company OHD vendors carry at least a five-million-dollar umbrella liability insurance coverage. Another participant mentioned that he bought insurance for the company, hence background checks on drivers are not important for him. While the company conducts reference checks on the vendors, he felt ensuring that the driver's background had been checked was not his company's responsibility. However, others in the survey wanted a record indicating a check had been done.

**Figure 3: Attribute on Vendor's OHD Experience for Trustworthiness**

In general, information on years of OHD experience, number of drivers with OHD experience, and background checks on drivers are highly desired by the receivers.

Performance

In terms of vendor performance, the participants were provided with five attributes—on-time delivery record, damaged goods record, a record of consistent driver, incident record, and customer service evaluation.

In general, the participants' key concern was the vendor performance. The participants shared that vendors are assessed based on the ability to meet the receiver's expectations and their ability to react to unplanned events. According to the survey, performance indicators such as on-time delivery and damaged goods records were the most important, followed by customer service evaluations, which provide receivers an idea of the vendor's ability to react to unplanned events.

Figure 4: Attributes on Vendor's Performance for Trustworthiness
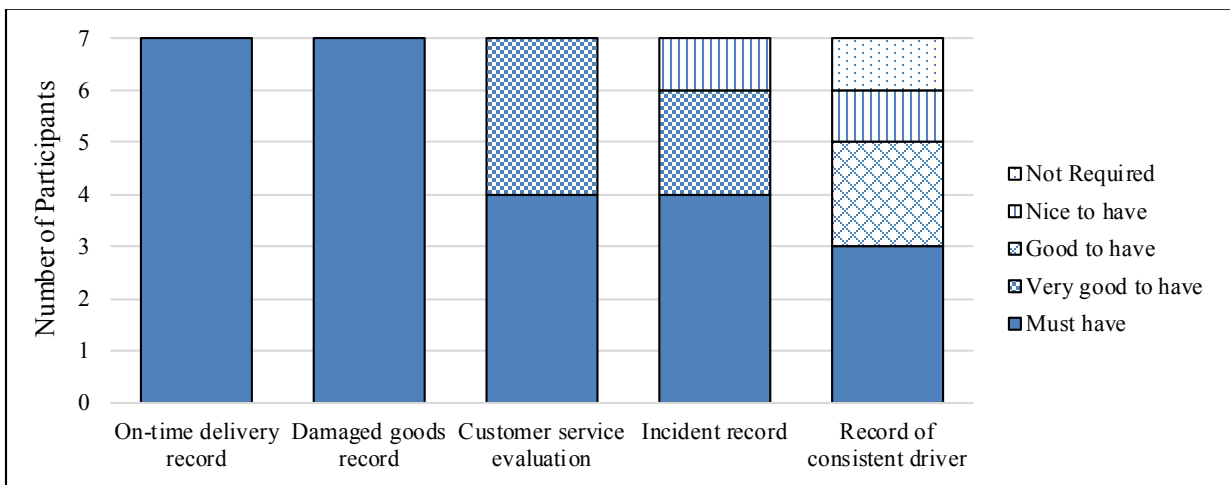
The participants had mixed responses regarding the need for a consistent driver for their delivery. The participants who favored having a consistent driver were also the ones who felt that vendors should make sure background checks are completed. Similarly, participants who did not require a consistent driver for deliveries, did not feel the need to have background checks on drivers.

OHD Training Courses

For the OHD Training Courses, there are two key questions. Firstly, what kind of content does the receiver value? Secondly, who should administer the training course?

<u>OHD Training Course Content</u>

Based on the survey, 86% of the participants thought it was important for the vendor to be formally trained in off-hour delivery. The participants were provided with four suggested training courses and asked to provide feedback regarding the courses' importance. The topics were What is OHD and How to conduct OHD, How to Conduct Low-Noise Delivery, Security Technologies Used in OHD, and receiver-specific training.

Most of participants felt that drivers need the basic training: What is OHD and How to Conduct OHD." During the discussion, many participants highlighted that they are more concern with making sure drivers can perform to their expectations rather training itself. Hence, receiver-specific training is very important. For hotel owners and managers, noise is a key concern as they do not want guest disturbed. The drivers are also expected to be professional and courteous when they chance upon any guest as any bad impression left by the drivers would negatively impact the reviews and business of the hotel. For owners and managers of food service establishments, food safety is the key concern. Hence, appropriate delivering method and placing the delivered products in the right locations are of the utmost importance. For example, a tub of ice-cream should be delivered in a refrigerated container and stored in the freezer when delivered instead of leaving it at the entrance. As the layout of every establishment and security requirements are different, the participants highlighted that the drivers need to familiarize themselves with the environment at the delivery spot. One of the participants highlighted that he trained the drivers on where to place the products and how to navigate around the establishment to make it easier for the driver to meet expectations in future. The following are quotes from participants:

> *Representative from the hotel industry:* For our hotel, it will be noise. "We have to minimize noise (…) noise stays down, be professional, be courteous (…) At the hotel, there's always people coming in and out, so they have to be always courteous and respectful of the environment and surrounding when they are on duty."

> *Representative from a management of companies and enterprises:* "For us, aside from basic understanding of OHD (…) really basic stuff like can candy be left of the floor? Refrigerated products still in the fridge?"

> *Representative from the hotel industry:* "Yes definitely. You have to do a walk through with them, where to put it, how to line it up. Some drivers will come in with a skid and just go "plop" and they plop it right in the doorway… I'd want to be the one participating in it and showing them everything because how would their boss know where it goes in my place… this is how you get through security. The door's locked between this and this, so you have to pick up the phone and call security. So, there's a lot of little ins and outs."

Figure 5: Training Courses That Enhance Trustworthiness of Vendor
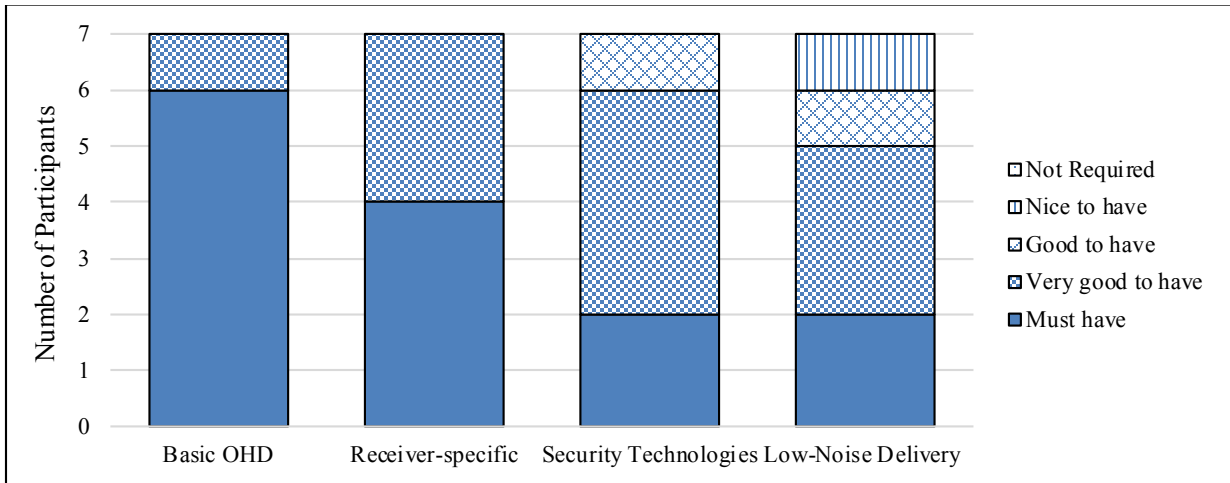
Administrator for Training Courses

The participants were also asked if training administered by an independent organization, state, or online provider would increase their trust for the vendor. During the discussion, the participants specified again that they were mainly concern with the performance of vendors. When vendors are unable to meet their expectations, participants said they hire a new vendor. The additional time to figure out the best type of training for the driver was not worth the effort. Further, participants thought that the training decision should be part of the vendor's responsibility. However, one of the participants suggested conducting a joint training between the vendor and receiver to help meet the expectations of the receiver. In general, the responses revealed that (1) receivers are focused on the outcome of the training rather than the process and (2) the organization administering the training is unlikely to affect the receiver's level of trust.

Key Elements of the Program

Key elements of the program should encourage participation from the receiver either as a receiver of the information from the TVP or a contributor. The receiver could contribute by nominating a trusted vendor, and/or providing a review for a vendor. The key elements identified are the reliability of the program, accuracy, and credibility of information provided as well as the level of risk and the burden on the contributor of information.

Reliability of Program

Recognition programs may be presented in two distinct forms: (1) a program has been accredited by an independent organization, such as the Better Business Bureau and (2) a program that consolidates customer's reviews to justify vendor's trustworthiness. Overall the participants saw value in both approaches. However, they were concerned about the definition of an independent organization, and felt that the independent organization should should consist of only third-party—rather than receiver or vendor—representatives to be fair and just. A trade group managing the program is likely to skew the assessment matrix of a Trusted Vendor to benefit themselves. For the program to be reliable, the metric has to be transparent and fair to all stakeholders.

Figure 6: Preference of Format while Searching for a Reliable Vendor

Legend:
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
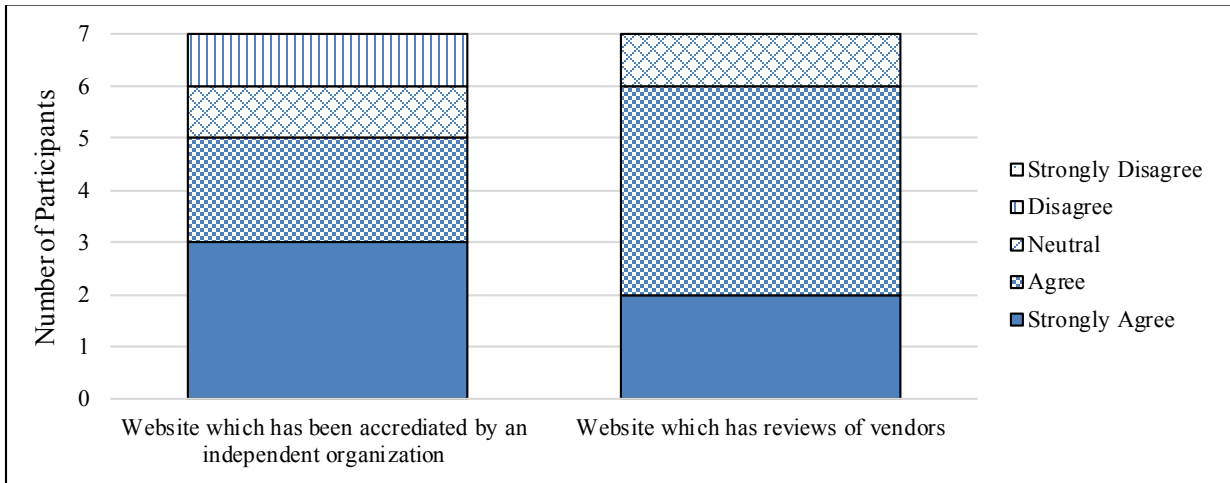
Accuracy of Information through an Appropriate Rating System

To understand the level of acceptance for accuracy, participants were given the option of obtaining the overall or individual rating of each attribute. In general, the participants preferred the individual rating of each attribute over an aggregated overall as individual rating provides more information.

Figure 7: Receiver's Preference of Rating Systems

Legend:
- Not Required
- Nice to have
- Good to have
- Very good to have
- Must have
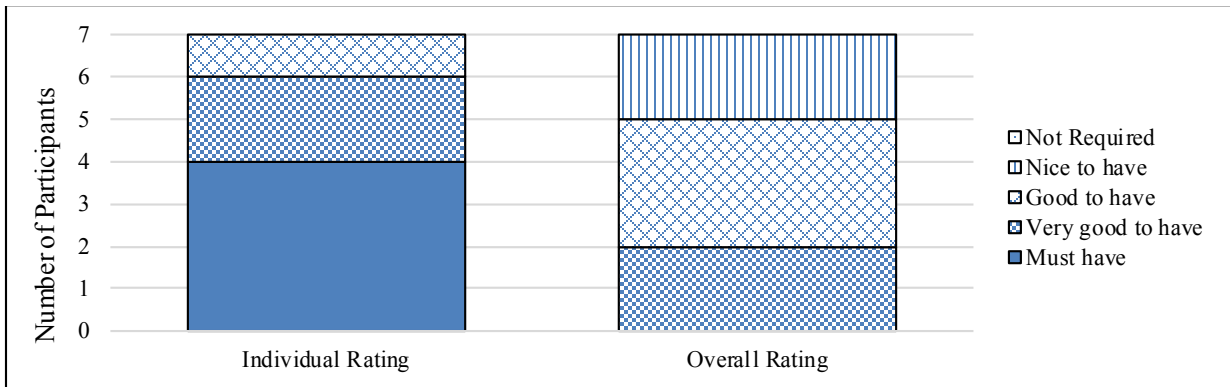
Credibility of Information through Review Verification or Reviewer Identification

Online customer reviews are a double-edged sword for any business. If the review is good, the image of the business will be promoted. However, if the review is bad, the business could lose sales and/or customers. Fake reviews are common in many online customer review sites. There could be fake reviews that were paid by the business to promote themselves, or there could be those with malicious intent. For the review to be credible, the review can be authenticated by indicating the review was verified or the author was identifiable.

Based on the discussion during the focus group, there was a consensus that the reviewers need to stand by what they say. Hence, the participants wanted an identifiable reviewer to make sure the reviews are honest. They also highlighted that the vendor should be given the opportunity to respond to the review. Based on the survey results, the participants valued verified reviews more than identifiable reviewers.

**Figure 8: Importance of Identifiable Reviewer and Verified Review**
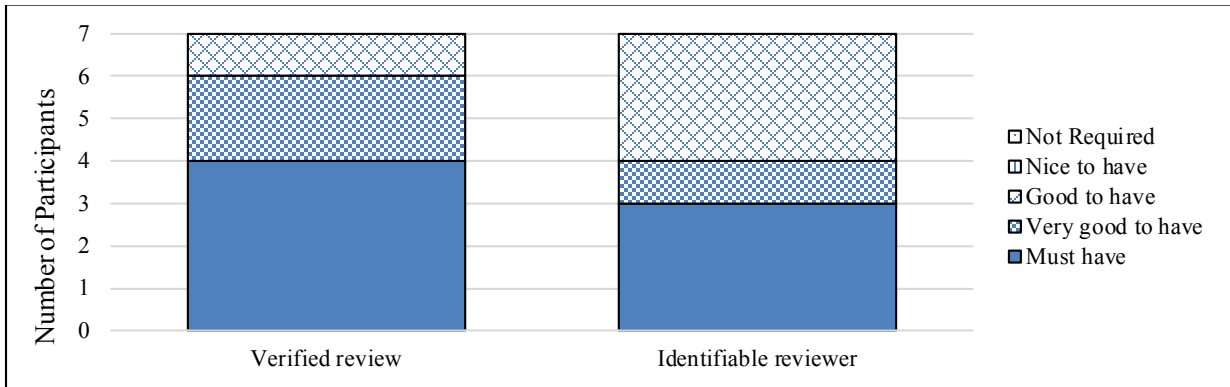
Exposure to Risk when Participating in the Program

Although it is common for customer review websites to share all reviews in the public domain, these reviews are typically written by a consumer instead of another business. The expectation in a business-to-business scenario is different from a business-to-consumer scenario. By publishing a review of their vendor to the public domain, the receiver is revealing their business relationship. Receivers may not be willing to identify their vendors as they may lose an edge over competitors when the competitors use the same vendor.

The participants were given an option to have their review publically listed or limited to a specific group. A few participants in the focus group discussions highlighted the reviews should be available to all. However, the results were mixed from the questionnaire. Some of the participants also suggested leaving it to the reviewer as an option.

Figure 9: Receiver's Preference for Review Privacy
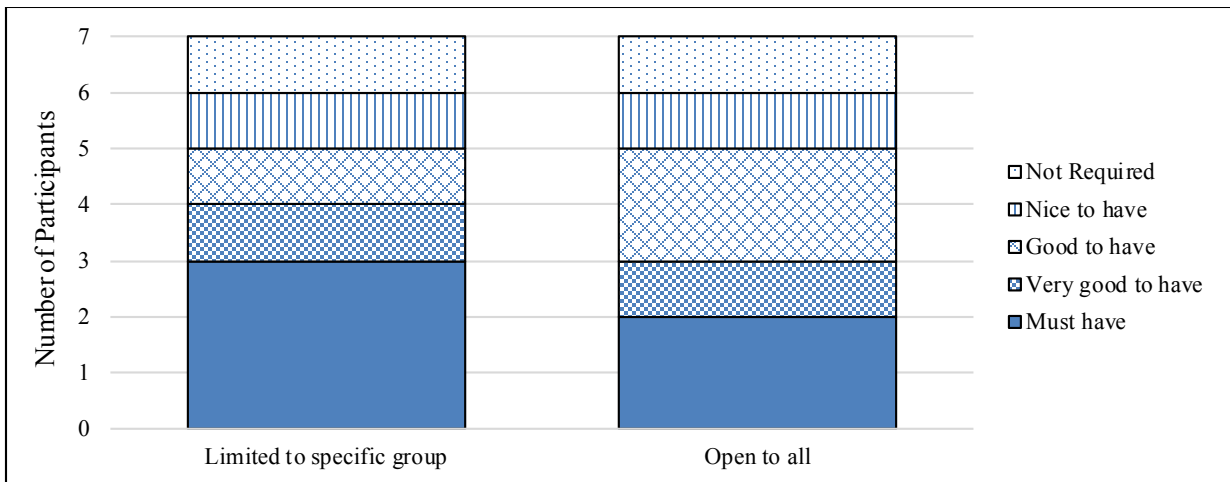
Acceptable Burden when Participating in the Program

As the receivers are most concern about the performance of the vendor, a receivers' review is very helpful in determining the vendor's track record. In general, participants were willing to complete a review for their vendor's performance, to be identified for the review, and preferred to review vendors through an online survey. However, it was made clear that the number of requests for review and the extent of the reviews should not be burdensome.

A few factors were presented to the participants: (1) frequency of survey to be completed for a vendor, (2) duration of a survey, (3) amount of time the participant is willing to spend on the surveys per month, and (4) the number of surveys the participant is willing to complete per month.

In terms of frequency of review for a vendor, five out of seven participants (72%) were willing to complete each vendor's survey quarterly while the remaining two participants (28%) were only willing to complete the survey about once or twice a year.

Figure 10: Frequency of Survey to be Completed by the Receiver for a Vendor
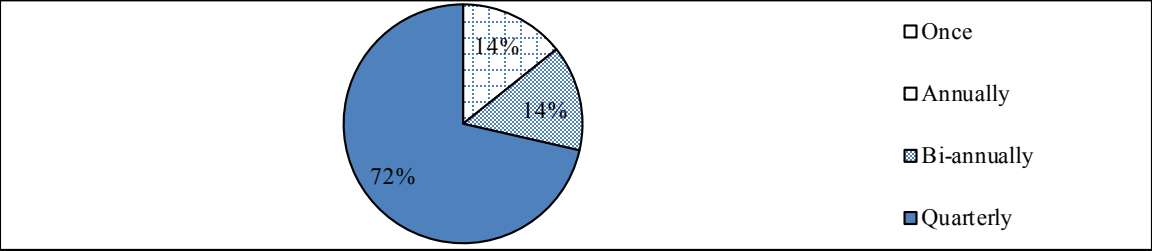

In terms of the duration of the survey, four out of seven participants (57%) were willing to review their vendor if the survey took less than five minutes. Two of the participants (29%) were only willing to allocate three minutes of their time to complete the survey while one participant (14%) was willing to complete a 10-minute survey. None of the participants were willing to spend more than 10 minutes of their time on each survey.

Figure 11: Acceptable Duration of a Vendor's Survey
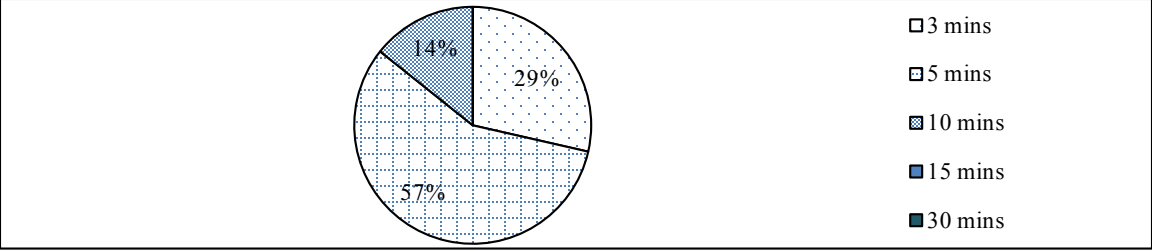
Participants were also asked how much time they would be willing to spend on surveys in a month. Three out of seven participants were willing to spend 30 minutes to review their vendors, while two of the participants were only willing to spend five minutes per month. The latter two participants, who were willing to spend a shorter amount of time on the survey than other participants, were also the ones who indicated they would only be willing to spend three minutes per survey and to complete a survey for their vendor once or twice a year. In comparison, the participant who was willing to spend 60 minutes per month on vendors review was also willing to complete a 10-minute survey each quarter.

Figure 12: Maximum Amount of Time Receivers are Willing to Spend on the Surveys
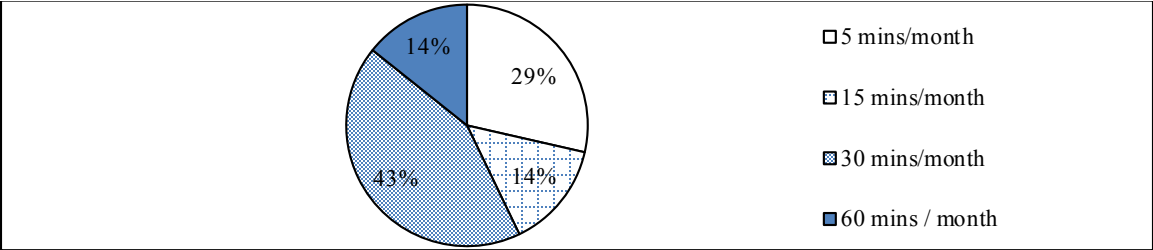
To derive the number of surveys participants were willing to complete per month, the team divided time spent on each survey by the total amount of time spend on surveys per month. Based on the survey data, most participants were willing to complete six surveys per month. The two participants who had lower willingness to spend time on surveys are only willing to complete one survey a month.

Figure 13: Acceptable Number of Surveys per Month
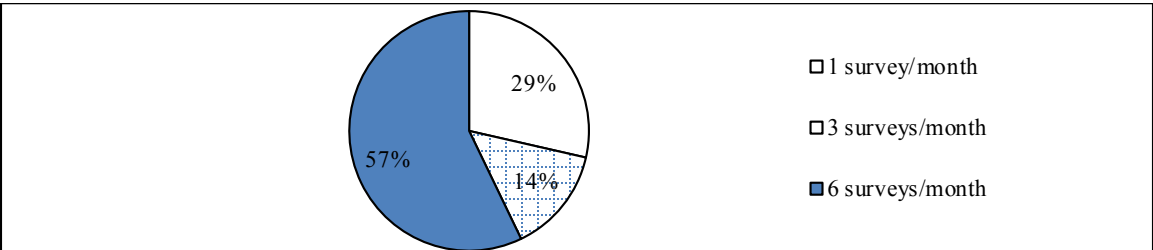
Appendix D: Self-Nomination Form

TRUSTED VENDOR SELF- NOMINATION FORM

The Trusted Vendor Program was developed by Rensselaer Polytechnic Institute (RPI) in collaboration with public and private sector partners. The program recognizes vendors who are trusted by their customers to deliver their goods during the off-hour hours (7pm to 6am).

How to Submit your Nomination

Fill the Nomination Form as thoroughly as possible to ensure comprehensive profile of your business. Electronic forms are available at the Trusted Vendor Program Website (http://coe-sufs.org/wordpress/trusted-vendor-project/). Hardcopy forms may be mailed to Jeffrey Wojtowicz, Department of Civil and Environmental Engineering, Rensselaer Polytechnic Institute, 110 Eighth Street, Troy, NY 12180-3590.

Your responses will be held in strict confidentiality.

BASIC INFORMATION

Company Name: _____

Address: _____

City: _____ State: _____ ZIP: _____

Office Telephone Number: _____ Fax Number: _____

Website: _____

DUN: _____ or EIN: _____ or USDOT Number: _____

Name of Contact Person: _____ Position: _____

Cell/Direct Number: _____ Email: _____

REASONS FOR NOMINATION (check all that apply)

☐ We conduct OHD
☐ We are reputable
☐ We have outstanding performance
☐ We are always on time for delivery

☐ We are known for being reliable
☐ Our delivery team is well-trained
☐ Others: _____

Could you provide a brief statement supporting your nomination (history of the company, experience doing OHD, some of the companies you deliver to, etc.)

_____
_____
_____
_____
_____
_____
_____
_____
_____

1

ABOUT THE BUSINESS

1. The address provided above is the company's:

   ☐ Only location   ☐ Headquarters   ☐ Branch

2. When was your company founded?
   _____

3. What type(s) of goods do you deliver? (e.g. Fresh Produce, Apparel, Electronics)
   _____

4. Do you perform off-hour deliveries on any of your routes (7pm – 6am)?

   ☐ Yes ☐ No

5. How long have you being performing off-hour deliveries? _____

REFERENCES

Please provide contacts of two existing customers as reference.

Reference 1

Company: _____

Address: _____

City: _____ State: _____ ZIP: _____

Name of Contact Person: _____ Position: _____

Cell/Direct Number: _____ Email: _____

Reference 2

Company: _____

Address: _____

City: _____ State: _____ ZIP: _____

Name of Contact Person: _____ Position: _____

Cell/Direct Number: _____ Email: _____

Thanks for Participating!

The Trusted Vendor Program was developed in collaboration with the New York State Department of Transportation, New York City Department of Transportation, Trucking Association of New York, and the Grand Central Partnership.

Appendix E: Third-Party Nomination Form

TRUSTED VENDOR NOMINATION FORM

The Trusted Vendor Program was developed by Rensselaer Polytechnic Institute (RPI) in collaboration with public and private sector partners. The program recognizes vendors who are trusted by their customers to deliver their goods during the off-hour hours (7pm to 6am).

How to Nominate a Candidate

Nominator is required to complete the Nomination Form as thoroughly as possible to ensure comprehensive profile of the nominee. Electronic forms are available at Trusted Vendor Program Website (http://coe-sufs.org/wordpress/trusted-vendor-project/). Hardcopy forms may be mailed to Jeffrey Wojtowicz, Department of Civil and Environmental Engineering, Rensselaer Polytechnic Institute, 110 Eighth Street, Troy, NY 12180-3590.

Your responses will be held in strict confidentiality.

BASIC INFORMATION - NOMINATOR

Your Name: _____ Position: _____

Company: _____

Address: _____

City: _____ State: _____ ZIP: _____

Office Telephone Number: _____ Fax: _____

Cell Phone: _____ Email: _____

BASIC INFORMATION - NOMINEE

Nominated Company: _____

Address: _____

City: _____ State: _____ ZIP: _____

Office Telephone Number: _____ Fax: _____

Name of Contact Person: _____ Position: _____

Email: _____

Cell Phone/Direct Number: _____ Email: _____

How long have you known the vendor? _____

How many deliveries do you receive from the vendor per week? (If applicable) _____

Does the vendor deliver to your establishment during the off-hours? (If applicable) _____

REASONS FOR NOMINATION (check all that apply)

☐ Vendor conducts OHD with no problem   ☐ Vendor is known for being reliable

☐ Vendor is reputable   ☐ Vendor's delivery team is well-trained

☐ Vendor has outstanding performance   ☐ Others: _____

☐ Vendor is known for its on time delivery

Could you provide a brief statement supporting your nomination (history of the company, experience doing OHD, relationship with the vendor, etc.)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thanks for Participating!

The Trusted Vendor Program was developed in collaboration with the New York State Department of Transportation, New York City Department of Transportation, Trucking Association of New York, and the Grand Central Partnership.

Appendix F: Vendor Interview Survey

<u>PART A: GENERAL INFORMATION</u>

1. How long have you been in the business?

   ☐ < 1 year ☐ 1-3 years ☐ 3-5 years ☐ 5-10 years ☐ >10 years

2. How many deliveries do you perform per week?

   ☐ <1 ☐ 1 ☐ 1-3 ☐ 3-5 ☐ 5-10 ☐ >10

3. What type(s) of goods did you deliver? (*Provide categories)

   _____

4. Do you perform off-hour deliveries (7 p.m.–6 a.m.)?

   ☐ Yes ☐ No

5. Are your deliveries made by the same driver?

   ☐ Yes ☐ No

6. Do you have any concerns involving off-hours deliveries?

   ☐ Yes ☐ No
      a. If yes, what are the concerns? _____

<u>PART B: PERFORMANCE METRICS</u>

1. How often are you able to make your deliveries on time to your customers?

   ☐ All the time ☐ Most of the time ☐ Sometimes

   ☐ Rarely ☐ Never

      a. Why are your deliveries delayed?
         ☐ Congestion
         ☐ Receivers are unable to collect the goods on time
         ☐ No parking spaces near the destination
         ☐ Lack of accessibility
         ☐ Lack of experienced drivers
         ☐ Others: _____

2. How often are your goods damaged during delivery?

   ☐ All the time ☐ Most of the time ☐ Sometimes

☐ Rarely ☐ Never

3. How often do you have to redeliver due to unexpected circumstances?

   ☐ All the time   ☐ Most of the time   ☐ Sometimes

   ☐ Rarely ☐ Never

4. If redelivery is required, are you able to fulfil it within the day?

   ☐ All the time   ☐ Most of the time   ☐ Sometimes

   ☐ Rarely ☐ Never

PART C: OFF-HOUR DELIVERIES (ONLY APPEARS IF Q4 = YES)

1. How many off-hour deliveries do you perform per week?

   ☐< 1   ☐1   ☐ 1-3 ☐ 3-5 ☐ 5-10   ☐ >10

2. Are you allowed to perform unsupervised deliveries?

   ☐ Yes ☐ No

3. Do you have additional insurance that covers your deliveries during the off-hours?

   ☐ Yes ☐ No
   a. If yes, how much is the insurance coverage? _____

4. How often do you received noise complaints related to the deliveries during the off-hours?

   ☐ All the time   ☐ Most of the time   ☐ Sometimes

   ☐ Rarely ☐ Never

   a. Which of the following are the sources of noise?
      ☐ Engine
      ☐ Push Cart
      ☐ Delivery person
      ☐ Speed Hump
      ☐ Road under construction
      ☐ Ill-maintained sidewalk
      ☐ Sidewalk under construction
      ☐ Others:_____

5. Do you have any safety concerns when performing off-hour delivery?

   ☐ Yes ☐ No
   a. If yes, what are the concerns? _____

Appendix G: Training Materials Content Example on Low-Noise Deliveries

Introduction

One of the main issues that arises with the implementation of Off-Hour Delivery (OHD) is that of noise emission. Noises that are associated with deliveries are even more prominent during the night hours when the ambient noise is low. Noise emission may cause disturbances and possible adverse health effects to members of the community. Therefore, it is important to make the participants of OHD aware of the issue and ways in which noise associate with evening deliveries can be mitigated. To this end, the team deems that training in this area is vital to the successful implementation of OHDs. The Rensselaer Polytechnic Institute team has previously done work in this area via two projects: (1) Integrative Freight Demand Management in the New York City Metropolitan Area: Implementation Phase funded by the United States Department of Transportation (U.S. DOT) Research and Innovative Technology Administration (RITA) and (2) Feasibility of Installing Noise Reduction Technologies on Commercial Vehicles to Support Off-Hour Deliveries funded by New York State Energy Research and Development Authority (NYSERDA) and New York State Department of Transportation (NYSDOT) (Holguín-Veras et al. 2013, Wang et al. 2013). The research done in these two projects provides a wealth of knowledge, which will be used to create a blueprint for the training materials used in the Trusted Vendor Program (TVP) to educate participants on how to conduct low-noise OHDs. This appendix discusses the main points to be included in the training materials. It should also be noted that all the low-noise strategies and technologies discussed can be grouped in various combinations to address noise emissions more comprehensively.

Noise Emission and Off-Hour Deliveries (OHD)

Some typical noises associated with deliveries and their associated noise levels are shown in Table 1 (Goevaers 2010).

Table 1: Noise Ranges for Some Delivery Activities

Action	Noise Measurement dB(A)
Slamming door	74
Driving up/away	67-83
Load hatch	65-92
Containers over load floor	74-85
Refrigeration kicking in	70-78
Removing onboard forklift	77-82
Shopping trolleys	53-77

Collecting noise data for the location where the OHD take place is helpful in addressing potential sources of noises that may be specific to the location. The team created a noise profile that shows the noise measurement of the ambient noise prior to the delivery, throughout the delivery from the point when the delivery vehicle pulls up to the location until the delivery is completed, and then when the vehicle leaves the site. Figure 1 shows an example of a noise profile for an OHD taking place on a commercial street which was done as a part of the New York City OHD Implementation Project (Holguín-Veras et al. 2013). This measurement was taken at a distance of 20 feet. The noise levels ranged from 89–59.90 decibel [dB(A)] with an average is 69.91 dB(A). The figure shows that the activities causing the major sources of noise were use of rolling cart inside the truck's container;

moving, installing and uninstalling the metal ramp on the street; closing the truck's back door; and closing the lift gate. These noise creators can be addressed by some simple changes of behavior and other low-cost applications such as noise absorption mats on the floor or sides of the truck body, which would lessen or even eliminate the noise cause by using rolling carts inside the truck. The strategies and technology discussed in the following section are some ways to address the noises shown in Figure 1.
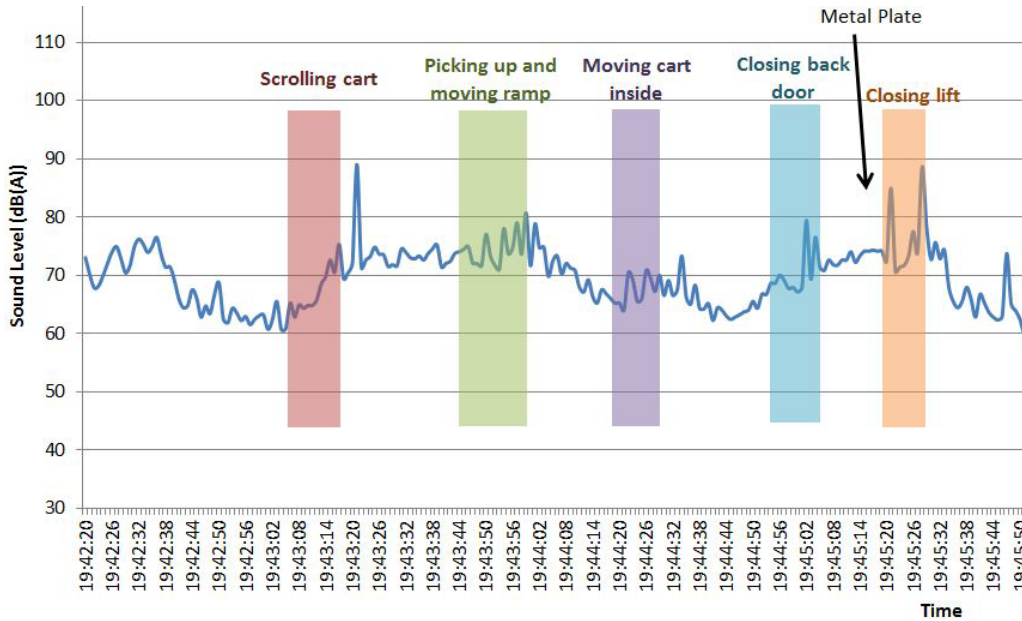

Figure 1: Noise Profile of an Off-Hour Delivery on a Commercial Street

Low-Noise Strategies

Noise mitigation strategies can range from simple change in behaviors with little to no cost to investments in equipment and vehicles with low-noise technologies. The strategies are summarized below.

Train driver/staff in low-noise behaviors

This method is very effective and requires little to no monetary investment to implement. Training delivery vehicle drivers and staff involved in receiving deliveries can go a long way in successful implementation. As can be seen in the noise profiles in Figure 1, some causes of the major noise such as closing doors and tail-lifts can be prevented by simple changes in actions. A few behavioral changes that can reduce noise emissions from OHDs include the following (Goevaers 2011):

1. Be mindful of speed when arriving and leaving delivery location.
2. Be mindful of the revolutions-per-minute level
3. Turn off radio when approaching delivery location and keep off throughout the delivery process and when leaving the location.
4. Be careful not to slam doors or gates. This may include vehicle doors as well as doors and/or gates of the establishment.
5. Be careful not to drop cargo storage bar.
6. Remembering to engage roll-cage stop with entire foot.

Other actions may be added to the list. This strategy of behavioral change is the focus of the training, as it is the easiest and cheapest to implement and has significant impact.

Physical changes

Physical changes to delivery sites can help decrease noise issues specific to that location. This includes inspecting the location and surrounding areas and making necessary improvements where necessary. Examples of physical changes include paving the driveway so that the delivery vehicle has a smoother surface to drive on

or creating an enclosed loading dock that the truck can back into which minimizes the noise the community experiences as the unloading occurs inside the establishment.

Noise absorption materials

Noise absorption materials can be applied to the warehouse space or in the vehicle to decrease the noise levels that are associated with unloading the delivery or from the engine. The materials are used to insulate sound and to minimize the creation of structure-borne noises (vibrations). The noise materials are applied specifically to the location as the type and thickness of the materials needs to be adjusted according to the particular site (Noisetek 2011). In the case of a truck, noise absorption materials can be placed in the trailer or body or in the engine compartment. For the delivery location these materials can be placed on the floors and the walls of the warehouse or storage location to decrease noises caused by rolling carts, dragging items, or placing items on the floor.

Cargo handling equipment

Cargo handling equipment used in the deliveries have low-noise versions that are available. These include forklifts, pallet trucks, rolling cages and carts, some of which operate as low as 60 dB(A). These technologies focus on the improving the wheel to operate smoothly. Other adjustments include the use of suspension seats and easy-to-use controls for forklifts as well as rubber studs to decrease vibrations for the hand pallet truck (Holguín-Veras et al. 2013).

Trucks and truck accessories

Trucks are the most identifiable source of noise with respect to deliveries due in part to the typical diesel engine operating at almost 80 dB(A) as shown in Table 4 (Goevaers 2010). However, the engine is not the only issue, and trucks may be retrofitted with low-noise accessories, and in the case of temperature-controlled delivery vehicle, there are refrigeration units that operate at lower noise levels.

Table 2: Truck-Related Noise Levels

Item	Peak noise dB(A)
Engine	79
Gear box	68
Brakes	72

Low-noise trucks

Low-noise truck models that address engine noise include electric trucks, hybrid trucks, and natural gas trucks. Electric trucks, as the name suggests are operated by an electric motor, which operate at lower noise levels than diesel trucks. With the need to recharge, these vehicles are not able to operate for as long a period as diesel trucks. While the electric vehicles complete deliveries in the urban space with less emissions (including noise), they are not as suitable for long distance deliveries. Although there are some models that have regenerative braking, which allows the motor to recharge during frequent starts and stops (Katers 2012).

Hybrid vehicles have a diesel engine and an electric motor that offer the benefits that comes with both diesel and electric. The driver uses the diesel engine to drive longer distances, and then switches to the electric motor once in the city center or residential area to complete the "last mile" of the delivery. Another low-noise truck option is using trucks that utilize natural gas, both liquefied natural gas (LNG) and compressed natural gas (CNG). These types of trucks also offer environmental benefits as they emit no fine dust or particles. Another benefit is that the trucks also use renewable biogas without having to do any retrofits (Daimler AG 2011).

Refrigeration units

The refrigeration unit for temperature-controlled trucks is another source of noise; two methods were found to mitigate the problem. One manufacturer used the method of placing the engine of the refrigeration unit —the noisiest part of the system—in an insulated box under the chassis, which traps the noise and allows the system to operate about 60 dB(A) (MotorTrader.com 2008). Another refrigerated truck used a certified low-noise cryogenic nitrogen tank placed under the vehicle instead of in the front to reduce noise emission (Frappa 2013).

Savings are an added benefit realized from this method as nitrogen-fueled operations are less expensive than diesel (Haldex 2010).

Truck Accessories

Trucks may also be retrofitted with low-noise accessories. There are low-noise tire options that have been certified by various environmentally-friendly organizations, such as German Blue Angel Organization that labels environmentally-friendly products. In order for tires to receive this label the following requirements need to be met (Sandberg 2008):

- Weight
- Noise emission
- Rolling resistance coefficient
- Mileage (service life in km, as specified by the National Highway Traffic Safety Administration(NHTSA) Uniform tire Quality grade (UTQG) standards)
- Braking distance
- Aquaplaning speed

Specifically, for noise emissions the organization requires the tire to operate at no higher than 72 dB(A).

The tail lift is another accessory on the truck that can be upgraded to operate at lower noise levels. One such low-noise model which operates at 60 dB(A) has the following features:

- Silent power pack—combination of a silent motor-pump combination and casing with sound-dampening panels.
- Sound-absorbing platform coating—that has noise absorption and anti-slip characteristics.
- Automated loading operations—to decrease the human factor of noise creation.
- Intelligent Interlocks—protects the automatic functions from misuse and damage, allowing for safer operations and a longer life for the lift (Dhollandia 2012).

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Endnotes

[1]   Available at http://trustedvendorprogram.org/home

[2]   http://trustedvendorprogram.org/join-us

[3]   Available at http://trustedvendorprogram.org/home

[4]   trustedvendorprogram.org/

[5]   https://ohdnyc.com/partners

[6]   http://trustedvendorprogram.org

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