Title: Concerns, career decisions, and role changes: A qualitative study of perceptions of autonomous vehicles in the trucking industry

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Abstract

The increasing adoption of automation will likely replace the tasks performed in many jobs, resulting in new challenges for workers. Yet, little is known regarding how workers perceive automation, including how it may influence their job attitudes and turnover intentions. Automated vehicles (AVs) are one example of new technology poised to alter the job of truck driving, which is overwhelmingly populated by older workers. In this study, we examined truck drivers', supervisors', and managers' attitudes and concerns about AV adoption and its effects on driving jobs to help the transportation industry prepare for automation with minimal workforce disruption. We drew from theorizing on self-interest in economics and lifespan coping theories to contextualize workers' reactions to automation. We conducted focus groups and interviews with truck drivers (N = 18), supervisors of drivers (N = 8), and upper-level managers of trucking companies (N = 25). Two themes emerged from the thematic analysis: *the unknown,* and *proficiency.* AVs may be viewed as threatening by drivers, causing anxiety due to widespread uncertainty and the fear of job loss and loss of control. At the same time, there will be a greater need for drivers to be adaptable for the era of AVs. AVs are also likely to result in other changes to the role of driving, which may have implications for driver recruitment and selection. We interpret our findings together with lifespan theories of control and coping and provide recommendations for organizations to effectively prepare for automation in the trucking industry.

Autonomous vehicles (AVs), also known as self-driving cars, are predicted to be deployed as early as 2030 (Litman, 2021). AV adoption will change the job of truck drivers by replacing their primary task of driving. Instead, the new “drivers” or AV operators will need to learn advanced safety systems and how to monitor automated software and hardware (Yankelevich et al., 2018). These extensive changes could be difficult for existing drivers given the average age (> 50 years old; Costello & Suarez, 2015) of long-distance truck and trailer drivers skews older than that of other occupations.

The trucking workforce stands at a unique tipping point as it overwhelmingly consists of older workers who may soon be challenged to adjust to automation. Initial survey research suggests that drivers feel ambivalence about AVs, with concerns over job security but also interest in the potential for increased safety (Richardson et al., 2017).

Moreover, AVs have been classified along 5 levels of increasing automation (SAE International, 2014; Kelly Blue Book, 2016) with levels 1-3 still requiring a human driver in the vehicle. Although human drivers may be needed with the introduction of AVs, there is little understanding of whether drivers, and particularly those who are older, will desire to continue in their jobs. Greater understanding of how drivers will react to their profession becoming automated can help to ease workforce disruption and maintain worker well-being.

We sought to understand truck drivers’ salient concerns about AVs as well as the impact of AV adoption on their career decisions and on the role of driving with three research questions (see Table 1 for motivation for each question). Specifically, we ask: (a) what are drivers’ most salient concerns about AV adoption? (b) considering the future of AV adoption, do drivers, supervisors, and upper-level managers perceive that drivers will wish to continue in their occupations? and (c) how will requirements for drivers change with the adoption of AVs?

In the wake of widespread projections that many roles will be partially and fully automated (Arntz, Gregory, & Zierahn, 2016; Frey & Osborne, 2013), little is known about workers' attitudes towards their jobs becoming automated. Accordingly, this study identifies challenges to preparing for the future of automation. We interpret findings through theories and research on occupational health and career adaptability and provide recommendations for trucking companies and organizations facing automation to help older workers maintain their work roles. Accounting for drivers' experiences and attitudes towards AVs is necessary for workforce planning and has implications for industries set to experience automation, particularly those that employ older workers.

Attitudes Towards Automation

Scholars prognosticate that anywhere from 9% to 47% of jobs will be replaced by automation, with less-educated workers most at-risk of being displaced (Arntz et al., 2016; Borland & Coelli, 2017; Frey & Osborne, 2013, 2017). Dekker and colleagues (2017) proposed the self-interest hypothesis to explain workers' attitudes towards automation. Workers who hold stronger positions in the labor market (i.e., men, highly educated workers, managers) are proposed to hold positive views of technology. Conversely, those who occupy less secure positions (e.g., women, part-time workers, temporary and contract employees) may have greater fear of technology. In accordance with this hypothesis, workers who are older and/or less educated tend to be more wary of new technology (Dekker et al., 2017; Dodel & Mesch, 2020; Gnambs & Appel, 2019).

German and Dutch drivers and fleet managers envision both benefits (enhanced reliability and safety) and drawbacks (liability concerns, losses of control and pleasure from driving and potential of being displaced) of AV adoption (Kishore Bhoopalam et al., 2021;

Richardson et al., 2017). However, drivers in the U.S. may have different evaluations of AVs. Kishore Bhoopalam and colleagues (2021) noted that Dutch drivers may have felt less threatened by AVs because they believed that AV adoption would take longer in the Netherlands given that their country is smaller than the U.S. AVs could also be seen as a greater threat to drivers in the U.S. due to the weaker social safety net compared to other industrialized nations (Abraham & Houseman, 2009; Debus et al., 2012).

Automation as a Career Concern

If truck drivers perceive that AVs are a threat to their jobs, how do they anticipate they will be affected? Concerns about one's career are one class of work stressors that can lead to the negative health effects known as strains (Rosen et al., 2010). Uncertainty about securing future employment is theorized to lead to stress and anxiety (Clarke et al., 2007). Meta-analytic findings also suggest that organizational change is positively associated with job insecurity, which older and blue-collar workers are more likely to experience (Keim et al., 2014). AVs could thus elicit stress as they may eventually replace the job of truck drivers, leading not only to job insecurity, but also the threats of job obsolescence and the need to move to a completely new profession.

Method

Participant Recruitment

Participants were recruited by both convenience and snowball sampling approaches (see Table 2). Managers were recruited through telephone calls made to trucking companies in Michigan and South Carolina (states where the research teams were located), advertisements in trucking association newsletters, and the research team's professional contacts of companies employing drivers. Managers who agreed to participate were asked to provide the research team with the contact information of up to five supervisors and drivers who might be interested in participating. Supervisors and drivers were also recruited by advertising the study on social media (e.g., Facebook, Instagram) and through the participant recruitment site Respondent.io. Participating supervisors and drivers were encouraged to share information about the study with other supervisors and drivers. Participants completed a pre-screening survey to verify each participant met the inclusion criteria (i.e., being currently employed with a U.S. trucking company in the role of a manager, supervisor, or driver). We concluded recruitment once we achieved data saturation (Sandelowski, 1995).

Data Collection

We collected data from June 2020 to November 2021 through an online survey and focus groups. The online survey consisted of sociodemographic questions, including age, gender, race, and length of time at current job, and was completed prior to the focus group. All focus groups were held virtually via Zoom due to the COVID-19 pandemic. Focus groups (N = 29) included a moderator, one-to-two notetakers, and one-to-five participants who worked in the same trucking role. Due to COVID-19 and participant no-shows, 13 focus groups contained one participant[1]. The focus groups lasted, on average, 69.32 minutes (*SD* = 24.05, range: 21-120) depending on the participants level of input and the number of participants. Focus group questions asked participants to describe their work role (e.g., tasks and challenges) and thoughts on AVs. We audio-recorded focus groups and the audio was transcribed verbatim by a third-party transcription service. Participants were provided with a $50 Amazon e-gift certificate.

Data Analysis

[1] Focus groups with a single participant may technically be considered interviews. However, in all cases, moderators followed the established semi-structured protocol and questions closely.

We calculated descriptive statistics for the survey data. Focus group data were thematically analyzed (Braun & Clarke, 2006, 2012). Inter-coder reliability was established for each of the coded focus group transcripts among the two coders with a kappa $\geq$ 0.80. NVivo Release 1.0 software was used to assist with coding and to calculate Cohen's kappa.

Results

Participants were, on average, 47.13 years old (*SD* = 12.26). The majority were male (86%) and White (83%). On average, participants worked at their company for 14.83 years (*SD* = 13.46) (see Table 3). Our analysis uncovered two themes: *unknown* and *adaptability*.

Unknown

Driver, managers, and supervisors echoed that there is an *unknown* of how AVs will work day-to-day in the trucking industry (see Table 4 for quote examples). Concerning Research Question (RQ) 1, drivers expressed anxiety over the uncertainty of how their jobs could be affected by AVs. Drivers, supervisors, and managers do not think the driving position will ever be replaced by AVs, due to the need for a "pilot" to be present in the event of an issue given the variety of the terrain (e.g., urban, rural, off-road), and material transported (e.g., steel, grocery stock, lumber). Truck drivers, and particularly older drivers, do not trust that a fully-automated truck will be able to independently navigate within cities, back into a dock, or load/unload goods. Yet, despite the justifications supporting the longevity of their job, drivers still shared concerns about being displaced by AVs and anxieties regarding how their job would change. Drivers, along with managers and supervisors, acknowledged the possibility that the need for drivers may decrease with each level of increased automation. Managers and supervisors discussed that this could be a particular concern for older drivers who may not have the skillset required for other jobs.

Adaptability

All participants expressed that an ongoing challenge with increasing automation will be drivers' *adaptability*. Addressing RQ 3, drivers must acclimate to new technology that changes their role in the truck. Prior to the introduction of automated features, drivers held full control over the vehicle. Accordingly, also addressing RQ 1, a further concern that drivers expressed about AVs was having reduced control. Many older truck drivers have been driving since all trucks were manual. However, despite initial trepidation, some older drivers have accepted specific technologies after using them (e.g., lane facing cameras, adaptive cruise control) or being forced to use them due to regulation changes (e.g., electronic logging device) and seeing their overall benefits. In response to RQ 2, supervisors, managers, and younger drivers predict that the majority of older drivers will not accept automation and will leave the occupation. Yet, most older drivers themselves did not express any greater reluctance to use technology. As automation levels increase in the trucking industry, managers and supervisors envision the need for a driving workforce that has experience with technology and is adaptable (RQ 3). Managers anticipate that older drivers who refuse to adapt will be forced to transition to another occupation or retire.

Managers and supervisors foresee that with the increase in AVs, there will be a corresponding decrease in the skill level required for driving positions, which will open the door for younger, less experienced drivers. All participants stressed the importance of the drivers' experience when managing unexpected situations on the road (e.g., bad weather, a blown tire, traffic) and to safely operate their truck. This proficiency could mean the difference between life or death. Younger, less experienced drivers may not have these proficiencies compared to the older drivers.

Discussion

The goals of this study were to understand drivers' concerns about AVs, as well as how automation would inform their career decisions and requirements for drivers. Drivers' major concerns related to AV adoption were the ambiguity over the changes that automation would bring and the potential of being displaced. Given AV adoption, our sample forecasted that the driving role would change to require greater adaptability and fluency with technology. Interestingly, concerning drivers' interest in continuing given automation, younger drivers, supervisors, and managers expressed concerns that older drivers could be more resistant to AVs and unwilling to continue in the driving role. Conversely, the older drivers in our sample expressed openness towards AVs. This discrepancy could potentially be driven by stereotypes about older workers (DeArmond et al., 2006). Although we found some evidence that drivers can acclimate to new technologies, some managers and supervisors nevertheless anticipated that drivers, and particularly older drivers, will not want to work with new technology and as a result may be more likely to leave the trucking occupation or retire.

Past research has found that workers, including drivers, envision both positive and negative effects of automation (Argote et al., 1983; Asatiani et al., 2020). Yet, in this study drivers conveyed limited optimism and comparatively more concerns about displacement and losing control. This desire to retain control aligns with findings that people prefer to work with robots that are less autonomous (Latikka et al., 2021; Pollaket al., 2020). Although, managers witnessed drivers move past initial resistance to new technology with continued exposure. This is hopeful, contrasting with evidence that workers' attitudes towards automation may become more negative over time (Argote et al., 1983). This finding is also consistent with research that shows truck drivers to be more accepting of platooning after experiencing it (Castritius et al., 2020).

With the adoption of AVs, the trucking industry will have to balance the ongoing need for experienced, safe drivers with the changes in the knowledge and skills required for the truck driving position- more technology knowledge, but less skill level. Managers envisioned that with advances in technology they will have to retrain their current drivers or recruit new technologically savvy drivers who are able to adapt to an evolving driving position.

Theoretical Implications

Drivers held concerns about the threats of job loss and reduced autonomy and were anxious given the “unknowable” nature of the changes that could potentially occur. Concerns over automation may present as a low-level, yet diffuse, career stressor associated with job insecurity. Although distal, automation is also characterized by greater ambiguity than other career-related stressors, such as work-family conflict (Rosen et al., 2010). Folkman’s (1984) theory of coping contends that control is beneficial for coping for those who desire taking action. Given that older adults are more likely to have an internal locus of control (Siu et al., 2001) and that truck drivers tend to value autonomy (Levy, 2015), the ambiguity of changes due to automation could be especially difficult as it may preclude more active means of coping. Indeed, a foremost concern among drivers was the possibility of losing control.

Adaptability was seen as a requirement for drivers facing AV adoption. Career adaptability is composed of the dimensions of concern, control, curiosity, and confidence (Savickas & Porfeli, 2012), and is related to career success (Hirschi & Valero, 2015; Zacher, 2014). Automation incites drivers to feel concern about their vocational future. However, the unknowable nature of the changes that AVs will bring means that workers are limited in their control over the situation. Thus, the other dimensions of career adaptability could be even more important for workers to adjust to AVs and potential career changes.

Practical Implications

Companies may help to reduce drivers' anxieties if, once they invest in automated technologies, they formulate expectations and share information about changes to driving jobs, in terms of tasks performed, knowledge and skill requirements, and the number of job openings. This recommendation is supported by insight that dispersing information about an organizational change effort can engender greater readiness for it (Ford & Foster-Fishman, 2012).

Stereotypes about older workers could present another barrier for organizations and drivers. Supervisors, managers, and younger drivers predicted that older drivers would have greater problems and reluctance in learning to use new technologies. Yet, older drivers generally appeared to express similar openness and perceptions of the benefits of technology. Research indicates that older workers are perceived to be less adaptable and willing and able to use new technologies (Davis & Songer, 2009; DeArmond et al., 2006). By contrast, meta-analytic results do not find that older workers are less adaptable or open to change (Ng & Feldman, 2012; Rossier et al., 2012; Tladinyane & Van der Merwe, 2015). Organizations may need to incorporate training to minimize age stereotyping into retraining programs to prepare for automation.

Participants in all roles consistently noted the value of drivers' experience for safety. Older drivers' experience can potentially be emphasized to counteract potentially harmful stereotypes as organizations plan for changes given AV adoption. Table 5 denotes strategies for organizations to effectively help older workers continue in their roles, derived from our findings and the wider literature.

These results also hold implications for organizations and drivers to prepare for changes to the role of truck driving. To assist with the driver shortage (Costello, 2017), companies may also need to recruit new potential drivers who may be more interested in automated driving. Drivers will also have more time to devote to other tasks and may have to endure less physical discomfort. Instead, they will need to be more open to learning new technology and must be willing and able to adapt to continued changes.

Limitations and Directions for Future Research

We focused on truck driving as this profession is anticipated to undergo automation within the next decade (Litman, 2021) and drivers tend to be older on average than the rest of the workforce (Costello & Suarez, 2015). Managers and supervisors discussed drivers' strong preferences for independence. Scholars should study workers in additional occupations to understand what workforce challenges will arise with automation. We also only collected qualitative data; quantitative methods should also be employed to predict workers' specific attitudes towards automation and their careers. Another study limitation is the use of a convenience sample, and it could be that drivers in different cities and regions may hold different concerns or attitudes towards automation.

AVs are categorized in levels. Our sample held general thoughts about AVs, and perceived that much about AV impacts was unknown, with this uncertainty provoking anxiety for some drivers. As AVs begin to permeate the industry, researchers should investigate the unique challenges and strategies to support drivers at different levels of automation. Research should also evaluate the efficacy of different strategies to allay driver concerns about automation and help them to continue in the driving role. For instance, research should assess whether providing information about the positive functions (e.g., increased safety and physical comfort) of automation, along with other forms of organizational support (e.g., offering retraining programs) may relate to more positive attitudes towards AVs.

Resources to shield workers from undue anxiety about automation should also be identified. Potential buffers to study include the national social safety net (Debus et al., 2012), information about anticipated changes, and access to career management services. Lastly, scholars should also investigate how new technologies can be designed to help older workers continue in their jobs, particularly given the driver shortage (Costello, 2017).

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Table 1
Study Research Questions and Motivation

Research Question	Motivation for Research Question
What are drivers' most salient concerns about AV adoption?	This insight is needed to support workers, particularly older workers and those with a lower level of education who are more vulnerable to workforce changes. It will also be useful to effectively plan for introducing automation by anticipating the workforce reception and proactively addressing the specific concerns that workers hold.
Considering the future of AV adoption, do drivers, supervisors, and upper-level managers perceive that drivers will wish to continue in their occupations?	For our second study goal, we explored supervisors' and managers' experiences working with and observing drivers, including through the rollout of new technologies (e.g., electronic logging systems, dashboard cameras) to further understand drivers' initial reactions to automation as well as how their attitudes may develop over repeated exposure to automated technology. Obtaining the viewpoints of such alternate sources can provide additional information and enhance rigor in qualitative research (Tracy, 2010). It is likewise valuable to understand whether managers and supervisors perceive that drivers can and will work with automation given stereotypes about older workers and technology (Brooke & Taylor, 2005; Dropkin, Moline, Kim, & Gold, 2016; McGregor & Gray, 2002; Van Yperen & Wörtler, 2017).
How will requirements for drivers change with the adoption of AVs?	This knowledge holds practical importance to plan for trainings and update recruitment and selection procedures, as well as to identify what factors may place drivers at a greater risk of being laid off. Knowledge of this question may help companies plan the most effective rollout for automated technology while supporting their employees, particularly older workers.

Table 2
Additional Detail on Study Methods

Method Stage	Details
Participant Recruitment	
Sampling Approach	A convenience sample of managers, drivers and supervisors were recruited through various methods including telephone calls, professional contacts, advertisements, and through the participant recruitment site Respondent.io. Participants were also asked to provide contact information of up to five supervisors and drivers who might be interested in participating (snowball sampling). Managers, supervisors and drivers who responded to the advertisements used a web link provided in the advertisement to complete a pre-screening survey.
Inclusion Criteria	The inclusion criteria for participants were: 1) that they worked in the trucking industry as a manager, supervisor, or driver, and 2) they worked in the U.S. Individuals who met the inclusion criteria were scheduled a focus group date and time and sent an email that included the consent form, information needed to join their virtual focus group, and a link to the online survey. We ceased participant recruitment when data saturation was achieved in the focus groups (Sandelowski, 1995).
Data collection	
Online Survey	An online survey was completed prior to the focus group and took approximately 15 minutes to complete. The survey consisted of close-ended demographic questions (age, gender, race) and questions about participants role in the trucking industry, such as length of time at current job. Survey data was analyzed descriptively.
Focus Groups	Informed consent was provided verbally by each participant at the onset of the focus group, and participants were presented with definitions of the different levels of AVs. Focus groups lasted, on average, 69.32 minutes (*SD* = 24.05, range: 21-120) depending on the participants level of input and the number of participants. A single focus group was concluded early because the lone participant was required to leave the focus group for his job, then was unable to reschedule (resulting in the short length of time). During the focus groups, moderators summarized responses back to participants to verify their answers and to allow for clarification or elaboration before moving to the next question." Focus groups were audio recorded and transcribed verbatim by a third-party transcription service

Focus Group Questions	For this study we focused on how participants thought AVs could change their job (and in the case of managers and supervisors, the job of truck driving), as well as how they felt about the possibility of their job changing with two open-ended questions: 1) *How do you think AVs will impact your job in 2, 5, and 10 years?* and 2*) What are your thoughts about whether your job will change or go away?* The complete interview guide is included as a supplementary file.
Focus group data analysis	Beginning with the data collection process, our general goal was to understand driver reactions to AVs. As we gained greater insight into how industry officials perceived AVs, our research questions evolved to become more specific, with a focus on understanding what salient concerns about AVs drivers hold, whether they desire to continue in their role given AV adoption, and how their role requirements would change. The inductive thematic analysis process involved six steps: 1) two members of the research team reviewed the data line-by-line, 2) initial codes were generated by pooling data related to each code, 3) initial codes were organized into potential themes, 4) themes were reviewed with respect to the coded excerpts and the entire data set, 5) themes were defined, and 6) the final analysis was constructed by choosing relevant examples and connecting them to the literature and research questions (Braun & Clarke, 2006, 2012). A thematic analysis approach was used as it is data driven and not based on a preexisting framework (Patton, 1990).
Reliability	Inter-coder reliability was established for each of the coded focus group transcripts among the two coders with a kappa > 0.80.
Coding tools	NVivo Release 1.0 software was used to assist with coding and to calculate Cohen’s kappa.

Table 3

Sample Characteristics

	Total (N=51)	Managers (n=25)	Supervisors (n=8)	Drivers (n=18)
Age*, *M(SD)*	47.13 yrs. (12.26) (Range: 25-72)	51.38 yrs. (11.45) (Range: 27-72)	36.29 yrs. (10.15) (Range: 25-57)	45.5 yrs. (10.9) (Range: 30-65)
Gender, # (%)				
Female	7 (14)	3 (12)	0	4 (22)
Male	44 (86)	22 (88)	8 (100)	14 (78)
Race**, ***, # (%)				
White/Caucasian	40 (83)	21 (88)	6 (86)	12 (71)
African American	6 (13)	1 (4)	1 (14)	4 (24)
American Indian/Alaska Native	1 (2)	0	0	1 (6)
Hispanic/Latino	2 (4)	1 (4)	0	1 (6)
Other	1 (2)	1 (4)	0	0
Length of time at company****, *M(SD)*	14.83 yrs. (13.46) (Range: 0.33-42)	20.79 yrs. (14.12) (Range: 3-42)	6.75 yrs. (4.56) (Range: 0.5-14)	9.92 yrs. (11.48) (Range: 0.33-39)

Note. *Missing 1 manager , 1 supervisor and 2 drivers. ** Missing 1 manager, 1 supervisor, and 1 driver. ***One driver marked 2 race/ethnicities. **** Missing 2 drivers, 1 manager.

Table 4

Examples of Supporting quotes and themes

Theme	Subthemes	Participant characteristics	Quote
Unknown	Uncertainty of how jobs could be affected by AVs	57-year-old truck driver (D5)	“You’re going to need a human being, because there’s so many different moving variables.”
		31-year-old supervisor (S1)	“You’re going to need pilots, you’re still going to need CEO or pilots to still make sure that the cargo is moving properly. So, there’s always going to be a job for those guys [drivers].”
		37-year-old manager (M9)	"Especially with...re-powering a load, or even trying to recover a load, if you got to move something as power-only, where it's already loaded on a trailer, there's a mechanical breakdown. You're still going to have that, and that's something where you kind of need that human interaction. You need to know the industry for 15, 20, 30 years, just having that experience. You run into new problems, you run into new issues arise, and as simple as a tire pop, you have a blowout. What's the AV going to do? Stop in the middle of the highway because they're getting an error code? Or is it going to continue on and find out how to get it fixed? Who's going to pay for it? Who's going to notify the customer of the delays?”
		50-year-old truck driver (D12)	"I don’t seem them [AVs] working too well with the delivery aspect of it because you’re going into different cities, different towns…backing around buildings, blind side backing. And a lot of these places I go to now are set up for box trucks or old school trucks, not a 53-foot trailer… "
		55-year-old truck driver (D2)	"Who is going to put that truck to the dock? Who’s going to open the doors to the trailer first? If that truck is completely driverless, how is it going to get out note and inspect the equipment before it takes off at the beginning of the shift?"
	Potential of Being Displaced by AVs	31-year-old truck driver (D21)	“I think that as a professional truck driver, we might see a little bit less demand for what we do. If the company is able to break it down so that it can fit into a pickup truck or into a smaller truck that's more automated, they might do that because there's less risk, and that would lower our desirability.”
		27-year-old supervisor (S7)	“It [automation] definitely poses a big threat to drivers. I mean, if you have an autonomous vehicle, you’re taking out their jobs. So I think that they’ll feel threatened.”
		52-year-old manager (M6)	“I see it being a compliment to what we do and not necessarily replacing people. Maybe once it develops and it’s a fine-tuned art, maybe you don’t need as many drivers.”

		30-year-old truck driver (D13)	“There are other drivers who, they're in their 50's, 60's, 70's, and they've been doing this since they were 18 or 19 years old. They don't know anything else. And the idea of a computer coming and doing their job and potentially better than they could is a scary thing because now they don't have a job.”
		Truck driver (age not provided) (D16)	“For the next two years there will not be much of an impact for the kind they are doing. But let’s say something like five to ten years, we’ll see some impact … I think some drivers might lose their jobs.”
Adaptability	New technology	57-year-old driver (D1)	"I think there's a lot of the older drivers that would not appreciate the truck telling them what to do in a sense, especially when they're on icy roads or windy mountains, whatever. Or heavy traffic like through Chicago or New York…I think the farther they go in this, the more they’re going to kind of turn away the real experienced drivers that we have out there."
		59-year-old manager (M7)	“When we introduce collision mitigation...We had to. We have some old school drivers that are just used to driving their own trucks. For them to adapt to letting that vehicle control their pace and in a lot of cases protect them from getting into a severe accident, that just took some getting used to.”
		65-year-old driver (D10)	“I can cause I'm probably the oldest one here and started out with paper logs, single axle tractor, single axle trailers. The electronic logs, I hate technology. I'm not a fan of technology. That's one of the reasons I'm glad I'm almost done.”
		55-year-old manager (M2)	"And you have the same thing with 45 to 60 year old’s that still have a lot of years left in their career, that are still being stymied by technologies that they need to learn to diagnose the truck tech equipment technology."
		57-year-old supervisor (S6)	“Some of the older ones [drivers] will get off the road, over-the-road, and do local driving.”
		45-year-old manager (M24)	“The older drivers had difficulties in the beginning with the e-logs. But with an autonomous vehicle, I think with the proper training and the proper mindset. I think it could be accepted...but there probably are some drivers that just may not be able to adopt it, and may not be able to accept it. And unfortunately, those drivers, they may have to find another profession.”
		54-year-old driver (D4)	“So, the technology that we do have, some of it is for the better…and that’s really a tremendous help.”

Skill level required	57-year-old driver (D1)	“It’s [AVs] going to weave out the old people, the experienced and put lesser experienced people, less cheaper people in the seats. And be able to take them like right out of college or which you can’t do at this point, right out of high school and put them in a truck.”
	57-year-old manager (M19)	"I think it’s [AVs] going to change the driving job in a big way. It’s going to make less skilled people available. Today drivers are in very high demand and very short supply. We think automation is going to help us get some people into driving that maybe we couldn’t get in before."
	27-year-old manager (M18)	“I actually see automation as a blessing for us in that area. I’m not sure, from an insurance standpoint, how they’ll feel about us bringing in less experienced people, because right now, that’s a big part of what they require of us. So, I do think, in theory, we’ll have more opportunities to bring in people if the barriers were lowered appropriately.”
	45-year-old manager (M24)	“You see that the adoption of AVs could even potentially create some new sort of jobs and change the industry such that you might have more openings for younger people who are interested to come in and monitor vehicles along their routes.”
	55-year-old manager (M20)	"I’m scared even when you get to four [level of automation] or something like that. You have a less experienced driver, but when the system has as issue it’s going to turn it over to that driver that doesn’t have the experience or skill set. Now the computer is saying, ‘I can’t handle this situation.’ You’re going to give it to somebody that doesn’t have that much experience to handle it and you might be creating a bigger issue."

Table 5
Proposed Strategies to Help Older Drivers Continue in Their Roles

Strategy	Explanation and Recommendations
Disseminate benefits of technology	• Technology that is difficult to learn or is disposed to failures may be received negatively by drivers. Companies can incorporate drivers' preferences and feedback into the design and use of new technologies (e.g., Huang, Roetting, McDevitt, Melton, & Smith, 2005; Roetting, Huang, McDevitt, & Melton, 2003). • As instantiated with the introduction of electronic longs in this study, technology can come to be accepted if it is seen as helpful; companies can foreground and share information about the ways by which technology will make tasks easier.
Allay career concerns about automation	• Proactively devise workforce strategies to meet the expected changes with automation to help ease drivers' uncertainties, which were evident in this study. • In the short-term, given agreement between managers, supervisors, and drivers about the importance of driver experience found in this study, this can include acknowledging the value of drivers' experience in the organization.
Keep older drivers prepared through training	• Organizations can accommodate older workers through tailored training and developmental activities such as continuous skill development (Armstrong-Stassen & Ursel, 2009; Appannah & Biggs, 2015). • Training and resources should be allocated to managers to properly plan and manage older drivers (Newnam et al., 2020).
Develop and maintain an age-friendly culture	• An age-friendly culture can be developed through meaningful work, task variety and autonomy, support, and job design with attention to older works (Armstrong-Stassen & Ursel, 2009; Appannah & Biggs, 2015). • Older drivers may be more engaged and likely to feel a sense of belongingness if the company allows for opportunities to develop relationships with supervisors and co-workers (Newnam et al., 2020).