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The shortage of heavy-duty truck drivers in Greece: Causes, challenges and the potential contribution of autonomous driving.

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Abstract

Both at European and more significantly at national level, the shortage of professional heavy goods vehicle drivers appears to be one of the most significant problems currently facing the road transport sector. At national level, where the average age of drivers remains high, problems such as low wages relative to the responsibility and difficulty of the job, prolonged absence from the base and the increasing frequency of traffic inspections, mainly due to the ageing vehicle fleet maintained in the country, are some of the factors that increasingly reducing the interest of the younger generations in pursuing the profession, therefore making transport operations increasingly difficult.

The study aims to highlight the main causes leading to the reduced attractiveness of the profession by examining a sample of drivers, company executives, and professionals in the sector. The methodology will be based on the collection of primary data through a questionnaire. The results are expected to contribute to the understanding of the causes mentioned above and to the assessment of the adaptability of the Greek transport system to new technological and social conditions.

The significance of this study lies not only in highlighting a problem directly related to the smooth functioning of the market and the competitiveness of businesses, but also in evaluating to what extent a potential investment in autonomous driving technologies could add value for transport companies in their effort to address the driver shortage problem.

Keywords

Heavy Goods Vehicle (HGV) drivers, Driver shortage, Road freight transport, Working conditions, Labour market, Greece

Περίληψη

Τόσο σε ευρωπαϊκό αλλά κυρίως σε εθνικό επίπεδο, η έλλειψη επαγγελματιών οδηγών βαρέων φορτηγών φαίνεται σήμερα να είναι ένα από τα σημαντικότερα προβλήματα που αντιμετωπίζει ο κλάδος των οδικών μεταφορών. Σε εθνικό επίπεδο όπου διατηρείται υψηλός ηλικιακός μέσος όρος οδηγών, προβλήματα όπως οι χαμηλές αμοιβές συγκριτικά με την ευθύνη και τη δυσκολία του επαγγέλματος, η πολυήμερη απουσία από την μόνιμη κατοικία και οι αυξανόμενοι έλεγχοι οδικών παραβάσεων κυρίως λόγω του μεγάλου σε ηλικία στόλου που διατηρείται στη χώρα, είναι μόνο μερικά από τα ζητήματα που μειώνουν ολοένα και περισσότερο το ενδιαφέρον της νέας γενιάς επαγγελματιών οδηγών δυσχεραίνοντας το έργο του κλάδου.

Η μελέτη σκοπεύει να αναδείξει τα κύρια αίτια που οδηγούν στη μειωμένη ελκυστικότητα του επαγγέλματος, εξετάζοντας δείγμα οδηγών, στελεχών εταιρειών και επαγγελματιών του κλάδου. Η μεθοδολογία βασίζεται στη συλλογή πρωτογενών δεδομένων μέσω ερωτηματολογίου. Τα αποτελέσματα αναμένεται να συμβάλλουν στην κατανόηση των αιτιών όπως προαναφέρθηκαν και στην αξιολόγηση της προσαρμοστικότητας του Ελληνικού συστήματος μεταφορών στις νέες τεχνολογικές και κοινωνικές συνθήκες. Η σημασία της παρούσας μελέτης δεν έχει σκοπό μόνο το να τονίσει το πρόβλημα το οποίο άμεσα συνδέεται με την ομαλή λειτουργία της αγοράς και την ανταγωνιστικότητα των επιχειρήσεων αλλά και το κατά πόσο φέρει αξία για τις μεταφορικές επιχειρήσεις μία πιθανή επένδυση σε τεχνολογίες αυτόνομης οδήγησης σε μία προσπάθεια επίλυσης του προβλήματος.

Λέξεις – Κλειδιά

Οδηγοί βαρέων οχημάτων, Έλλειψη οδηγών, Οδικές μεταφορές εμπορευμάτων, Συνθήκες εργασίας, Αγορά εργατικού δυναμικού, Ελλάδα

Table of Contents

Περίληψη.....	vi
Table of Contents	vii
List of Figures	x
List of Tables.....	x
1. Introduction	1
1.1 Purpose and objectives of the dissertation	1
1.2 Significance of the Greek state	2
1.3 Methodological approach.....	2
1.4 Contribution and significance of the study	3
1.5 Limitations of the research	3
1.6 Structure of the dissertation	4
2. Literature review and international experience.....	5
2.1 Labour shortages in the road transport sector	5
2.2 Factors of job attractiveness in the driving profession.....	6
2.3 Demographic trends and ageing workforce	7
2.4 Generational perspectives and workforce dynamics.....	8
2.5 Labour market dynamics in road freight transport.....	9
2.6 Regulatory environment and sectoral pressures.....	10
2.7 Research gap and positioning of the present study	11
3. Research Methodology.....	12
3.1 Research design.....	12
3.2 Data collection method	12
3.3 Questionnaire design	13
3.4 Sampling and target population	14
3.5 Data analysis	15
3.6 Validity and ethical considerations	15
3.7 Methodological limitations	16
4. Results and empirical findings	17

4.1 Introduction	17
4.2 Sample characteristics	18
4.3 Perceived difficulty of the profession	21
4.4 Perceived causes of the driver shortages	23
4.5 Professional satisfaction and career outlook	25
4.6 Cross group analysis	28
4.7 Summary of findings	33
5. Discussion	36
5.1 Introduction	36
5.2 Interpretation of Key findings	36
5.2.1 Working conditions and lifestyle constraints	36
5.2.2 The role of remuneration	37
5.2.3 Ageing workforce and entry barriers	38
5.2.4 Generational differences	39
5.3 Comparison with existing literature	40
5.4 Implications of the findings	42
5.4.1 Implications for transport companies	42
5.4.2 Implications for policy makers	42
5.4.3 Implications for the labour market	43
5.5 Discussion in relation to technological developments	44
5.6 Summary of discussion	45
6. Conclusions and recommendations	47
6.1 Summary of findings	47
6.2 Conclusions	47
6.3 Recommendations	48
6.4 Limitations and future research	49
Bibliography	51
Appendix A: Survey questionnaire	52
Appendix B: Tables	52
Appendix C: Figures	52

List of Figures

Figure 1: Distribution of respondents by age group	18
Figure 2: Years of professional driving experience among respondents.....	19
Figure 3: Average monthly net income of respondents	20
Figure 4: Respondents' evaluation of the main difficulties associated with the profession	21
Figure 5: Perceived Causes of Driver Shortage	23
Figure 6: Respondents' willingness to recommend the profession to others.....	25
Figure 7: Respondents' views regarding the attractiveness of the profession for younger generations	26
Figure 8: Level of income satisfaction among respondents	27
Figure 9: Respondents' intention to remain in the profession over the next five years....	57
Figure 10: Perceived impact of the profession on personal and family life	57

List of Tables

Table 1: Raw data	54
Table 2: Categorical raw data.....	55
Table 3: Regression Statistics	56

1. Introduction

At both European and national levels, the shortage of professional heavy-duty truck drivers has emerged as one of the most significant challenges facing the road freight transport sector. Road transport remains a critical pillar of modern supply chains, ensuring the continuous movement of goods to support any economic activity within a country. The availability of qualified and experienced drivers is therefore essential for the efficiency, reliability and competitiveness of transport operations.

In Greece, the problem is particularly acute. Professional drivers are characterized by a high average age, while the inflow of younger drivers into the sector remains limited. A combination of factors has contributed to the declining attractiveness of the profession, including demanding working conditions, long and irregular working hours, extended periods away from home, relatively low remuneration compared to the level of responsibility involved and increasing regulatory pressure. These conditions have reduced the appeal of the profession, resulting in operational challenges for transport companies.

1.1 Purpose and objectives of the dissertation

The primary purpose of the dissertation is to investigate the underlying causes of the difficulty in recruiting and retaining heavy duty truck drivers in Greece. Rather than relying on assumptions or anecdotal evidence, the study seeks to identify, analyze and prioritize the factors that influence the attractiveness of the profession from the perspective of those directly involved in the sector.

The specific objectives of the dissertation are:

- To examine the working, economic and social conditions that are associated with the profession of heavy-duty truck drivers
- To assess how these conditions affect job satisfaction and long-term commitment to the profession
- To identify the factors that are the most crucial to the current driver shortage in Greece
- To evaluate, based on the findings, the potential contribution of autonomous driving as a potential future approach to mitigating sectoral challenges the sector faces depending on the nature of the causes.

1.2 Significance of the Greek state

Greek state carries majority of EU freight goods that are imported from other states to the Greek state's ports as also are exported from the same ports and not only by Greek factories. A shortage in Greek heavy-duty drivers means that foreign drivers must execute the route and deliver to any destination within Greece. This results in increased transportation cost for a transport company outside Greece while it could simply forward the load to a Greek transport company to deliver it within the country, but since the workforce is not enough to cover at least the needs of the Greek transport companies, it is logical for foreign transport companies to raise their costs to their customers and take over the transport until the final destination.

Another factor that the importance of lack of heavy-duty drivers is greater than other states is because Greek state does not have a modern railway network, capable in volume of serving the country's needs both in internal traffic and exports. This lack of resources leads to a raising demand for road transportation which from its side leads to a need for drivers. Compared to other countries which have sufficient infrastructure makes the Greek state of great Importance in this matter.

1.3 Methodological approach

The dissertation adopts a quantitative research approach based on the collection of primary data. A structured questionnaire was designed and distributed either with hard copies or through a link to the online version of the questionnaire, to professional heavy-duty truck drivers operating in Greece. The questionnaire consists only closed-ended questions, enabling efficient data processing and providing a statistical analysis opportunity.

Emphasis was given on ensuring that the questions would remain neutral and non-directive. This design choice was made to maximize response rates among drivers, whose working schedules often limit their availability for lengthy surveys. The use of ranking allows the identification of the relative importance of different factors affecting the profession without guiding respondents toward predetermined conclusions.

1.4 Contribution and significance of the study

The significance of the study lies in its focus on identifying the root causes of the heavy-duty driver shortage rather than proposing immediate or prescriptive solutions. By establishing a clear and empirical understanding of the factors that currently shape the attractiveness of the profession, the dissertation provides a robust analytical basis for assessing the effectiveness of potential future interventions.

Logistics and transport companies may have a better understanding of why they face their daily problems and alternate their strategies and planning. Labour market research may change significantly after being able to understand the causes of shortages in this profession. This dissertation will try to show that there are many factors that affect the profession, that there is no one-way route to success and that even to interpret the causes of shortages or the true difficulty of the profession is difficult and complicated. By reading the dissertation, someone will be able to understand better the workforce environment that logistics and transport companies are in, looking for new potential employees and may reshape the way, the standards or even the benefits they provide for a job.

This dissertation tries to point out that there are different factors that affect the attractiveness of the profession within the same job title of “Heavy-duty driver”, since there are big differences between each job description. By trying that, the dissertation will try to provide a better understanding of the lack of drivers to each category of transportation, such as dry, freight, bulk, hazard etc.

1.5 Limitations of the research

As with all investigations, this study is subject to certain limitations. The analysis relies on self-reported data collected through questionnaires, which may reflect respondents’ perceptions instead of objective measurements. Additionally, the scope of the research is limited to drivers operating in Greece and may therefore not be generalizable to other national contexts. Both time constraints and data availability also restrict the extent of longitudinal analysis. Nevertheless, these limitations define the scope of the study rather than undermine its validity and are taken into consideration when interpreting the results and drawing conclusions.

Even though the questionnaire provides the choice of geographical base and type of transported goods, it cannot be absolute since we are aware that the routes and the type of

goods transported are reported by the respondent based on quantitative superiority. The dissertation could provide better results if all the collective answers were from specific types of transportation with standardized routes, distances, types of goods and drivers. Thus, another limitation of this dissertation is that despite its effort to separate all those different factors that affect and shape the profession, in the end it can't provide data that examine each factor as an absolute but examine factors based on their superiority.

1.6 Structure of the dissertation

Following the introductory chapter, Chapter 2 presents a review of the relevant literature and international experience related to labour shortages in the road freight transport sector. Chapter 3 describes the research methodology, data collection process and analytical tools employed in the study. Chapter 4 presents and analyses the empirical findings derived from the questionnaire data. Chapter 5 discusses the results in relation to the research objectives and existing literature, while Chapter 6 concludes the dissertation by summarizing the key findings and outlining implications for future research.

2. Literature review and international experience

This chapter reviews the existing literature related to labour shortages in the road transport sector. It focuses on identifying the main structural, economic and social factors that influence the availability and attractiveness of the heavy-duty truck driving profession.

Emphasis is given on international and European studies that examine working conditions, demographic trends, regulatory pressures and workforce dynamics within this sector.

Given all that, this chapter establishes the theoretical and empirical framework that informs the research design and analysis presented in the subsequent chapters.

2.1 Labour shortages in the road transport sector

Across Europe as also internationally, labour shortages have been widely mentioned within this sector at a point which is characterized as structural rather than cyclical. Constant changing labour market, demographic trends and preferences and sector specific working conditions come to form a general imbalance between labour supply and demand (European Parliament, 2009), (IRU, 2023)

The International Road Transport Union (IRU) reports constantly a wide gap between the demand for drivers and the available workforce, highlighting the shortage of younger people entering the profession which has as a result the aging of the active one. According to reports of IRU, a significant number of professional drivers approach retirement age, while the rate of replacements remains low. (IRU, 2023)

Heavy-duty truck drivers' shortage has been acknowledged by the European Parliament as critical challenge for the sustainability of road transport and supply chains and emphasizes also at the fact that shortages are not only linked to economic conditions but also to the overall attractiveness of the profession. (European Labour Authority, 2025)

There are studies that identify the shortage of heavy-duty truck drivers but at the same time there is no way to measure that. Transport companies across Europe report difficulties in filling vacant driver positions, with estimations exceeding tens of thousands of them but at the same time this gap cannot be measured to show its significance. On this way there is a significant qualitative problem across Europe that offers a sense of quantitatively great need but with no means to be measured and thus been understood. (European Parliament, 2009)

This qualitative feeling of the problem comes to be supported by the expansion of logistics activity, driven by economic growth and the rise of e-commerce which by them own raise the demand for road-transport across Europe. This increasing demand is in turn widening the gap between drivers approaching retirement and drivers now entering the profession.

2.2 Factors of job attractiveness in the driving profession

As in many demanding professions, job attractiveness plays a central role in explaining labour participation. In the case of heavy-duty driving there are studies that identify working conditions as a primary factor that influences both entry and exit from the profession. Extended periods away from base, long and irregular working hours, physical and psychological pressure are some factors that affect the profession negatively. In the same study, factors such as tight delivery deadlines, working schedules that differ from one week to another and continuing night driving seem to increase the likelihood of occupational burnout and premature exit from the profession. (ETF, 2021), (ETSC, 2001)

On the other hand, a simple solution like the raised level of remuneration that is given to this specific profession seems to not quite always work. Studies revealed that the shortage of drivers cannot be solved by only raising wages since nowadays, factors as social recognition, quality and balance between work and life play a significant role. (IRU 2023, EURES 2022)

To be able to understand all these factors we must explain the mechanisms that affect them. This specific job, the heavy-duty truck driver, in its superiority, must complete routes that demand most of the times days of driving, meaning that the driver is away from his home most days of the week. This alone discourages someone by entering the profession. Continuing this difficulty of the profession, even when the driver is at his base home, irregular working schedules or timelines reduce significantly his family life, while at the same time they lead him to burnout. Even though it is not the only profession that the employee must be away from its base, it is from the few that the employee (either an employee driver or an owner of a truck that operates it on his own) cannot plan his resting days and most importantly cannot insist on planning them since the competition in transport companies is great. Burnout may increase turnover but at the same time works as a negative factor for someone to enter the profession, especially if that someone is going to be employed and not self-employed. This is why raises to remuneration packages don't

quite always work in cases of lack of labour workforce. On out time, family life is something that difficult can be bought as this lack of drivers shows.

2.3 Demographic trends and ageing workforce

The ageing structure of the professional drivers workforce has been widely identified as one of the most significant structural challenges affecting the road freight transport sector. Across Europe the average age of heavy-duty truck drivers continues to rise while the entry rate of younger drivers remains comparatively low (IRU, 2024).

The retirement age of heavy-duty drivers is a growing proportion of the workforce while on the other hand drivers under the age of 25 remain very limited. This creates a large gap between those two groups that affects transport companies by creating pressure as experienced drivers leave the sector faster than new entrants replace them (IRU, 2024).

There are several factors that affect the entry of younger drivers to the profession. Besides the difficulties that exist in entering the profession (cost for driver's license, training time etc.) there are differences on how younger workforce prioritize life over work balance. Specific working schedules, flexible working arrangements as also low loyalty to companies are some of the barriers that are created by the youngest drivers and not necessarily from the market itself. This can be based on the fact that younger generations, potential future heavy-duty drivers, had different education until their driving age compared to their fathers. As the world evolved so did this upcoming generation of drivers that for certain may have influenced their professional expectation. Without analyzing how this could affect the labour market, thus entering in psychological analysis, this dissertation will take for granted that their different education, or at least the fact that each father of them wanted a better future for their child, somehow affected the youngest generation of potential drivers and now have a need for a more balanced life.

In addition, the general image of a truck driver has gradually changed over time. Truck driving was conceived as a stable profession with remuneration greater than the average on each country. Instead, now with all the complexity logistics companies create guiding to a more demanding environment, that image gradually falls and the attractiveness of the profession is reduced.

Thus, the ageing driver population creates a structural vulnerability within the sector. As large cohorts of drivers approach retirement age, transport companies face increasing difficulty maintaining operational capacity unless new recruitment pathways are successfully developed.

2.4 Generational perspectives and workforce dynamics

Continuing the concept of quality and balance between life and work, a concept that was historically prominent among older cohorts, studies reveal that as the generations pass, labour market tends to prefer personal wellbeing to professional stability.

Older-in- age heavy-duty drivers presented greater tolerance for prolonged absences from home and irregular working patterns having as a result a totally different effect to the labour workforce and the economy in general than today. Comparing older drivers to younger ones, this mismatch contributes to the declining appeal of the profession, particularly in countries where alternative employment opportunities are available. (European Parliament ,2009). (IRU, 2023),

Studies suggest that older policies that were applied in the sector may not be effective anymore. Generational shifts must go together with organizational practices to attract and retain drivers in the current labour market environment although this may seem sometimes difficult. Current regulations and market demand is against any potential flexibility offer from any transport company to new drivers. The profession on its own, somehow, its a barrier for any new entries because of its inflexibility, since it cannot provide work from home days, or make your own schedule like some other professions do provide. Thus, there are not only the limitations that the profession has but also that the competition that it faces is greater than anyone can imagine.

This younger generation (people that at this time are at a legal age to drive a heavy-duty truck, meaning that are over 21 and less than 35), which been through 2 economic crisis, lockdown and a constant recession, is particularly settled in everything that has to do with its financial gains, knowing that the economic boom experienced by their older generations will not happen again anytime soon. This is another factor that pushes them to balance between life and work.

2.5 Labour market dynamics in road freight transport

Besides demographic trends, the shortage of heavy-duty truck drivers can also be understood through broader labour market dynamics. In many European countries, economic growth and expanding logistics demand have increased the need for road freight transport services. E-commerce and over the years, a specialization across countries in both the primary and manufacturing production sectors increased the need for road transportation while at the same time all the regulations that came up regarding the transportation sector, lead to an inflexibility of the demanded job. At the same time the labour supply has not expanded at a similar rate and is almost perfectly elastic due to factors that are explained in this dissertation.

There are many factors that affect the attractiveness of the occupation as also factors that do not exist in other professions. Responsibilities, long working hours, irregular schedules and constant distance from each base are some crucial factors that do not exist in other occupations. This has as a result that when someone is available in the market for employment, they often compare the negatives of the profession of a heavy-duty truck driver to other professions that do not have those.

Besides those crucial factors, there are more that to anyone outside the profession may be promoted as technological developments or improvement of safety standards, but there are negatives on those factors also. Heavy-duty truck drivers may enjoy some technological improvements or be safer while driving, but on the other hand they must face many regulations regarding driving hours or road safety compliance.

The professional environment has become increasingly regulated in recent decades. Regulations in driving hours, rest periods, tachograph monitoring speed limits and many others, have increased the operational complexity of the profession and the pressure experienced by the drivers. All those factors contribute to the perceived intensity of the profession.

These labour market dynamics demonstrate that the driver shortage cannot be attributed to a single factor but rather emerges from the interaction of economic demand, demographic trends, regulatory frameworks and evolving expectations of the workforce.

2.6 Regulatory environment and sectoral pressures

Regulatory frameworks concerning road transport aim to enhance safety, protect workers and ensure fair competition. Often the same regulations increase the pressure on drivers and transport companies. Regulations related to driving hours, rest periods and road compliance given their complexity, often translate into tighter operational constraints and increased administrative burdens (European parliament, 2009).

Prolonged absence that was mentioned in previous chapter, along with regulations about rest periods, are translated into driver's fatigue. Studies by the European Transport Safety Council (*ETSC*) identified fatigue as a critical factor of pressure. Fatigue, which is translated to pressure, not only affects road safety but also reduces job satisfaction and increases the likelihood of attrition from the profession.

How pressure and prolonged absence exist or even created can be explained shortly.

Heavy duty truck drivers are not only obligated to travel at specific speeds thorough the whole route with no possibility of increasing their speed in highways but also must travel for specific hours within the week. This is not something that they can increase by paying more to their insurance company, but it is something that traffic police constantly check through the tachograph of each vehicle to fine any violation, so driving more finally will cost more instead of being more efficient. For sure measures like those are for the driver's own safety, but by adding speed limits, regulations, working hours, deadlines, responsibility and then all that again for someone to simply return home raises the driver's fatigue significantly.

Empirical research focusing on both Northern and Southern European countries, including Greece, confirms that fatigue is a prevalent issue among professional drivers and is associated with working time arrangements. All the findings underline the importance of regulations and pressure when analyzing shortages in the sector. (Kontogiannis et al.2017)

2.7 Research gap and positioning of the present study

Despite extensive international research on driver shortages, empirical studies focusing specifically on the Greek road freight transport sector remain limited. Existing analysis often relies on aggregated European data, which may obscure national particularities that have to do with the current economic structure, fleet characteristics and labour conditions.

Moreover, there is a lack of research that systematically links identification of heavy-duty truck drivers' shortage with the evaluation of potential future view. The present study seeks to address this gap by providing primary empirical evidence from professional drivers operating in Greece. By analyzing the research in first-hand data, the dissertation aims to contribute context-specific insights that can inform both academic debate and practical decision-making within the sector.

Another point where the gap might be filled with more nation accurate data, is that without being aimed, the questionnaire will be filled mostly by Greek drivers who were born and raised in Greece. Not out of a choice but because of our culture, there are not as many foreign heavy duty truck drivers as in other nations where the occupation of foreign people is commonly used. In Greece most of the driver's that either travel nationally or internationally are Greeks, and thus the responses provided come also with the nations temperament thus strengthening the nations specific insights.

3. Research Methodology

3.1 Research design

This study adopts a quantitative research design to systematically investigate the factors contributing to the shortage of professional heavy-duty truck drivers in Greece. A quantitative approach was selected because the primary objective of the research is to identify, measure and prioritize the determinants influencing the attractiveness and sustainability of the profession.

This type of research enables the collection of structured data from a defined population and allows statistical analysis of patterns, relationships and relative importance of variables. Given that the study seeks to evaluate perceptions across multiple drivers to compare the weight of different contributing factors, the quantitative method was considered the most appropriate and efficient.

As mentioned previously, most of the respondents are Greek, thus the quantitative questionnaire is of great importance because it has the ability of filtering any personal view for any matter of the drivers and to deliver only personal experiences from them. There couldn't have been any conclusion taken if the survey wasn't structured with predefined answers since there wouldn't be any common points within the respondents' answers and thus all the dissertation could not have reached a specific conclusion about the potential usefulness of autonomous driving. Indeed, there are many factors that affect the attractiveness of the profession and because of that a calm and cold questionnaire was needed to filter all the personal views from the drivers so that later these factors could be interpreted.

3.2 Data collection method

Primary data were collected through a structured questionnaire distributed to professional heavy-duty truck drivers operating within Greece. The questionnaire was established electronically via Google Forms to facilitate accessibility and maximize response rates among participants with demanding working schedules. For this type of work, a brief structured and clear questionnaire was necessary for the drivers to be willing to fill it. Since the answers didn't come up from a pool of people waiting to fill the questionnaire but was distributed on each responder separately through channels of this specific

industry, the questionnaire had to support constantly the arguments that were told to the drivers before filling it and this happened mostly from the clarity and the negativity that they saw within the answers of the questionnaire. Google Forms was selected both because the means of sharing the questionnaire was easy as also because it provides ready-to-analyze results and a live picture of the given number of responses.

The survey consisted of close-ended questions, including:

1. Multiple choice questions
2. Likert-scale rating questions
3. Ranking questions

This structure was intentionally chosen because it allows consistent coding, minimizes ambiguity and enables statistical processing of responses. No question was selected that would allow for free-form responses such as text development, as these could not be statistically analyzed later.

3.3 Questionnaire design

Emphasis was placed on ensuring that the questionnaire remained neutral and non-directive. If someone knows even few about this field, manipulating the answers through the way they frame the questions is easy. At this specific industry, the neutrality of the questionnaire plays a role not only in that it does not affect the results but also in the extent to which it affects the receptivity of the drivers regarding its completion. For example, if the demographic question on earnings did not have predetermined answers with salary scales but a blank field for completion, then the receptivity of the respondents to complete it, as well as their contribution to confirming its integrity to their colleagues, would be reduced.

The questionnaire was designed to require no more than three minutes to complete. Drivers operate constantly under time constraints and irregular schedules; therefore, a brief questionnaire reduces respondent fatigue and increases the possibility of filling it out. This is why likert scale and ranking questions were used for this questionnaire and no other form of response that would raise the responding time. Another factor that only those types of questions were selected is that even if the questions indicated a one-word typing answer, there would be a great possibility of the results to be unmeasurable leading to unclear results.

All questions were formulated using neutral wording. The questionnaire avoids leading language, presuppositions, or references to potential technological solutions, since something like that would cause disruption within this category of employees. The potential solution of autonomous driving was only described to owners of multiple trucks because this was quite interesting for them but also to encourage their employees to fill in the questionnaire. Those types of questions ensure that responses reflect participant's genuine perceptions regarding the causes of the driver shortage, rather than being influenced by the researcher's assumptions. At the same time neutral wording allows participants to feel safer while filling the questionnaire and share their experience with other drivers as positive. If for any reason any negative rumor about completing the questionnaire were to spread, all primary research would go back a long way until the questionnaire creator regained the trust of potential respondents.

Ranking questions were included to identify the relative importance of different factors. Unlike simple multiple-choice questions, ranking questions can provide deeper insights into which variables are perceived as most influential per type of driver. As mentioned previously, because any other form of questionnaire couldn't later be analyzed, like a small essay that would answer to "why do you believe that... etc", ranking questions provide both measurable integrity of responses as also the Greek temperament that is mentioned previously.

3.4 Sampling and target population

The target population of the study consists of professional heavy-duty truck drivers currently operating in Greece, regardless of employment status (company-employed or self-employed). As mentioned previously, the nation's culture is not matching the one of the rest of Europe since the foreign drivers employed are quite fewer compared to other European nations. Thus, the target population of the study beside the fact that operates mostly in Greece, is also Greek.

Given practical constraints, the study employed a convenience and voluntary participation sampling. The questionnaire was distributed through professional networks industry contacts and digital communication channels relevant to the transport sector. No hard copies of the questionnaire were used, even if Google Forms provides this option. For all the questionnaires that were filled, the creator and owner of this dissertation was presence

to provide any clarifications needed or solve any potential problems that might occur without interpreting the responders' answers at all.

While this approach does not guarantee full representativeness of the national driver population, it enables access to active professionals within the sector and allows the collection of relevant responses. Given the industry provided as a tool to promote the questionnaire, heavy-duty truck drivers from a variety of transported goods were taken as a sample. This enables a view richer in different opinions rather than the one that would be provided if the respondents were occupied in the transportation of a single type of goods.

3.5 Data analysis

Collected data were exported from Google Forms into spreadsheet format for statistical processing. The analysis primarily relies on descriptive statistics, including:

- Frequent distributions
- Percentage analysis
- Mean and ranking aggregation

Ranking scores were calculated to determine the relative importance assigned to each factor. Likert-scale responses were analyzed to evaluate overall levels of job satisfaction, perceived work-life balance and professional outlook. Frequencies, percentages and mean values allow the identification of general patterns and tendencies within the responses. Categorical variables were analyzed by frequency analysis to examine the distribution of responses across different categories such as experience levels, remuneration and employment types.

Different factors that affect the profession will be analyzed through average scores from Likert-scale responses. This approach allows for the identification of the most significant issues that respondents on their own, consider the most crucial ones.

3.6 Validity and ethical considerations

As measures for the validity and reliability of the research, the questionnaire was conducted in a way that does not allow interpretation differences because it is based on themes identified in the literature review, including working conditions, remuneration, demographic pressures, regulatory environment and professional perception.

Also, the response format is based on standardized responses as also Likert scale formats to ensure the consistency of the data and not allowing any responses that could not be analyzed.

Participants voluntarily and anonymously submitted each questionnaire and before that all of them were informed about the use of their responses. No personal identifiable information was asked and emphasis was given either from the content of the questionnaire or orally about the usage of the responses.

Given the sensitivity of this particular labour workforce group, the responses about the use of their filled questionnaires, were not that will be used to evaluate a possible autonomous vehicle as a solution to the problem of not finding heavy-duty truck drivers, but as a mean to understand and maybe improve the main factors that affect this industry and improve the input of new drivers to the workforce.

3.7 Methodological limitations

The greatest limitation in this sampling is the self-reported data that may reflect subjective perceptions and sometimes temporarily rather than objective measurements. In the end, the responders provide answers based on their personal experiences and subjective evaluations and don't offer statistics to measure their experiences. Additionally, the questionnaire captures responses at a single point in time and does not allow any longitudinal analysis.

Among professional drivers there is a lot of mobility from company to company.

Especially in an era where finding human resources is difficult, professional drivers receive more special treatment from company managers. Thus, a possible impression of negativity in a questionnaire is likely to be temporary until the respondent finds a better job that he or she will be more satisfied with.

On the other hand, the previous limitation provides an actual, real, average picture of the labour market capturing data at a single point in time. This means the study does not account for potential changes in perceptions or conditions over time, nor does it allow long-term trends assumptions.

Beside those limitations, the methodology is appropriate for explanatory investigation and provides meaningful empirical insight into the perceived causes in the driver shortage in Greece.

4. Results and empirical findings

4.1 Introduction

This chapter presents the findings derived from the questionnaire conducted from professional heavy-duty truck drivers operating in Greece. The purpose of this chapter is to categorize and analyze the findings that came up from the filled questionnaires, to identify the most crucial factors that affect the attractiveness of the profession and contribute to the understanding of the general shortage in labour workforce at this industry. Later, at the discussion chapter, the results of this analysis will play their role in the potential contribution of autonomous driving as a solution in the drivers shortage. After cleaning up the responses, a total of 79 responses were retained for analysis. One response was excluded due to inconsistencies in the recorded answers, which could potentially disrupt the results. The analysis is based mostly on descriptive statistics, including frequencies, percentages and mean values as well as selected cross-group comparisons.

Since the variables are many to compare and each one effects on its way the result of this research, the analysis below will take place in several sections, starting from more general groups like the demographic group or of the professional characteristics group and then sections with more focus on each factor will take place.

The sections with more focus on factors like the overall evaluation of the profession, the satisfaction of the remuneration or the perceived difficulty of the profession provide a better and more rich on information picture about the factors that effect mostly the shortage in heavy-duty truck drivers but still because of the results complexity, a further analysis will be needed.

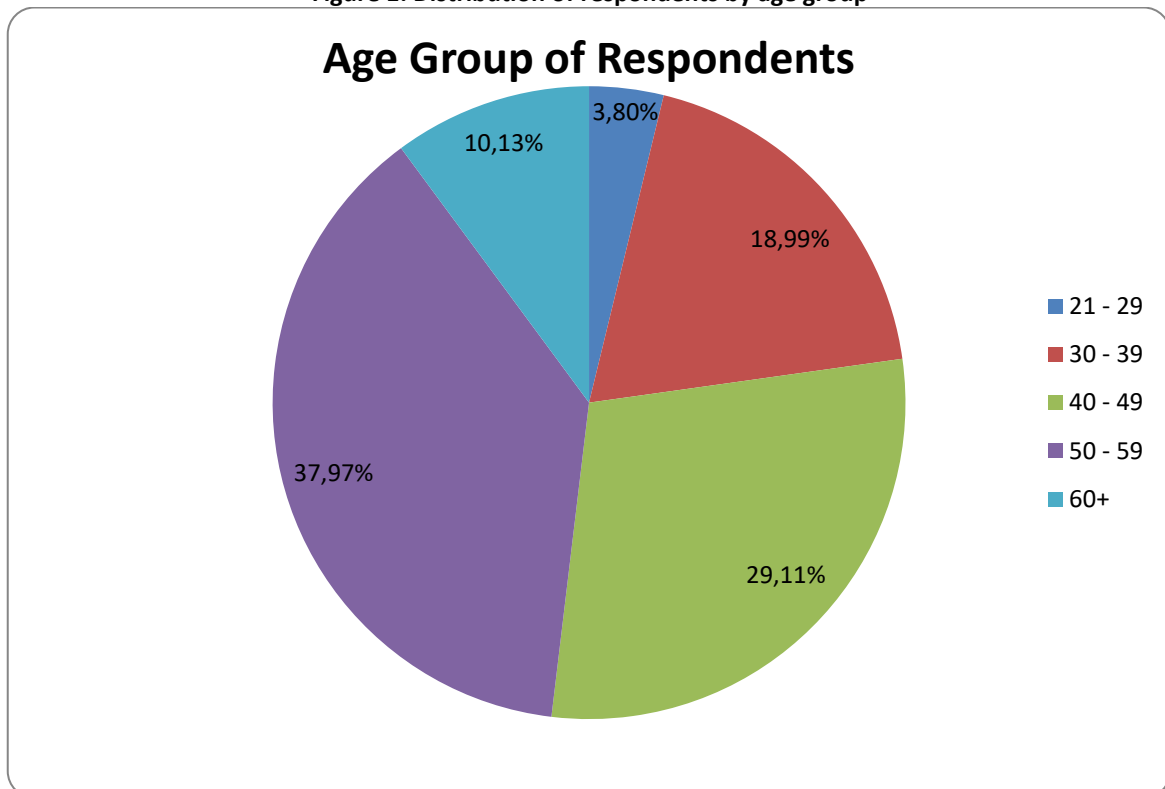
At this point and to conclude with the analysis, selected subgroup comparisons are examined in order to identify differences across types of transport activities and age groups. This will provide a clearer view about the causes of the problem and will help to exclude factors that may seem logical and easy to interpret as the problem but indeed at many cases aren't that important.

This questionnaire couldn't examine a specific type of road transportation or a specific age group. On one hand the simplest explanation is that the lack of heavy-duty drivers meets all over Europe and in all types of heavy-duty transportation and age groups and not just in one. Thus, despite all this great complexity of interpretation, this dissertation aims to help explain

a major European and not only problem, through the analysis of real and specialized factors and not simply by trying to explain the larger groups of drivers without any categorization. It is clear that in every research an average of a group is examined but as many other professions, this one also has its “bad” jobs and its “good”. For a driver a good one may be considered a job in which there are only 8 hours of driving within the day, for example from a port to the nearest city and then again the same, or a job in which the daily rest will be definitely at home or more that anyone finds willingly to work. This dissertation will try to identify possible specifics of a job that make it possible to drivers willing to work and to characterize factors that shape each type of transportation.

4.2 Sample characteristics

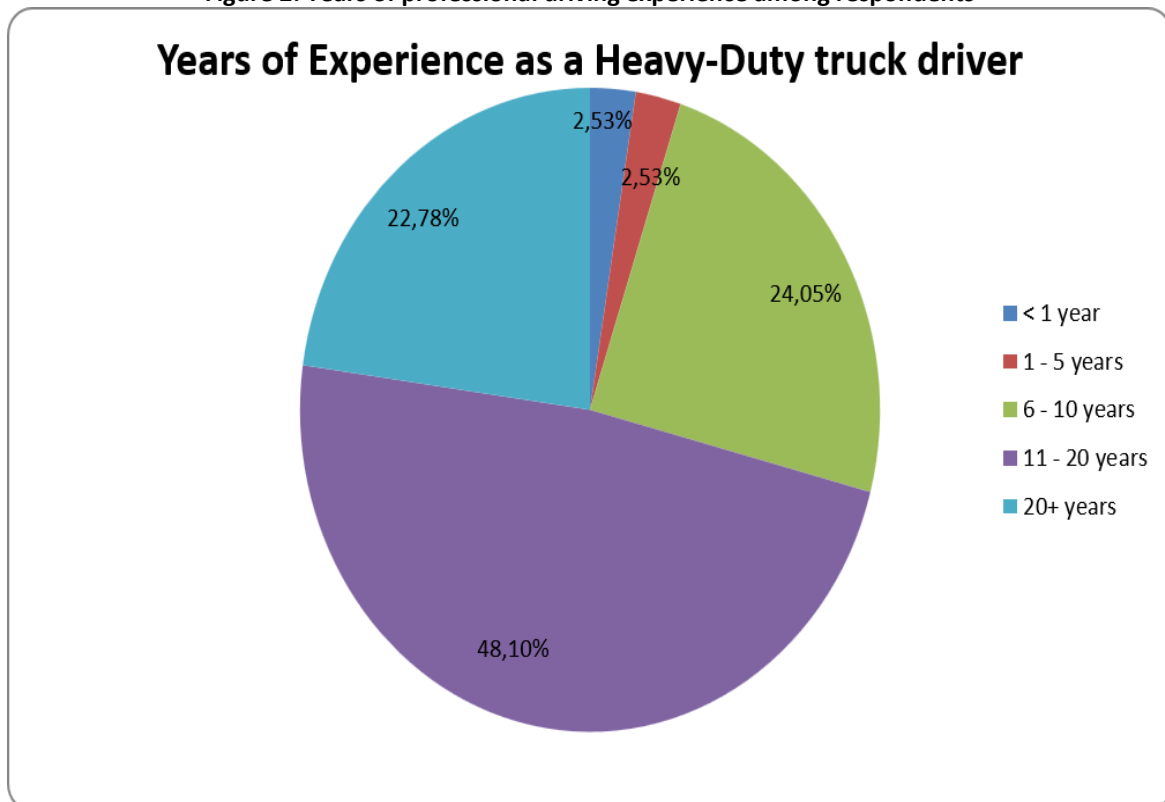
Figure 1: Distribution of respondents by age group



The demographic composition comes to provide an important insight into the structure of the current workforce in the road transportation and to confirm all those that were mentioned in previous chapters. As observed in the above Figure 1: Distribution of respondents by age group, the largest proportion of respondents belongs to the 50-59 age group, followed by those aged between 40 and 49. On the other hand, the participation of younger individuals, particularly those under the age of 30 is extremely limited.

This distribution comes to confirm all the previously mentioned studies and comes to strengthen the imbalance between young and old generation of drivers. The low representation of younger drivers suggests that the industry in the near future will face great problems and lack of human resources. Beyond this, it is visible that the attractiveness of the profession faces challenges that affect the general image of the profession among younger generations, which comes to support the future problems of lack of labour.

Figure 2: Years of professional driving experience among respondents



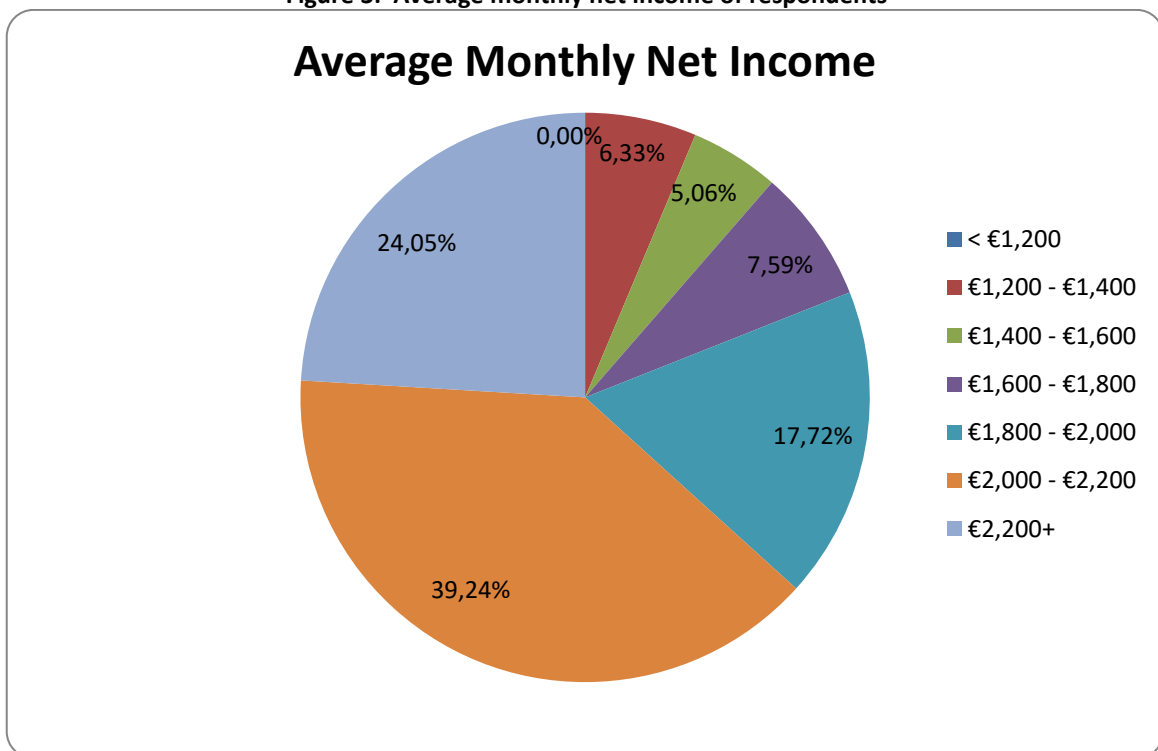
Another pattern that is observed and supports the argument that the inflow of younger drivers in the profession is quite low, is the extensive driving experience among the respondents. This pattern is also reflected in Figure 2: Years of professional driving experience among respondents, which presents the distribution of years of experience among respondents, with a great number of them reporting more than 20 years of experience, the questionnaire provides an indication of lack of new entrants' inflow into the profession. The current workforce in its majority consists of long-established professionals who have remained in the sector for a considerable period of time and on its minority from drivers that have less than 10 years of experience. Although this as an index on its own doesn't prove that there is lack of resources, it provides another view into the

general shortage of heavy-duty truck drivers and tries to explain a factor that contributes to the explanation of the problem.

In terms of employment status, the sample is composed on its majority by company-employed drivers and on its very small minority by self-employed drivers. This suggests that the findings primarily reflect the perspectives of drivers operating within structured organizational environments with what this entails in terms of obligations towards employers but also reduced responsibilities in relation to a company's obligations towards third parties.

Regarding the nature of transport activity, most respondents operate within Greece while a smaller proportion of them is involved in international transportation. This distinction is particularly relevant for later analysis as working conditions and operational requirements may differ between domestic and international transport.

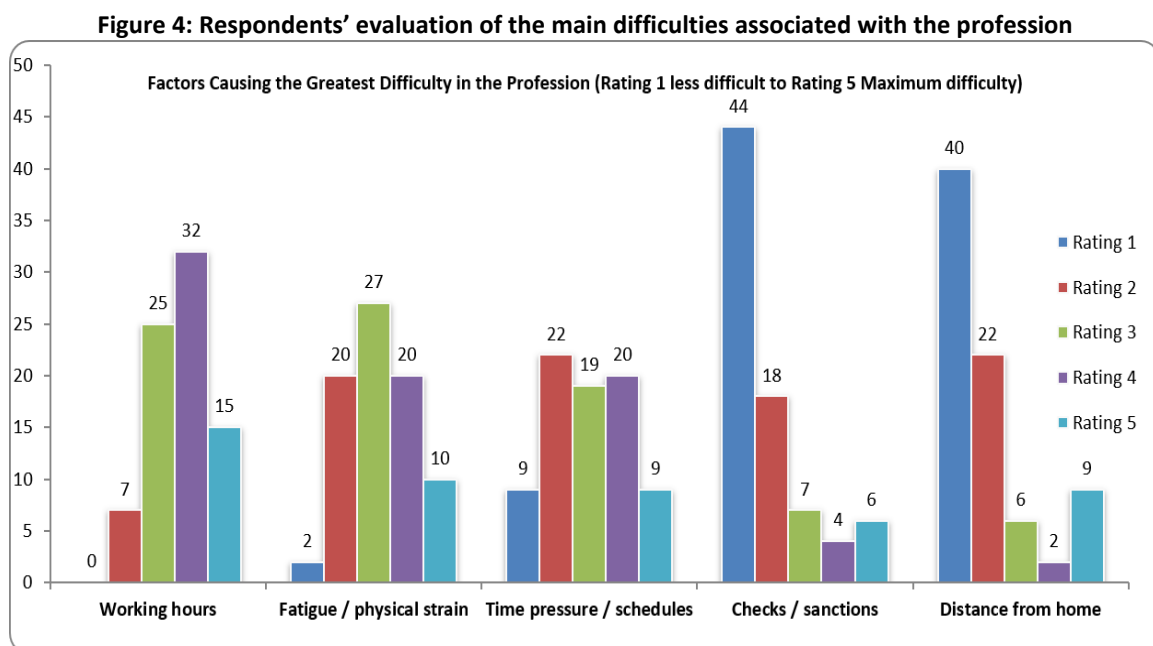
Figure 3: Average monthly net income of respondents



Finally, the remuneration levels as shown in Figure 3: Average monthly net income of respondents, indicates that a significant proportion of drivers, earn salaries more than the average salary of an average employee in Greece and way more than the basic legal salary set by the state. However, in the following sections it will be pointed that remuneration alone does not appear to fully explain the shortage of drivers, suggesting that there are other factors that play a more important role in this shortage this dissertation discusses.

Something that supports that argument, is that lack of heavy-duty truck drivers is a problem of more developed European states as well, in which both the average salaries of a common employee as the average salaries of a heavy-duty truck driver are higher than the ones in Greece. This supports the argument that this new generation needs something more than just remuneration. This dissertation will not proceed with assumptions for the reasons why, but will characterize those general other needs as other factors, since to determine those factors and to avoid speculations, another dissertation would be needed.

4.3 Perceived difficulty of the profession



The analysis of the perceived difficulty of the profession reveals important insights into the daily challenges faced by heavy-duty truck drivers. Respondents were asked to evaluate through some Likert-scale questions, several aspects of their profession's difficulties, which allows a further comparison of different factors with relative intensity. The finding is clearly illustrated in Figure 4: Respondents' evaluation of the main difficulties associated with the profession, where working hours receive the highest average rating among all examined factors. Long and irregular schedules appear to impose significant pressure on drivers, requiring their constant attention both mentally and physically over long period of time. This finding highlights the operational intensity of road-transport and proves that time-related demands represent a core challenge within the profession. Something that should be clarified at this point because it will come to refute

the fines part later, is that drivers do not consider working hours only to be actual driving hours, but anything that has to do with the vehicle. The loading process, the part of the crews that usually takes place before or after a delivery and not, for example, during their leave period, even the legally required eight-hours driving breaks they must take, are considered working hours for them for the obvious reason that all of this takes place outside their home.

To support that, fatigue and physical strain also receive high scores, indicating that the profession is physically demanding and may have long-term effects on drivers with their health and well-being. For someone outside the industry the driving part contributes only into mental fatigue but considering all the previously mentioned tasks a driver is responsible for, the physical fatigue part is explained.

Time pressure to delivery schedules is another factor that contributes to the difficulty of the job, although it appears to be slightly less significant than working hours and physical fatigue. This suggests that while deadlines are important, are not the primary source of pressure compared to the overall workload and this can be explained by the fact that as in the majority employees in companies, the drivers don't have the same stress as owners or companies when it comes to negative consequences from customers for any delays.

Even more less significant are factors like regulatory controls and sanction. Employee drivers don't consider potential fines as a challenge of the profession and this may have to do with the fact that lack of human resources is widespread in the industry and this provides a sense of confidence to active drivers. Companies are now being asked to cover fines even when the drivers are solely at fault, so as not to lead employees to resign and be the first to lose transport work.

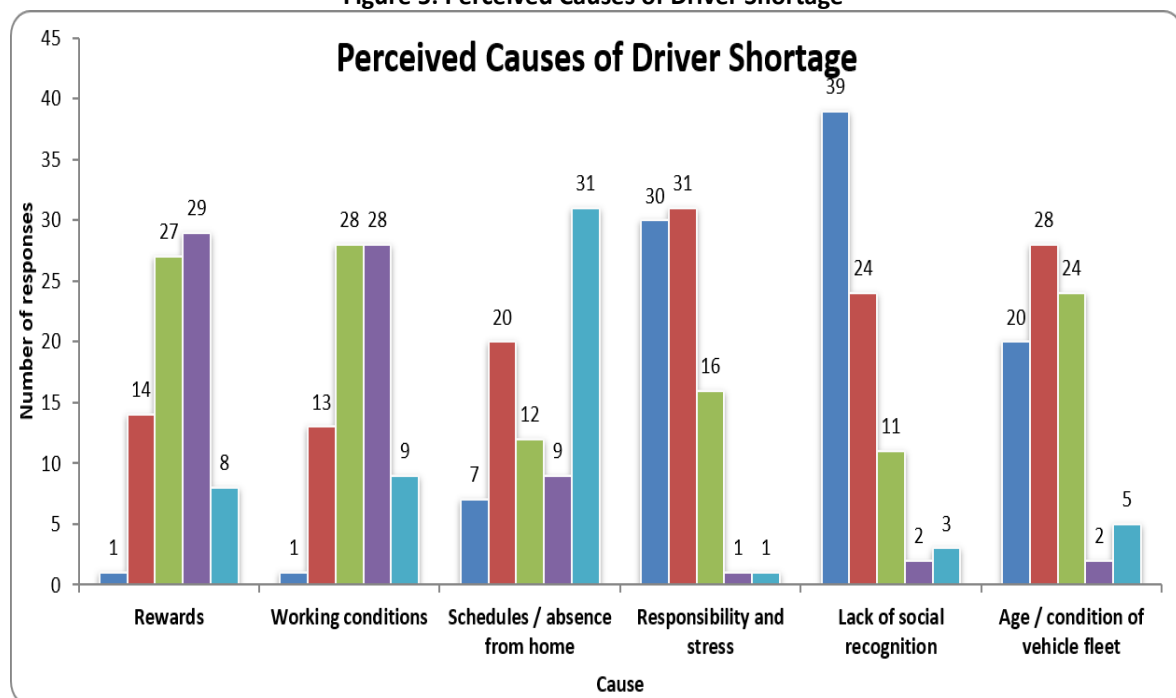
Similarly, the distance from home, although relevant, appears to be less critical compared to other factors. This could be in contrast to the long working hours thus long distances from home, but if examined carefully, due to the fact that the majority of the respondents are more than ten years in the profession and have adapted to this situation. So even that this factor that may not seem to bother drivers, in reality contradicts so much the new generation that desires a balance between work and life that makes this neutrality in the factor perhaps the greatest difficulty of acceptance for the younger generation of people who will be called upon to choose the profession. In essence, the profession does not call them to get tired but to be permanently away from their home.

Overall, the results suggest that the profession is perceived as demanding mainly due to its operational characteristics, rather than external constraints. This clarification is important because it indicates that the core challenges are embedded within the structure of the industry and work itself.

4.4 Perceived causes of the driver shortages

The analysis of the perceived causes of the driver shortage represents one of the most important components of this study. Respondents were asked to evaluate the relative importance of several potential factors contributing to the difficulty in recruiting new heavy-duty truck drivers. The importance of this specific question is considered great because the difficulties of finding new drivers cannot be examined if the opinion of the indirect "sellers" of the jobs is not also assessed. Existing drivers are the ones who shape the reputation of the profession. Regardless of the companies' efforts to attract new drivers with various benefits, the view of active drivers regarding the profession is what indirectly allows young people to enter the industry.

Figure 5: Perceived Causes of Driver Shortage



The findings at Figure 5: Perceived causes of driver shortage, confirm again that the most significant factor is the nature of the profession. The extended absence from home, the irregular and long working hours are some of the factors that shape the attractiveness of the profession and highlight the importance of lifestyle considerations in shaping opinions.

The inability to maintain a stable personal and family life appears to be a major deterrent for potential entrants.

Working conditions are also identified as a key factor. Physical demands, working environment and the overall intensity of daily operations shape a perception for the profession as a challenging one not only physically but also psychologically.

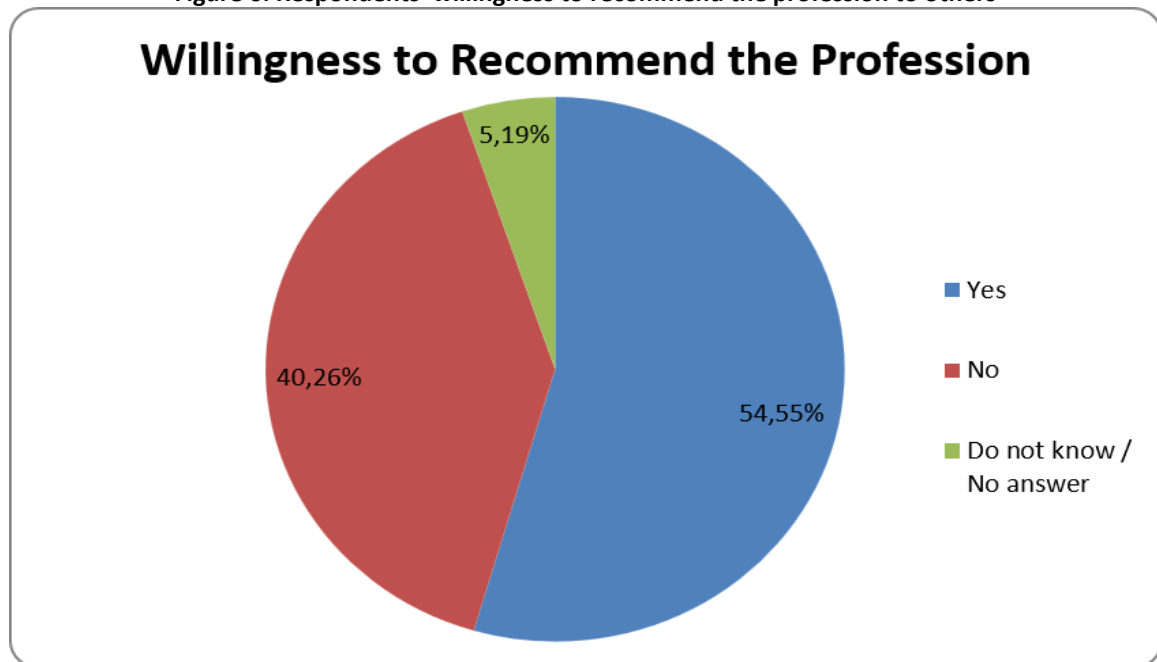
On the other hand, even if remuneration is considered important, it does not dominate the results. Mostly non-economic considerations drive the shortage of heavy-duty truck drivers rather than economic ones and maybe this is a result of a relative homogeneity of salaries between the respondents. This homogeneity points out that the respondents are aware of the market and they know that there won't be great differences between companies regarding the offered salaries and this is why they have as granted on their minds.

Continuing with the less important factors, the questionnaire pointed out that responsibility, stress, social recognition and the condition of the vehicle fleet appear to be less influential. While those elements contribute to the overall perception about the profession, they do not seem to represent the primary drivers of the shortage. Again, although, this is a perception of active drivers who at the same time shape their personal opinions and then advertise them from the perspective of an employee and not from an owner's one as the majority of the respondents are employees in transport companies.

The overall pattern of responses suggests that the heavy-duty driver shortage is a multidimensional problem, and it cannot be based on a single dominant cause. The active drivers perception about the shortage is based mostly on working conditions and less on economic factors and this comes from their personal experience. Something that has to be clarified is that the answers provided in this question didn't come from contacted research that every respondent has made, but from their own experience and perception.

4.5 Professional satisfaction and career outlook

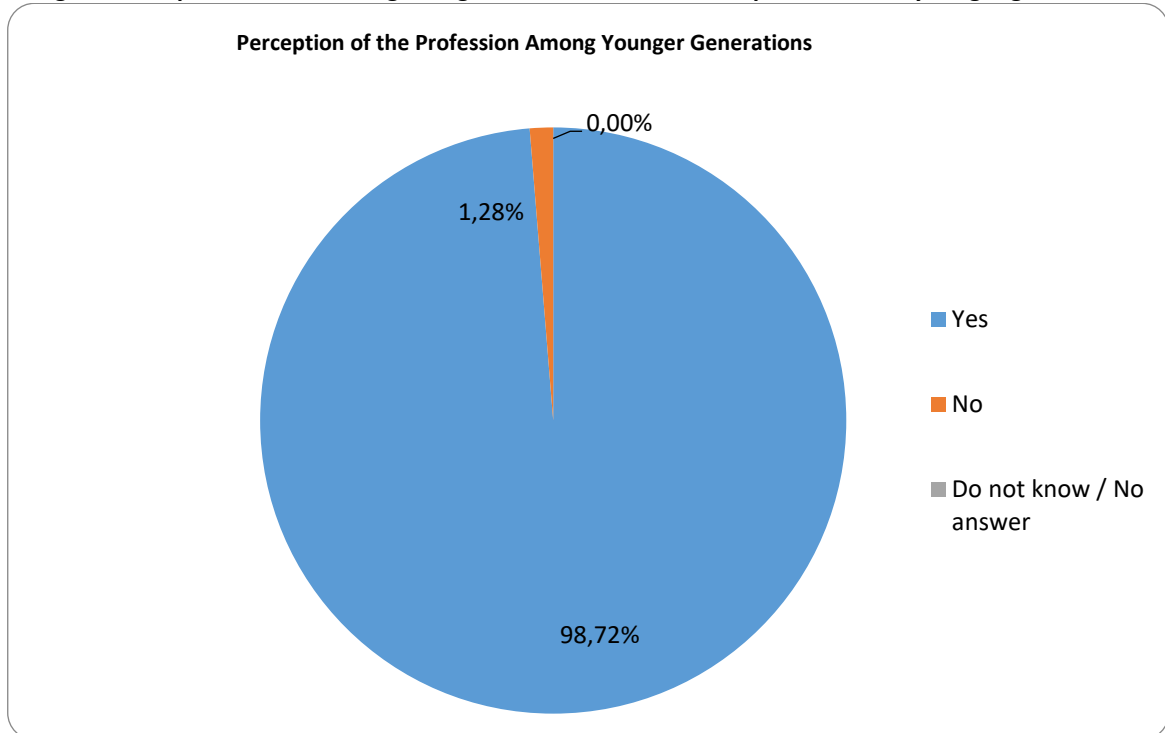
Figure 6: Respondents' willingness to recommend the profession to others



Those findings provide valuable insight into how drivers perceive the profession in broader terms. Despite the challenges identified, as illustrated in Figure 6: Respondents' willingness to recommend the profession to others, a significant proportion of respondents indicate that they would still recommend the profession to others. This suggests that although demanding, the profession retains certain positive characteristics that are recognized by those currently employed in the sector. On the other hand, those currently working in the industry, as mentioned in previous paragraphs, are mostly between the ages of 50 and 59. This in itself can also give weight to the dimension of whether the new generation maintains the same perceptions as people in this age range.

This is reinforced by the next finding as showed in Figure 7: Respondents' views regarding the attractiveness of the profession for younger generations, in which it is observed that there is a universal agreement that the profession has become less attractive to younger generations. This finding is particularly striking and represents one of the strongest results of the analysis. It reflects a widespread perception that the profession is no longer aligned with the expectations and priorities of younger people entering the job market.

Figure 7: Respondents' views regarding the attractiveness of the profession for younger generations



In terms of future intentions, the majority of respondents state that they plan to remain in the profession over the next five years (as can be seen in Appendix Figure 9: Respondents' intention to remain in the profession over the next five years), something that on one hand gives a sense of stability presented in the profession but on the other hand, due to large proportion of old people that are currently active, gives a sense of necessity of staying and not of choice.

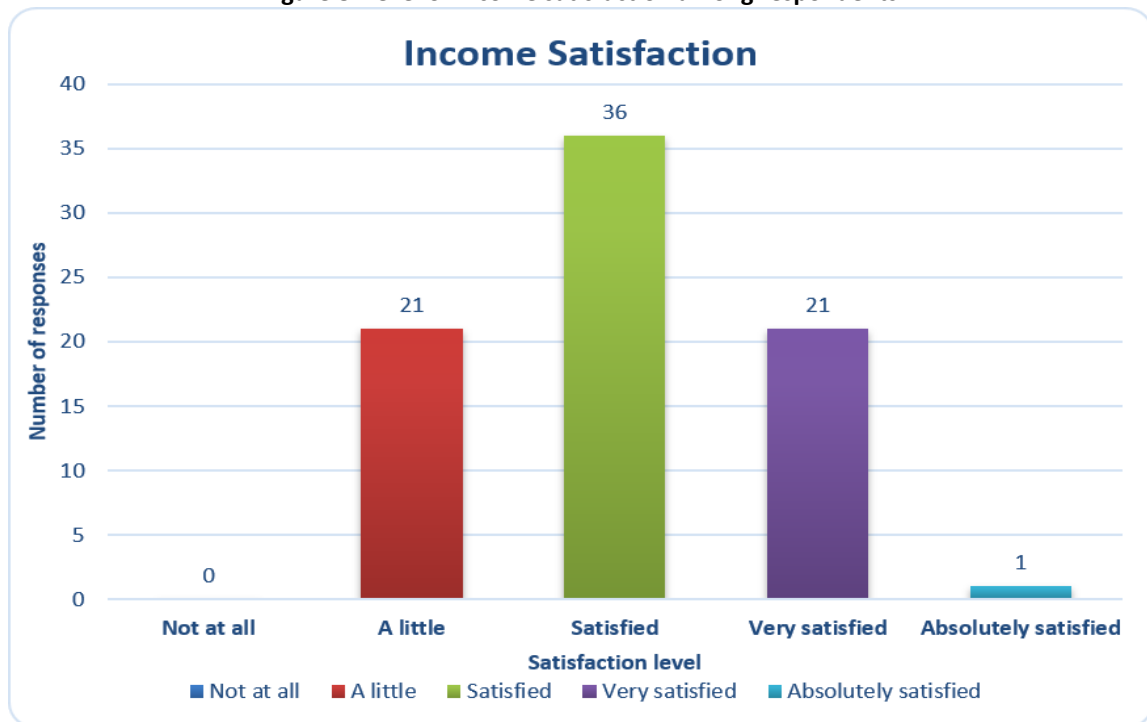
Something worth pointing out is the fact that even if more than 75% of the respondents are more than 30 years old, more than 23% of the total answers report experience from 6 to 10 years. This shows that somewhere along the way, the profession was considered a profession of necessity and not a career. In Greece, where having the necessary license entitles you to drive a heavy vehicle from the age of 21, it seems that in many cases the choice of the driving profession is made out of a need to make a living and not by a choice for a career on this industry.

Another thing that contradicts the general perception of the profession among most young people is the remuneration aspect. In order to give this the dimension, it deserves, we must enter from the perspective of a young person and analyze the messages we receive from the market regarding the exhaustion that the profession offers in combination with a mediocre aftertaste of salary satisfaction. This provides less motivation for young people to enter the profession due to the fact that this generation grow up, at least in Greece, by

hearing rumors that the profession of the heavy-duty truck driver was from the highest paid professions in the country for many years until the year 2009 when the when the profession ceased to be closed as the taxi profession is today, but with certain laws it opened up allowing the development of competition. As is known, as we tend to perfect competition, profit tends to zero. Something similar happened in this sector, essentially depriving it of one of its strong advantages in approaching a new world.

This also can be supported by the income satisfaction chart at Figure 8: Level of income satisfaction among respondents, in which as observed the majority of the drivers are simply satisfied by their remuneration and not thrilled about it. Combining that with the fact that the majority of the drivers are employees and not owners, someone can understand that because the profession is on perfect competition, even if the owners deal with the lack of heavy-duty truck drivers, they can not provide big salaries because the nowadays income isn't as it used to be.

Figure 8: Level of income satisfaction among respondents



The combination of high retention among existing drivers and low attractiveness for new entrants suggests that the shortage problem is likely to intensify over time, particularly as older drivers approach retirement.

4.6 Cross group analysis

To further explore the findings, selected comparisons were made across different groups of respondents in an effort to understand better if a specific group formed this unattractive view about the heavy-duty truck driver or if it is a combination of them all.

Starting with age differences between older and younger drivers, which is the main suspect for the drivers shortages, we observe that younger respondents tend to express lower satisfaction with remuneration and greater concern regarding work-life balance. This confirms that younger drivers have different expectations from the profession, placing greater emphasis on lifestyle considerations. This, if analyzed further, even if the group of 50-59 years old drivers is excluded, all the rest of the respondents are almost at the same levels of salaries. This points out that the level of salaries plays a significant role in the beliefs of younger generations since the rumor for the profession is that it pays better than the rest of the market but sacrifices more from your personal life. The real question here is whether this new generation is aware that balancing your work-life time will eventually reduce the remuneration packages, at this specific profession or not and when it does, if this new generation will be willing to work for this industry.

This comes to be supported by the fact that older drivers report higher levels of physical fatigue and thus, the rumor that is spread is that it is a tiring profession, taking the rewards they receive for granted, while in reality the truth is that they are simply reporting the fatigue of the profession at this time, not as a profession that suddenly became difficult but as an accumulated fatigue from their years of service.

In any case these findings support the argument that generational differences play a significant role in shaping the future of the profession. The gap between the expectations of younger drivers and the realities of the job, probably will contribute on the ongoing difficulty in attracting new drivers.

Even if differences are also observed between drivers engaged in domestic and international transport, due to the fact that the sample is low the result should be interpreted with caution. Respondents involved in international operation appear to demonstrate a higher level of intention to remain to the profession rather than domestic ones.

Another comparison that can be made with type of transport activity is that among the respondents there are 4 types of transportation with the majority of the drivers delivering

freight packed goods and the other 3 minorities sharing 30% of the answers, transferring dry packed goods, liquid foodstuff and fresh milk. For those 4 types of transportation, more than 60% of the respondents receive salaries between 2.000€ and 2.200€ monthly with a significant proportion out of this percentage receiving more than 2.200€. An average based on the distribution of the questionnaire of 2.050€ to 2.150€, remuneration is relatively competitive within the Greek labour market of heavy-duty truck drivers. This comes to support the argument that the new generation of drivers don't seek only financial security and wellness but mostly work -life balance.

4.6.1 Cross-tabulation analysis – chi-square tests

Cross-tabulation analysis was conducted to investigate further any potential relationships between demographic characteristics, professional perceptions and long-term commitment to the profession. A deeper understanding of the factors that influence the drivers and the overall attractiveness of the profession is achieved through this analysis. The multidimensional problem of the shortage of heavy-duty truck drivers in Greece is supported from the provided findings.

Age group and intention to remain in the profession.

Table 2 presents the relationship between age groups and respondents with their intention on remaining in the profession over the next five years. The results indicate that older drivers present significantly stronger retention intention compared to younger drivers. Even if the 60+ category of drivers isn't valid due to the fact that these people are close to retirement and thus leaving the profession isn't a choice, the drivers aged between 50-59 reported a positive intention to remain in the profession, while on the other hand younger drivers displayed higher levels of uncertainty and negative responses.

Despite the professions difficulties, the findings suggest that older drivers appear more professionally established and committed on remaining in the profession than younger ones. This reinforces the argument that generational differences and workforce ageing represent some of the major challenges for the long-term sustainability of the road transport industry.

A chi-square test of independence was conducted to examine the statistical significance of the relationship between the two variables. The null hypothesis stated that no statistically

significant relationship exists between age group and professional commitment, while the alternative hypothesis indicated that such a relationship exists. The analysis revealed a statistically significant relationship between the two variables with p-value lower than 0.05 (7.39E-12). Therefore, the findings indicate that age significantly influences respondents intention to remain in the profession over the next five years. Younger drivers appear to be more uncertain regarding their long-term professional future within this sector. This finding reinforces the argument of the current study regarding the unattractiveness of the profession among younger drivers.

It should be noted that certain frequencies were below the commonly recommended threshold due to the sample size and the uneven distribution of responses across categories. However, the analysis was considered appropriate for explanatory and interpretive purposes within the context of the present study.

Work-Life Balance and Intention to Remain in the Profession

In Table 2 the table of work-life balance represents the answers that were given by the respondents regarding the effect that their work has on their personal lives. It was a scale response question in which for the less affection the answer was 1 to maximum affection in which the answer was 5.

The distribution of responses does not appear as would be expected, meaning that if someone is too affected by his work does not necessarily intend to leave the profession in the next five years. This observation reinforces the complexity of the driver shortage problem and highlights the existence of multiple interacting factors influencing long-term professional commitment.

Even if the answer is obvious, a chi-square test of independence was conducted to examine the statistical significance of the relationship between the variables. Although the relationship appears to be meaningful, the statistical analysis did not reveal significance at conventional levels ($p = 0.247$). Thus, the null hypothesis could not be rejected, suggesting that work-life balance alone may not determine heavy-duty truck drivers intention to remain in the profession.

Income Satisfaction and Recommendation of the Profession

Something last that will be examined through Table2, is the relationship between income satisfaction and willingness to recommend the profession to other individuals. The analysis shows that respondents reporting higher levels of remuneration satisfaction are generally more likely to recommend the profession. However, negative responses remain present even among participants expressing relatively positive evaluations regarding salary levels. Typical example of this, is the fact that drivers as observed with moderate salary satisfaction (level 3) still strongly avoid recommending the profession. Salary is “acceptable” but attractiveness still weak.

Again, another indicator seems to not be enough to justify the labour shortage but on the other hand seems to influence professional perception to some extent. The chi-square test of independence that was conducted the statistical significance of the relationship between remuneration satisfaction and willingness to recommend the profession revealed a significant relationship between the two variables ($p < 0.001$). Therefore, the null hypothesis was rejected, indicating that remuneration satisfaction significantly influences respondents’ perceptions regarding the attractiveness of the profession. On the other hand, the persistence of hesitation towards recommending the profession, even among moderate satisfied drivers, supports even more the fact of this multidimensional problem.

4.6.2 Logistic regression analysis

To further investigate the factors influencing the attractiveness of the profession, a binary logistic regression analysis was conducted using respondents’ willingness to recommend the profession to other individuals as the dependent variable. Professional perception and recommendation behavior can be affected by other factors and thus this analysis aims to prove in what level this can be done.

The dependent variable was coded as binary, where “1” represented respondents willing to recommend the profession and as “0” the unwillingness to recommend it. The independent variables as can be seen in Table3 included age group, work-life balance impact, income satisfaction and intention to remain in the profession for the next five years. Those were selected due to their theoretical relevance to labour shortage literature as well as the findings of the descriptive and cross-tabulation analyses conducted previously.

The analysis produced a significance F value of 3.25404E-08 which indicates a statistically significant proportion of the variation observed in respondents' willingness to recommend the profession. Additionally, 41,8% of the variation in professional recommendation behavior can be explained by the variables included in the model. This percentage reinforces once more the complexity of the problem.

Analyzing per variable it is observed that income satisfaction is one of the strongest and statistically significant predictors of respondents' willingness to recommend the profession compared to other individuals with $p < 0.001$. Work-life balance also showed a significant relationship to recommend the profession ($p = 0.012$). More specifically, respondents reporting stronger negative impacts of the profession on personal and family life appeared less willing to recommend the profession to others. Again, this indicator shows that the attractiveness of the profession is affected by the lifestyle-related pressures that exist in this occupation. Age group was also found to demonstrate a statistically significant relationship with recommendation behavior to be at ($p = 0.031$). This finding is particularly important for the interpretation of the labour shortage problem, as it indicates that although experienced drivers often remain within the profession, they may simultaneously hold negative perceptions regarding its attractiveness for future generations. Finally, intention to remain in the profession over the next five years also emerged as a statistically significant predictor of recommendation behavior ($p = 0.004$). Even if in the previous indicator the experienced drivers (thus the older ones) are not willing to recommend it to others, this indicator shows that there is a close connection between professional satisfaction, occupational perception and long-term retention within the sector which ends up on recommending the profession.

Concluding, the analysis shows that the attractiveness of the profession which has a crucial part in the future shortage of heavy-duty truck drivers, is influenced by a combination of financial, demographic and lifestyle-related factors. Work-life balance and perception of the profession play a more crucial role compared to the remuneration satisfaction factor. These results reinforce the complexity of the problem and support the structural challenges that are currently faced by the road transport sector.

4.6.3 Assessment of model assumptions

Before conducting a predictive interpretation of the regression model, it is important to assess the extent to which the main assumptions of the model are satisfied.

Assumption 1: Linearity

In the present study, the independent variables were measured using ordinal scales representing age categories, work-life balance perceptions, remaining to the profession willingness and income satisfaction levels. Although these variables are categorical in nature, they were coded numerically in to examine general trends and relationships. Therefore, the assumption of linearity should be interpreted with caution and the results viewed primarily as indicative rather than strictly causal.

Assumption 2: Independence of observations

The responses were collected from individual drivers who completed the questionnaire independently.

Assumption 3: Multicollinearity

The model assumes that the variables are not excessively correlated with each other. As can be observed from the questionnaire, the questions differ between them and there is no association between these independent variables.

Multicollinearity was assessed by examining the theoretical independence of the explanatory variables. Since age, income satisfaction, work-life balance and intention to remain represent distinct conceptual dimension, severe multicollinearity was not expected. Due to limited sample, VIF diagnostic check was not performed.

Assumption 4: Normality and Homoscedasticity of Residuals

The regression model assumes that residuals are approximately normally distributed and exhibit constant variance. Due to small sample size ($n = 79$), these assumptions may not be fully satisfied. Consequently, the results should be interpreted primarily as exploratory and explanatory rather than as precise predictive estimates.

Assumption 5: Sample size

The model was calculated using 79 observations. Despite it's size, it is considered sufficient for explanatory binary logistic regression analysis involving a limited

number of predictors. Nevertheless, greater samples would provide a more reliable prediction model, most likely without any need for this kind of assumption.

4.6.4 Predictive interpretation of the regression model

This model provides a useful view regarding the factors that increase or decrease the likelihood that a professional driver will recommend the profession to other individuals. Since recommendation behavior may be considered an indirect indicator of professional attractiveness, the model contributes to understanding the conditions under which the profession is perceived more positively by active and potential future drivers. The preventive interpretation of the model is based on the estimated logistic coefficients and their statistical significance, allowing an assessment of how each independent variable affects the probability of recommending the profession.

The results suggest that income satisfaction represents one of the strongest predictors of recommendation behavior. Those who receive higher salaries tend to recommend more the profession. Work-life balance also demonstrates a statistically significant influence on recommendation behavior. Respondents reporting greater disruption of their personal and family life appeared less willing to recommend the profession. This observation supports the broader findings of the study, which consistently identified working conditions, fatigue and lifestyle-related pressures as important challenges faced by professional drivers. The negative coefficient associated with age, suggests that older respondents appear less likely to recommend the profession compared to younger drivers. This from one hand shows that older drivers are more aware of the challenges a new one might face and this is why they don't recommend it and on the other hand the number of young driver's is too small to justify the conclusion that they recommend the profession. Furthermore, respondents expressing a stronger intention to remain in the profession over the next five years were significantly more likely to recommend the profession to others. This relationship suggests that long-term professional commitment and positive occupational perception are closely interconnected. Drivers who intend to continue working within the sector generally appear more confident regarding the profession's value and future prospects.

Based on these findings, the model allows the development of professional profiles. For example, a driver reporting high income satisfaction, moderate work-life balance and a

positive intention to remain in the profession would be expected to demonstrate a relatively high probability of recommending the profession to others. Conversely, a driver experiencing significant work-life balance difficulties, lower satisfaction with remuneration and uncertainty regarding future professional commitment would be expected to demonstrate a considerably lower probability of recommending the profession. Again, given the limited number of observations and the explanatory nature of the analysis, the predictive value of the model should be viewed as supportive evidence rather than as a definitive forecasting tool.

The attractiveness of the profession as an indicator of the potential future lack of heavy-duty truck drivers is a combination of financial, occupational and lifestyle-related factors. To improve the future recruitment potential, a combination of improvements and changes must be applied.

4.7 Summary of findings

The empirical findings of this study provide a comprehensive overview of the factors influencing the shortage of heavy-duty truck drivers in Greece.

First, the profession is characterized by an ageing workforce just like in the rest of European countries, with limited participation from younger drivers. Second, the most demanding aspects of the job related to working hours, physical fatigue and operational pressure. Third the main causes of the shortage are linked to lifestyle constraints, working conditions and to a no longer attractive remuneration package for the amount of job asked. The current workforce on the other hand remains relatively stable on the short term but this can't provide any optimistic view of the profession to the younger generation. Finally, the differences across age groups and types of transport activity highlight the complexity of the issue and suggest that the shortage cannot be addressed through a single solution if the causes of this shortage are not clarified.

Overall, the results indicate that the heavy-duty truck driver shortage is a structural and multifactorial problem that requires a comprehensive understanding of both economic and non-economic factors with the gravity of the problem up until now to be upon the non-economic factors giving the fact that the new generation invests a lot to the work-life balance and realizing as the time passes that with this profession, no matter the transported load, work-life balance is considered a luxury.

5. Discussion

5.1 Introduction

This chapter discusses and interprets the findings presented at the previous sections, aiming to provide a deeper understanding of the factors that contribute to the shortage of heavy-duty truck drivers in Greece. Instead of mentioning again the results, this chapter will focus on analyzing their meaning and implications within the context of road transport sector.

This chapter will support the findings or relative literature mentioned in the second chapter through presented similarities and additional insights. Additionally, this chapter will assist on finding potential new dimensions of the problem and thus will conclude if finally aligns completely with the findings of other literature or if due to geographic location of the country are other patterns also.

By discussing all that, this chapter aims to interpret the significance of drivers in the context of the Greek transport industry and if autonomous driving solutions like the ones supported in states like Sweden, China and Japan would contribute to this massive problem.

5.2 Interpretation of Key findings

5.2.1 Working conditions and lifestyle constraints

One of the most important findings from the provided answers is that dominant role for the attractiveness of the professions is the one of working conditions and lifestyle constraints. The most demanding aspect of the profession is the working hours, followed by physical fatigue and operational pressure. A factor of not such gravity, if be read without an explanation from the answers, is the one of absence from home, but if this factor is translated to the logic of a young man, means that maybe this is of the same gravity as the one of working hours. And the translation is needed because as mentioned before, current active driver's logic is that leaving inside the truck is normal as there are many routes to cover as much money to earn.

As mentioned in previous chapters, for this profession long working hours mean automatically long absences from home. This suggests that the profession is not only

physically demanding but also places considerable strain on drivers' personal and family life. Due to the fact that younger generations seek a more balanced life-work routine, those prolonged periods away from home may be perceived to be incompatible with the expectations of potential heavy-duty truck drivers.

This observation is consistent with what was discussed at the second chapter in which work-life balance was identified as key determinant of job attractiveness in the road transport sector. This is something that complies also with any other job, since fatigue in general plays crucial role not only in the attractiveness of the profession but also on how positively advertised the profession is and how long an employee stays in it.

Those findings are particularly significant. If the active drivers support and advertise that the profession's shortage is because it is quite tiring and provides less family time than any other rather than any purely economic factor, then any solution that will focus on financial incentives are unlikely to be sufficient. Instead, an overall job design may be required to improve the attractiveness of the profession.

5.2.2 The role of remuneration

Something that will come in contrast to any possible assumption that will be related to the factors of lack of heavy-duty truck drivers, is that indeed the remuneration packages are not that important and do not appear to be the dominant factor explaining the shortage of drivers. The majority of respondents reported income levels within a relatively competitive range, with a significant proportion earning between 2.000€ and 2.200€ per month and a considerable level exceeds this level.

Despite these income levels, the shortage of drivers persists, suggesting that financial incentives alone are insufficient to attract new entrants into the profession. The results of the questionnaire come to refute both the reputation that exists in the industry regarding the lack of drivers with the responsibility to bear their financial earnings, as well as any feeling that may be formed in anyone outside the industry regarding the normalization of the difficulties of the profession are reduced in the eyes of drivers because earning are increasing significantly.

The literature highlights the increasing importance of non-monetary aspects of employment, such as work-life balance, job and personal satisfaction and overall quality of working conditions. Previous studies have shown that even when wages are relatively

attractive, individuals may still avoid or leave professions like that because they are feeling more stressed and physically givers and this has effects on their life.

In general, if policy makers or companies don't change the way they operate, this dissertation provides an explanation for the limited effectiveness of current approaches. In the whole dissertation, both at the literature part and also in the responses part, we note that even explaining the difficulties of the profession is complicated and none of the explanations provided mentions large increases in financial rewards as the only means of attracting labour.

5.2.3 Ageing workforce and entry barriers

Another important finding that comes up from the responses and reinforces the literature is the clear identification of an ageing workforce within the road transport sector. The majority of respondents belong to middle-aged and older groups, while the participation of younger drivers remains extremely limited. Additionally to that, most respondents report long experience, which suggests that the current workforce is largely composed of individuals who have been active in the industry for quite some time.

This structure implies that the profession is not attracting sufficient numbers of new recruits to train, trust and at some point, to replace the existing workforce since the retirement period is getting near. This will result in the problem getting bigger, since older drivers gradually exit the labour market and the replacement rate will remain low. Thus, the limited presence of young people indicates that the problem is not only of presence but also future-oriented.

As mentioned before, this finding is consistent with the literature discussed in the second chapter, which identifies the ageing workforce as a key structural challenge in the transport sector. Factors such as a high training costs, licensing requirements and the demanding nature in general of the profession are often cited as barriers to entry for younger workers. It can be argued that the biggest barrier to entry into the profession seems to be the negative unintentional advertising generated by existing drivers and not so much the resources required to integrate new ones into it. It is not stated in the bibliography that the younger generations have no intention of working even in difficult jobs. The unintentionally mentioned tries to emphasize an effort by the older generations of drivers who have families that now their own faith in the profession has been shattered

so they unintentionally do not advertise it positively. The thesis could support this specific argument if the questionnaire included, instead of the question “Would you recommend someone you know to pursue the profession?”, the “Would you recommend your children to pursue the profession of driving?”, but it would be considered a question that guides to a specific answer. For this reason, a more neutral question was chosen, which from the answers given fully supports the argument that existing drivers do not want their children to engage in the profession.

The implications of this demographic imbalance are particularly significant. Addressing the driver shortage requires not only retaining the existing workforce but also attracting a new generation of heavy-duty truck drivers. Without targeted interventions aim at reducing entry barriers and improving the attractiveness of the profession, the labour supply is likely to decline further in the long term.

5.2.4 Generational differences

Empirically, the profession no longer aligns with the expectations of younger generations. This comes to be supported by the fact that from the answers provided, it seems that younger drivers are not so satisfied with their remuneration packages while at the same time place greater emphasis on the impact of the profession on personal and family life. In contrast, older drivers seem by their responses that are more stable in their professional choices and more likely to remain in the sector despite its challenges.

These differences suggest that expectations about the benefits each job offers have changed over time. Younger individuals that enter the market are biased towards the time that they spend away from home, their flexibility and their quality of life. This means that often this generation has trouble distinguishing if what they need is a better work-life balance or benefits that will make them forget this balance. It is certain that professions such as that of a driver, which require long working hours or irregular schedules and prolonged absence from home, are considered less attractive, but even in this type of profession, the generational problem observed is that young people cannot accept that in these, as in simpler professions, there is a limit to the earnings they can offer to workers. It is likely that this lack of acceptance of pay limits has led the new generation to change their work preferences. As identified in the literature also, younger generation of workers are more likely to value non-monetary aspects of employment, such as working conditions

and personal well-being. Thus, sectors that fail to adapt to these changing expectations may experience increasing difficulties in attracting new entrants.

The implication of these findings are particularly relevant for the future of the road transport sector. Traditional approaches to recruitment may no longer be sufficient in the current labour market environment. To address the driver shortage, more than economic factors must be examined and in many cases the structure of the whole industry. Transport and logistic companies to cope to that, must change the way they have functioned until now, not only in terms of the demands they had from their drivers, but also in their daily planning. Unfortunately, this profession is not something that can be done without the worker's presence and so to reduce the driver's working hours the industry must somehow dismiss him until the next eight-hour shift and at the same time be able to deliver the goods that may have final destinations. The heart of the problem the industry must solve to attract more workers is this, and this is the point where solutions that applied already in other countries can help Greece get over this problem also.

5.3 Comparison with existing literature

The findings of this study cannot by themselves conclusively prove the fact that there is lack of heavy-duty truck drivers in Greece since there was no data investigation and direct measurement about the problem of labour supply and demand on national level. Despite that, it is broadly consistent with the existing literature about the complexity and the many dimensions the problem of drivers shortages has. The empirical results align with previous research which emphasizes to the part that no single factor can fully explain the labour shortage and its imbalance of young and aged people.

More specifically, working conditions that are identified in literature as an important factor also get to be proven through the responses from the questionnaire. It is observed that long working hours, physical fatigue and irregular schedules are among the most significant factors affecting this view, as respondents consistently identified these aspects as the most demanding elements of their work and as a key contributor to the shortage of drivers. Furthermore, these indications are strong evidence and reinforce the aforementioned literature due to the fact that the respondents may fall into the general category of heavy vehicle drivers, however, all of them perform four different types of work. In all four of these types, the fatigue and working hours issues were of great

importance to drivers. This shows that studies investigating the causes of labour shortages are on the right track, regardless of the specialization of the problem.

Similarly, the findings regarding remuneration are consistent with existing research. While financial benefits are recognized as an important factor, they do not appear to be the primary driver of labour shortage. Mentioned studies in previous chapters have shown that even when salaries are relatively competitive, the profession may still struggle to attract new entrants due to its demanding nature. The results of this study come to reinforce this argument by demonstrating that relatively high income levels do not eliminate recruitment difficulties. Something that should concern the industry is the fact that based on the questionnaire, although active drivers are not dissatisfied with their salaries in the majority, they would not recommend their acquaintance to the profession. Literature therefore agrees with the study both in terms of the complexity of the problem and in terms of the fact that there is no single solution such as increasing salaries, given that those who already receive high salaries should not have these beliefs about the profession. Even if this study's results refers exclusively to Greek drivers, it is observed that the salaries provided to the drivers are higher than the one's the majority of employees in the country. This, even in proportion to the salaries provided by more developed countries than Greece, comes to reinforce the previous mentioned bibliography in this regard.

Additionally to this, the ageing workforce is also confirmed though the questionnaire provided to volunteers which comes to support all the other related literatures by providing evidences and not just theorems and intuitive views. Several studies that have shown the increasing average age of drivers and the limited participation of younger individuals can now reinforce their thesis by providing also primary data. This perspective adds depth to the understanding of the problem and allows for a more specific interpretation of the factors influencing the shortage.

Overall, the comparison between the findings of this study and the existing literature reveals a high degree of consistency while at the same time offers an additional depth through empirical evidence. The results as expected confirm that shortage of heavy-duty truck drivers is a complex issue with multiple factors affecting it.

5.4 Implications of the findings

5.4.1 Implications for transport companies

The findings of this study are of great importance for transport companies operating within the road freight sector. Given that working conditions such as long absence from home, long working hours e.t.c are the most crucial factors that influence the attractiveness of the profession, it has as a result a forced adaptation of the transport companies to those new rules. It seems that traditional operational models that rely on long working hours and constant pressure may no longer be sustainable in the current labour market environment. In particular, companies may need to focus on improving scheduling practices, allowing for more predictable working hours and reduced periods of absence from home. Those adjustments may provide a more stable labour workforce to the company with improved job satisfaction from the workers and less fatigue for them. Additionally, attention should be given to the overall working environment, including workload management and the reduction of unnecessary operational stress.

As the results indicated, it would be pointless for transport companies to invest in higher salaries since it would be insufficient to attract or retain drivers. Instead of that, companies should invest in finding ways to improve the working conditions and in making the profession more attractive than it is now. These investments mentioned could range from extra drivers to reduce the volume of existing drivers, to collaborating with another transport company to share routes and reduce working hours. Of course, all of this as long as the relevant legislation allows it.

5.4.2 Implications for policy makers

In addition to the influence that the results of the research will have on transport companies, policy makers responsible for labour, market and transportation will face the influence of those results also. The ageing workforce and the limited entrance of younger individuals indicate that targeted interventions are required to encourage entry into the profession. Problems like the reductions of barriers to entry like the minimum age limit or the costs regarding licenses and certifications will occur and will have to be faced to keep on attracting young people to the profession.

Financial support could be given to young people who would like to become businessman by owing a truck like reduction of taxes or reduced cost for fuels for some years. In

general, the state should do something both to motivate young people to get involved in the profession but also to reshape the public perception about the profession of heavy-duty truck driver.

Policy makers in general, if they want to deal effectively with the problem that may soon occur, will have to work alongside with transport and logistic companies who specialize to that and to find out ways that will reduce the fatigue of the drivers and will make again the profession of the truck driver attractive like it was at least for Greece some decades back. Furthermore, and before all that, policy makers need to consider regulatory frameworks that allow for greater flexibility while they still maintain safety standards. A balanced approach that protects drivers while also improving working conditions could contribute to the sustainability of the industry.

5.4.3 Implications for the labour market

Finally, as the results indicate, future heavy-duty truck drivers will be in their majority similar to the expectations and preferences as a normal 9-5 office worker or a simple bus driver within the city. This will have as a result, the traditional employment models to not align with current labour market trends which will be caused by the fact that even now, so more enough in the future, the profession is unattractive.

This shift in preferences will have as a result the imbalance of supply and demand of labour to grow and if no regulations shift also or if some other solutions come up, the gap between retired truck drivers and empty truck drivers positions to grow.

What the market slowly asks is adaptability. It is not a rule that all the future drivers will ask to work only for 8 hours, without worrying about the smaller salary they will receive or that all will want to sleep at their home daily, or that they will deny working at some more stressful and fatigued categories of trucks. What the results indicate is that future labour market will shape the demand side to a more adjustable and flexible one. Future drivers even if for some time will not be able to have what they wish, will be less anxious and will not try to leave the profession completely but just to change employer. Without adaptation, the sector of road transportation will continue to face structural shortages, regardless of economic conditions.

5.5 Discussion in relation to technological developments

The findings of this study can also be discussed in relation with all those recent technological developments in the transport sector and particularly the autonomous driving systems as a method of adaptation to this new era of labour market and a possible solution to the problem of shortage of heavy-duty truck drivers. Technological innovation is often presented as a potential solution to labour shortages, especially in sectors where working conditions are demanding and recruitment is difficult. In the context of road transportation, autonomous driving technologies possibly will transform the nature of the profession.

As always, based on the results of this study, it can be assumed that technological solutions may contribute to addressing some of the key challenges that are identified by the responders. Since working hours, fatigue and operational pressure were found to be the most significant factors that affect the attractiveness of the profession, the introduction of systems with partial automations could have a positive impact at the driver's fatigue. For example, partial driving automation could assist drivers during long waiting lines like the ones that can be found at customs points or even take control of the truck while on long way routes. Practices like that in a variety of vehicles are already used in more developed countries such as in China, where Qomolo brand trucks are used for operations within ports without the participation of any driver. Some of those vehicles are battery powered self-driving trucks with specific autonomy and can perform tasks under specific conditions without any need for human interference.

On the other hand, a significant factor that causes the shortage of heavy-duty truck drivers is the one of long absence from home and not just the factor of fatigue. Technology may be applied in some cases but can't eliminate this factor completely. Instead, may create new challenges, including the need for specialized skills, adaptation to new systems and possibly resistance from the workforce. Thus, a solution like the previous one may not assist particularly. For example, even if a vehicle like the previous mentioned was used by a transport company to reduce the drivers fatigue and let him/her sleep while the vehicle was crossing some miles, beginning let's say from Athens to Thessaloniki, would still be consider from the driver as also from the Greek law about occupation, as working hours and thus as absence from home.

This study doesn't investigate the type of technology that will be applied to solve part of the problem but examines the potential contribution of it as a way to allocate labour workforce from one type of transportation to another. On this way the labour shortage will be reduced because a part of those vacant job spots that there are now will be covered by autonomous vehicles. One thing that policy makers although must consider is the fact that this solution does not solve the problem. Assuming that autonomous vehicles operate in ports and drivers are distributed from ports to national freight transport does not necessarily mean that they will remain in the profession in general. For some, this sector is considered easier than others, so by forcibly transferring a driver to another mode of transport, you do not necessarily mean that you retain them. Thus, the concept of changing some laws and regulations at this sector to retain the labour workforce is independent of a possible application of autonomous driving trucks. Technology can support rather than replace broader efforts to improve the attractiveness and sustainability of the profession. Fully autonomous heavy-duty transport remains technologically and regulatorily limited in Greece at the present stage.

5.6 Summary of discussion

At this chapter were examined the empirical findings of the study and the factors that contribute to the shortage of heavy-duty truck drivers in Greece were explained. After analyzing the results from the responses given to the questionnaire, the discussion highlighted the complexity of the problem confirming that it cannot be attributed to a single cause but instead many sectors must interfere with the industry to produce some efficient results that will endure and improve the attractiveness of the profession. The analysis indicates that working conditions and work-life balance with anything this equals for younger generations, represent the most significant factors affecting the attractiveness of the profession. Physical fatigue, long journeys with many operating hours, and extended absence from home were identified as the main challenges faced by drivers. At the same time, remuneration, although important, seems that it cannot quite fix the whole problem. Incentives alone are insufficient to address the shortage of heavy-duty truck drivers and this is reinforced by the fact that the majority of the truck drivers are closing to retirement and there are limited young individuals.

Furthermore, the discussion has shown that technological developments, such as autonomous driving, may contribute to improving certain aspects of the profession, particularly by enabling transport companies into allocating active drivers from routes that can be performed from the corresponding vehicles to routes were needed. However, since this kind of solution will not solve the problem entirely, a combination of broader improvements as also laws and regulations changes, need to take place to labour market policies to have some actual results. Overall, the findings of this stud provide a strong foundation for understanding the key factors of the heavy-duty truck drivers shortage and set the basis for the conclusions and recommendations presented in the following chapter.

6. Conclusions and recommendations

6.1 Summary of findings

This study aimed to investigate and understand the main factors that affected the shortage of heavy-duty truck drivers in Greece by adding also a comparison within the findings of the responses taken from active professionals in the sector. Through the collection and analysis of primary data, the research provides valuable insights into the current state of the profession and the challenges it faces.

The analysis of the findings proved that the problem of shortage is a complex and multidimensional issue. The working conditions with the long working hours stand out, following by physical fatigue and operational pressure, were identified as the most significant challenges faced by drivers. Additionally, lifestyle-related factors, especially the extended absence from home, were found to play a crucial role in shaping the attractiveness of the profession.

While remuneration package was also recognized as an important factor, it is not the dominant cause of the shortage. The results indicate that despite the fact that the salaries received from the drivers are way above the average salary in Greece, are not sufficient on their own to attract new entrants. The overall working conditions cannot be contained as demanding due to the fact that there are significantly higher salaries for the drivers. Moreover, the study confirmed the presence of an ageing workforce with limited participation of younger people that indicates potential long-terms challenges for companies within the sector even if the companies don't employ drivers.

6.2 Conclusions

Based on the analysis conducted in the study, it can be concluded that the problem of lack of heavy-duty truck drivers in Greece, is a complex problem and no single solution can be applied. For the reduced attractiveness of the profession, the demanding lifestyle of the profession can be blamed especially among younger drivers who differ in many ways from the older and active ones.

From the findings it can be observed that no single solution can be applied. While financial may play a significant role in addressing the problem, unfortunately single play as a mean to solve by its own the problem is impossible. The shortage should be

understood as the result of the imbalance between the expectations of the modern workforce and the realities of the profession. Any other effort different than some, which will focus on the routes of the problem, will be temporary and maybe will have negative results also.

Targeted actions must be taken to change the attractiveness of the profession since as the results have shown, the active workforce in Greece are consisting by ageing workforce that is getting closer to pension. Complexity has always been a way for industry to delay any changes related to labour shortages, while at the same time it has always been a sector with a high volume and intensity of work that any issue that "worked" did not need "fixing".

6.3 Recommendations

For companies

Transport companies should focus on two ways for better results. The first one is to improve working conditions and organizational practices to enhance the attractiveness of the profession. This may be more structured and predictable schedules, reductions of excessive working hours, better management of workload, collaborations with other transport companies so that distances can be shared accordingly, continues pressure to policy makers to modify laws that at this point restrict the operational work and stalls it. The second has to do with the investment in autonomous vehicles, a fairly costly and complex project which, if done hastily, will have negative impacts on the driver workforce. Sooner or later, autonomous vehicles will make their introduction to the Greek market, not as part of the solution to the driver shortage but as a means of enhancing competition. At this point, the way in which this working model will be promoted will play a very important role in the overall perception of these vehicles by drivers. In the near future, it does not necessarily mean that autonomous vehicles will be able to carry out all the transportation you perform in the country, however, promoting them as a solution to relieve drivers and not as a replacement is crucial. If for some reason the wrong message is sent to employees, then the newly introduced drivers will be even fewer than they are now, and the problem will essentially be magnified. The investment should essentially start by promoting the right messages and later on infrastructure to eventually end up in an investment in autonomous vehicles.

For policy makers

Policy makers should consider implementing measures aimed at reducing barriers to entry into the profession. Initiatives to improve the public image of the profession, modifications of the regulations always for the interest of the drivers as also motivations to new entrants to own their own truck with regulations at least for some early years that will differ from the rest of the market are some of the things that policy makers must examine if capable of doing to improve the attractiveness of the profession.

For the future of the sector

Automation at any level will play an important role in the daily lives of transport companies in the near future. What needs to be paid particular attention to is that the sector does not become a simple follower of developments to the point where it cannot manage them. If the sector simply follows the developments in automation and cannot guide the development, then it will not be able to control the shortage of heavy vehicle drivers because negative advertising will create an even more negative image. As in every profession, in this one too, workers are prejudiced regarding whether they will be replaced by technologically advanced machines. This, in addition to the negative image, ceases to stimulate the interest of young people in being trained in the subject. The risk therefore does not concern active drivers exclusively but also the motivation that may be lost by any potential driver.

6.4 Limitations and future research

Despite its contribution, this study is subject to certain limitations. The use of non-probability sampling method means that the findings may not be fully representative of the entire population of professional heavy-duty truck drivers in Greece. Also, the reported data include the possibility of perception bias since each response reflects individual experience and subjective evaluations, even if this was necessary for a more in-depth analysis of the problem to be achieved.

Furthermore, the results of the comparison made between types of transport and driver categories reflect a situation at a given time and it is not certain that this will continue in the future. In case a market survey needs to be conducted for a possible investment in the future or even to enhance the reliability of the present results, it will be necessary to take a larger sample of heavy vehicle drivers and ideally the same quantity from each type of

transport operating in Greece. The type of transport, as mentioned previously, plays an important role in the outcome of the results.

In addition, based on this study, the way is opened for future research that can be conducted regarding whether it is beneficial or even whether it is the only way for transport companies to invest in autonomous heavy-duty vehicles with the aim of either increasing competition, improving driving safety, or even redirecting active drivers to jobs that, due to circumstances, cannot be filled by autonomous vehicles.

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Kontogiannis et al., 2017, pp. 3–15

Appendix A: Survey questionnaire

1. Η ηλικιακή σας κατηγορία: [21-29], [30-39], 40-49], [50-59], [60+]
2. Έτη εμπειρίας ως οδηγός βαρέων οχημάτων: [<1 έτος], [1-5 έτη], [6-10 έτη], [11-20 έτη], [20+ έτη]
3. Είδος απασχόλησης: [Υπάλληλος σε εταιρεία], [Αυτοαπασχολούμενος / Ιδιοκτήτης οχήματος]
4. Περιοχή έδρας: [Λεκανοπέδιο Αττικής], [Θεσσαλονίκη - Πέλλα – Ημαθία], [Σέρρες - Καβάλα - Δράμα - Ξάνθη – Ροδόπη], [Τρίκαλα - Λάρισα - Γρεβενά – Κοζάνη], [Βοιωτία - Καρδίτσα – Άρτα], [Πελοπόννησος], [Άλλη]
5. Μεταφορές εντός ή εκτός Ελλάδος: [Διεθνείς μεταφορές αποκλειστικά], [Εθνικές μεταφορές αποκλειστικά], [Διεθνείς μεταφορές κατά 30% και Εθνικές κατά 70%], [Εθνικές μεταφορές κατά 30% και Διεθνείς κατά 70%]
6. Μεταφερόμενο είδος κατά πλειοψηφία: [Συσκευασμένα τρόφιμα, φάρμακα, ευπαθή προϊόντα που απαιτούν ψύξη], [Συσκευασμένα προϊόντα που ΔΕΝ απαιτούν ψύξη], [Χύδην προϊόντα εκτός τροφίμων], [Χύδην τρόφιμα εκτός γάλακτος], [Φρέσκο γάλα], [Καύσιμα και άλλα εύφλεκτα υλικά], [Κανένα από τα παραπάνω (πχ ειδικές μεταφορές)]
7. Μισθολογική κλίμακα: (Μέσος όρος μηνιαίων καθαρών απολαβών): [< 1.200€], [1.200€ - 1.400€], [1.400€ - 1.600€], [1.600€ - 1.800€], [1.800€ - 2.000€], [2.000€ - 2.200€], [2.200€+]
8. Επιλέξτε δύο παράγοντες που σας δυσκολεύουν περισσότερο στο επάγγελμα: Βαθμολογήστε από το 1 (Ελάχιστη δυσκολία) έως το 5 (Μεγάλη δυσκολία). [Ωρες εργασίας], [Κόπωση / σωματική επιβάρυνση], [Πίεση χρόνου / δρομολογίων], [Έλεγχοι / Κυρώσεις], [Αποστάσεις από το σπίτι]
9. Είστε ικανοποιημένος/η από τις οικονομικές σας απολαβές;: (1 = Καθόλου, 2 = Λίγο, 3 = Ικανοποιημένος/η, 4 = Πολύ ικανοποιημένος/η, 5 = Απόλυτα ικανοποιημένος/η)
10. Πόσο επηρεάζει η εργασία σας την προσωπική / οικογενειακή ζωή;: (1 = Καθόλου, 2 = Λίγο, 3 = Μέτρια, 4 = Πολύ, 5 = Πάρα πολύ)
11. Ποιο θεωρείτε ότι είναι σήμερα το σημαντικότερο αίτιο της δυσκολίας ανεύρεσης οδηγών;: Βαθμολογήστε από το 1 (Λιγότερο σημαντικό) έως το 5 (Σημαντικότερο). [Αμοιβές], [Συνθήκες εργασίας], [Ωράρια / απουσία από το σπίτι], [Ευθύνη και

- άγχος], [Ελλειψη κοινωνικής αναγνώρισης], [Ηλικία / κατάσταση στόλου οχημάτων]
12. Θα συστήνατε σε άνθρωπο εκτίμησης σας να γίνει οδηγός βαρέων οχημάτων;: [Ναι]. [Όχι], [Δεν γνωρίζω]
13. Πιστεύετε ότι το επάγγελμα γίνεται λιγότερο ελκυστικό για τις νεότερες γενιές;: [Ναι]. [Όχι], [Δεν γνωρίζω]
14. Η εξέλιξη της τεχνολογίας αυτονομιών (lane assist, brake assist etc) στα οχήματα βοηθάει ή όχι στη περάτωση του μεταφορικού έργου; : [Ενισχύει την ασφάλεια και την οδηγική ξεκούραση του οδηγού και διευκολύνει το μεταφορικό του έργο], [Ενισχύει την ασφάλεια και την οδηγική ξεκούραση του οδηγού ωστόσο φέρει πολλούς περιορισμούς επί του μεταφορικού έργου], [Δυσχεραίνει το μεταφορικό έργο τόσο από πλευράς πρόσθετης οδηγικής κόυρασης όσο και από πλευράς περιορισμών], [Λόγω γεωγραφικής θέσης, οχήματα νέων τεχνολογιών δεν συμβάλουν πρακτικά στη διευκόλυνση του μεταφορικού έργου]
15. Σκοπεύετε να παραμείνετε στο επάγγελμα τα επόμενα 5 χρόνια;: [Ναι]. [Όχι], [Δεν είμαι σίγουρος]

Source: Author's own design

Appendix B: Tables

Table 1: Raw data

Count	Age Group	Intention of staying in the profession next 5 years	Income satisfaction (1=Not at all, 2=Not quite, 3=Satisfied, 4=Very satisfied, 5=Completely satisfied)	Profession recommendation	Work-Life Balance (1=Not at all, 2=a little, 3=moderately, 4=a lot, 5= quite a lot)
1	30 - 39	Yes	3	Yes	4
2	60+	No	3	No	2
3	60+	No	3	No	2
4	60+	No	3	No	2
5	60+	No	3	No	2
6	60+	No	3	No	2
7	60+	No	3	No	2
8	60+	No	3	No	2
9	50 - 59	No	3	No	4
10	50 - 59	Yes	3	No	4
11	50 - 59	Yes	3	No	4
12	50 - 59	Yes	3	No	4
13	50 - 59	Yes	3	No	4
14	50 - 59	Yes	3	No	5
15	50 - 59	Yes	3	Yes	5
16	50 - 59	Yes	3	Yes	5
17	50 - 59	Yes	3	Yes	5
18	50 - 59	Yes	3	Yes	5
19	40 - 49	Yes	2	Yes	5
20	40 - 49	Yes	2	Yes	5
21	40 - 49	Yes	2	Yes	5
22	40 - 49	Yes	2	Yes	5
23	40 - 49	Yes	2	Yes	5
24	30 - 39	Yes	2	No answer	4
25	30 - 39	Yes	2	No answer	4
26	30 - 39	Yes	2	No answer	4
27	30 - 39	Yes	2	Yes	5
28	30 - 39	Yes	2	Yes	5
29	30 - 39	Yes	2	Yes	5
30	21 - 29	Yes	4	Yes	3
31	30 - 39	Not sure	3	No answer	2
32	40 - 49	Yes	4	Yes	3
33	50 - 59	Yes	5	Yes	4
34	40 - 49	Yes	4	Yes	3
35	40 - 49	Yes	4	Yes	4
36	40 - 49	Yes	4	Yes	3
37	30 - 39	Yes	4	Yes	3
38	40 - 49	Yes	4	Yes	2
39	40 - 49	Yes	3	Yes	1
40	40 - 49	Yes	4	Yes	3
41	40 - 49	Yes	4	Yes	2
42	40 - 49	Yes	4	Yes	3
43	50 - 59	Yes	4	Yes	2
44	50 - 59	Yes	4	Yes	2
45	50 - 59	Yes	4	Yes	2
46	50 - 59	Yes	4	Yes	2
47	50 - 59	Yes	4	Yes	2
48	50 - 59	Yes	4	Yes	2
49	50 - 59	Yes	4	Yes	2
50	50 - 59	Yes	4	Yes	3
51	40 - 49	Yes	4	Yes	3
52	30 - 39	Yes	4	Yes	3
53	50 - 59	Yes	4	Yes	3
54	40 - 49	Yes	2	Yes	3
55	21 - 29	No	2	No	1
56	30 - 39	Not sure	2	No answer	3
57	50 - 59	Yes	3	No	3
58	60+	Yes	3	Yes	2
59	21 - 29	No	2	No	5
60	30 - 39	Not sure	2	No	2
61	40 - 49	Yes	3	No answer	3
62	50 - 59	Yes	3	No	3
63	30 - 39	Yes	2	No	2
64	40 - 49	Yes	3	Yes	2
65	40 - 49	Yes	2	No	3
66	50 - 59	Yes	3	No	2
67	30 - 39	Yes	3	No	2
68	50 - 59	Yes	2	No	2
69	40 - 49	Yes	3	No	2
70	30 - 39	Yes	3	Yes	2
71	40 - 49	Yes	3	Yes	3
72	50 - 59	Yes	3	No	3
73	40 - 49	Yes	2	Yes	2
74	50 - 59	Yes	3	No	2
75	50 - 59	Yes	3	No	2
76	50 - 59	Yes	3	No	2
77	40 - 49	Yes	2	No	3
78	50 - 59	Yes	3	No	2
79	50 - 59	Yes	3	No	2

Table 2: Categorical raw data

[illegible]

Yes = 1
No = 0

Age Groups	
21 - 29	1
30 - 39	2
40 - 49	3
50 - 59	4
60+	5

Table 3: Regression Statistics

<i>Regression Statistics</i>					
Multiple R	0,646712529				
R Square	0,418237096				
Adjusted R Square	0,386790452				
Standard Error	0,393250347				
Observations	79				

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	8,227094262	2,056773566	13,29989625	3,25404E-08
Residual	74	11,44379181	0,154645835		
Total	78	19,67088608			

Appendix C: Figures

Figure 9: Respondents' intention to remain in the profession over the next five years

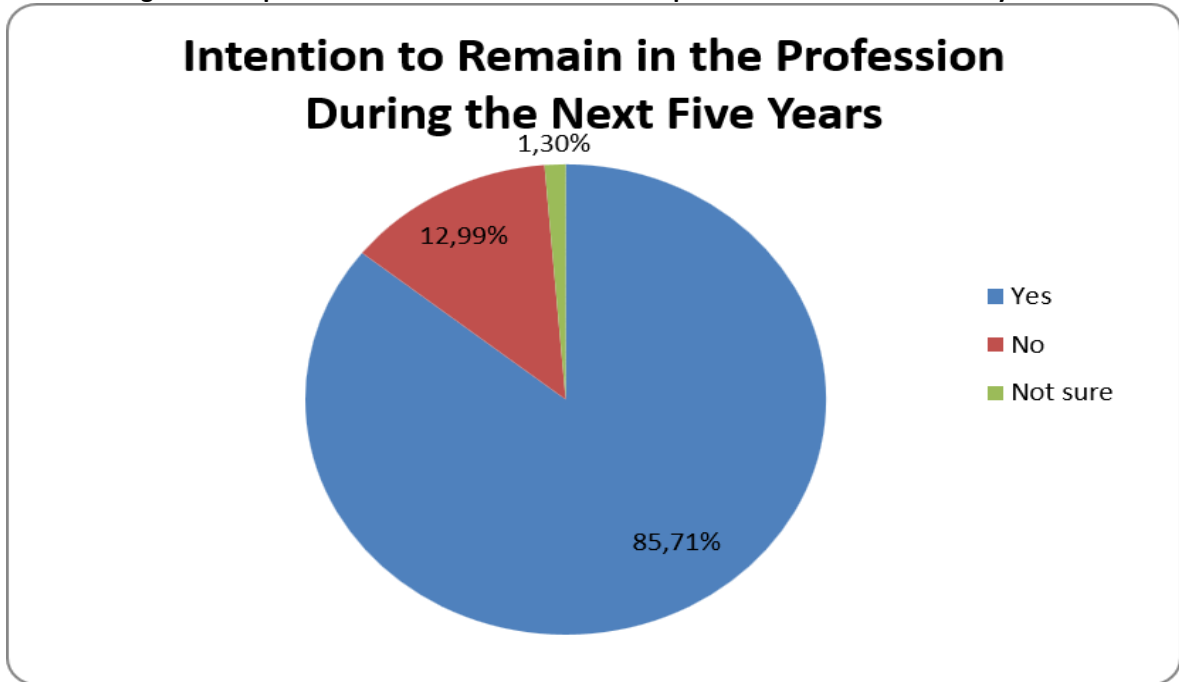
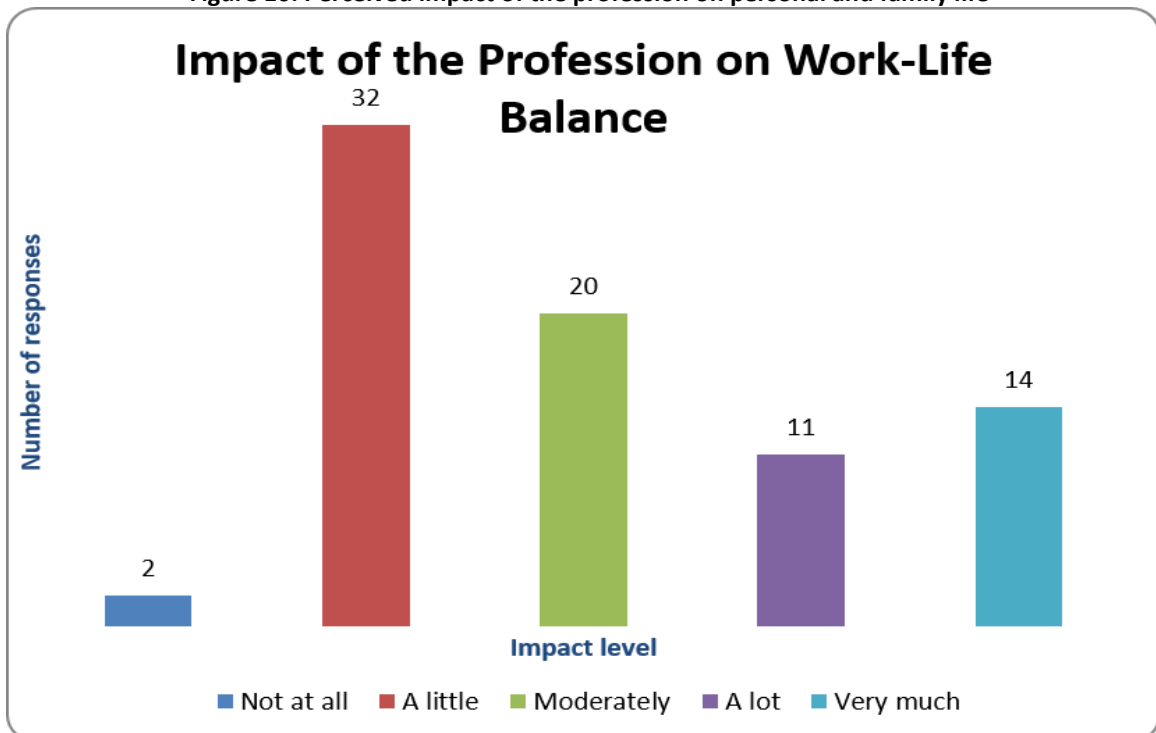


Figure 10: Perceived impact of the profession on personal and family life



Author's Statement:

I hereby declare that, in accordance with article 8 of Law 1599/1986 and article 2.4.6 par. 3 of Law 1256/1982, this thesis/dissertation is solely a product of personal work and does not infringe any intellectual property rights of third parties and is not the product of a partial or total plagiarism, and the sources used are strictly limited to the bibliographic references.