Data Analysis Results

Work Package 3 Deliverable for the Project

"THE BUSINESS CASE FOR A FLEET MANAGER"

Coventry University

August 2024

Executive Summary

A fleet manager in humanitarian and development organisations plays a pivotal role in managing vehicles and drivers on the ground. Despite its significance, there are limited academic studies focused on the role. The review of literature in work package one showed that the role is mostly confused with other related functions such as supply chain manager. In practice, aid organisations are reluctant to invest in the role and only some organisations have dedicated fleet managers at the country level.

This report provides a deeper understanding of the role by discussing the level of maturity of fleet managers in aid organisations, professional training and development for the role, fleet ownership models, and return on investment for the role. We collected data from seven humanitarian and development organisations, some with and some without a dedicated fleet manager in their country offices, through interviews and questionnaires. We then cross-checked the analysis through an online survey from a wider number of organisations.

The findings of the study show that while there is a sector-wide recognition of the role, it is still at the early stages of maturity with a lot of room to grow. The report casts light on the professional training and development for the role as a main contributor to the role's growth. It identifies six barriers and four enablers of training and development. Moreover, it identifies various vehicle ownership models from outright ownership to fully outsourced and discusses the implications of ownership type for fleet managers. Finally, the return on investment for the role was calculated. It is shown that for every dollar spent on the recruitment and development of a fleet manager, an organisation sees an average return of $3.38 and $5.61, respectively, suggesting that the recruitment and training for the role are financially feasible decisions.

Table of Contents

1. Introduction

Fleet managers play a key role in humanitarian and development organisations by managing drivers, vehicles, and the last mile delivery of aid to service users. As the scope and magnitude of aid sector operations grow, the role starts to gain momentum and recognition. This comes with the need to professionalise the role and further investment in training and development. Despite these dire needs, the aid is lagging behind the commercial sector and a fleet manager's role remains under-presented in the aid sector with insufficient investment, training, and support.

This report is the third work package for the project "The Business Case of a Fleet Manager". In the previous work packages, we analysed the role and its competencies from the perspective of academic literature. Next, we collected data from a range of humanitarian and development organisations to better understand the role, its level of maturity, and the financial returns it could bring to organisations. This report illustrates the results of data collection and presents qualitative and quantitative analyses to deepen our understanding of the fleet manager's role in the aid sector.

2. Profile of Cases

In total, seven aid organisations participated in the study. The profile of these organisations is shown in Table 1.

Table 1: Profile of aid organisations participated in the study

Organisation	Objectives and areas of operation	Budget
Org P	Girls' and children's rights and equality in over 80 countries.	€1.1 billion
Org M	Supporting people affected by emergencies, natural disasters, displacement, and conflict.	$50 million
Org I	Providing protection, health and nutrition, water and sanitation, food security, shelter and settlements, and education in emergency.	€111 million
Org F	World's largest humanitarian network, comprised supporting local Red Cross and Red Crescent action in more than 191 countries, bringing together more than 16 million volunteers for the good of humanity.	F 1.5 billion
Org H	Protecting lives and restoring livelihoods by clearing landmines and other explosives, helping countries recover after conflict.	£95 million
Org A	Responding to save lives, with special attention to the most vulnerable and marginalised.	€621 million
Org W	Committed to ending hunger and malnutrition worldwide.	€323.2 million

The data collection from 16 November 2023 to 29 March 2024 involved 14 meetings of 30 – 60 minutes, in total nearly 735 minutes, around 12—hours, of meeting. Most of the meetings were audio and video recorded and transcribed by Microsoft Teams, with the consent of interviewees for subsequent data analysis. Table 2 shows the summary of the interviews conducted.

Table 2: Summary of conducted interviews

Organisation	Date/time	Informant's position	Length	Main topics discussed
Org P (interview 1)	16.11.2023 14:00-15:00	- Global fleet coordinator, logistics and procurement - Global fleet manager - Head of supply chain	60min	• Introduction • Aims of the research • Organisational structure • Practices related to the feet managers' competencies
Org M	17.11.2023 10:00-11:00	- Team leader global logistics advisors - Global logistics manager	60 min	• Introduction • Aims of the research • Organisational structure • Practices related to the fleet managers' competencies
Org I (interview 1)	28.11.2023 14:00-15:00	Director of global logistics & supply	60 min	• Introduction • Aims of the research • Organisational structure • Practices related to the fleet managers' competencies • Explaining follow up questionnaire related to the ROI
Org I (interview 2)	29.11.2023 9:00-10:00	Country fleet officer (Moldova)	45 min	• Introduction • Aims of the research • Organisational structure • Practices related to the fleet managers' competencies. • Explaining follow up questionnaire related to the ROI
Org P (interview 2)	29.11.2023 14:00-15:00	- Global fleet coordinator, logistics and procurement - Global fleet manager - Head of supply chain	45 min	• Discussion on how to fill and modify the follow-up questionnaire.
Org F (interview 1)	12.01.2024 10:00-11:30	- Global fleet coordinator - Head of logistics (UK) - Global lead - supply chain environmental sustainability and capacity development	90 min	• Introduction • Aims of the research • The Global fleet coordinator provided an overview of Org F's operations, Fleet Wave system, and the estimate of costs. • The research team showed how to fill in the questionnaire.
Org H	19.01.2024 9:00-10:00	Global fleet manager	60 min	• Introduction • Aims of the research • The informant explained the training and development programmes at Org H. • The research team showed how to fill in the questionnaire.
Org A	25.01.2024 9:00-10:00	Director logistics and green supply chain	60 min	• Introduction • Aims of the research

				- The informant explained Org A's structure, fleet management, and trainings. - The research team showed how to fill in the questionnaire.
Org I (interview 3)	02.02.2024 9:00 – 10:00	Country fleet officer (Moldova)	60 min	Follow up on filling out the revised questionnaire
Org W (interview 1)	07.02.2024 14:30 - 15:30	Logistics and procurement manager	45 min	- Introduction - Aims of the research - The informant explained Org W's structure, fleet management, and trainings. - The research team showed how to fill in the questionnaire.
Org W (interview 2)	16.02.2024 14:00 – 14:30	Logistics and procurement manager	30 min	The informant asked and was responded on their queries about how to fill in the Excel sheet.
Org P (interview 3)	06.03.2024 10:00 – 10:30	Global fleet coordinator, logistics and procurement	30 min	The research team helped the informant finding the missing data and entering them in the questionnaire.
Org I (interview 4)	21.03.2024 1:30 – 11:00	Director of global logistics & supply	30 min	The research team tried to find a way to find the required data, because Moldova data was not useful for ROI. The informant suggested starting data collection from another country office, but it was decided not to follow it due to time limitation.
Org F (interview 2)	29.03.2024 9:00 – 10:00	Senior fleet officer - global fleet unit	60 min	Since the previous informant was on leave and had not responded, the new informant helped to find the data needed for ROI from Fleet Wave system.

3. Analysis of the role of a fleet manager

3.1. The definition, responsibilities and objectives for the role of a fleet manager

This section discusses the findings about the role of the fleet manager. Firstly, from the perspective of academic literature in the area of humanitarian and development operations, few studies were found to focus on the role of fleet manager in the aid sector. Academic literature does not clearly differentiate between fleet manager and other related, yet distinct, roles such as supply chain manager or logistics manager. We have conducted a thorough review of fleet manager competencies in work package 1 and extracted a wide range of competencies from the literature. However, our data collection from the case studies confirmed that many of the competencies found in the literature are not in fact fleet manager competencies. For example, none of the cases believed that "warehouse management" or "donor management" are fleet manager competencies. This is because fleet manager is not established as a standalone role in the literature and is often seen together with other related roles.

We identified a few studies that specifically study the role of fleet manager. Among those, the study of Kunz et al. (2015) in the *Journal of Humanitarian Logistics & Supply Chain Management* was prominent. The results found that a fleet manager role entails vehicle procurement, operations, allocation, and disposal, as well as managing vehicle leasing and renting. They suggested that the role requires gaining further acceptance and momentum and there are conflicting interests between the headquarters and the role of a fleet manager. For example, headquarters are interested in reducing total fleet costs, while country offices might choose to keep old vehicles to increase availability.

We use the interviews to establish the role of a fleet manager in humanitarian aid. First, we clarify what is meant when we refer to a "fleet manager" in this study. The role of fleet manager exists at the global level, in the headquarters, which is normally called "global fleet manager". It also exists at the regional level and oversees fleet management in multiple countries within the same geographic region. However, this study focuses on the role of fleet manager at the country level only, where the role exists within a country office or national delegation of an aid organisation and is responsible for managing fleet within a country. Furthermore, we observed that the role might take different names within a country office based on the size of the fleet being managed and the operational complexity. For example, "fleet officer" and "fleet coordinator' are usually used for the role when managing a lower number of vehicles, while "fleet manager" is used for larger fleet or in more complex operating environments. We do not differentiate between these titles at country level in this study. Hereafter, "fleet manager" is used consistently to refer to the role which manages fleet in the country offices or national delegations in humanitarian and development organisations.

Based on the aggregation of results, the role of a fleet manager entails managing two main resources: vehicles and drivers. These resources are interwoven, and a fleet manager's role involves managing the interaction of the two. The responsibilities related to these two resources and their interaction are listed in the following:

1. **Managing vehicles:** Type and capacity of vehicles, vehicle requirements, ensuring vehicles are fit for purpose (e.g. does the organisation need the same vehicle or different ones? Are they suitable for all the operations of the organisation?), vehicle sourcing and vehicle rental contract management, managing fuel contracts, vehicle service and maintenance (e.g. selection and managing relationship and contracts with workshop based on the vehicle type and model), managing contracts and claims with insurance companies (includes selection of insurance company, determining the level and type of insurance based on organisational needs and operations), vehicle registration and legal works with local authorities.

2. **Managing drivers:** recruitment of drivers, checking the driver licences and fit-to-drive documents, driver induction, training, and coaching, day to day driver allocation, and driver dispatch management.

3. **The intersection of vehicle and driver management:** knowledge of fleet information systems, implementation of fleet policy, controlling and monitoring the movement of vehicles (e.g. through vehicle tracking system), monitoring cargo transportation, supplying fuel to vehicles, monitoring fuel consumption, decision on creating a spare parts storage or buying them when they are needed, crash and incident investigation, recording and reporting, relationship management with local authorities, and police, reporting fleet activities based on organisational KPIs, understanding of emissions and carbon footprint. Moreover, in more advanced levels of the role, efficient management of vehicles and drivers would inform organisational strategic objectives related to sustainability, health, and safety.

Therefore, we can define "fleet manager" as "the person responsible for managing vehicles, drivers, and the intersection of the two within a country office or national delegation".
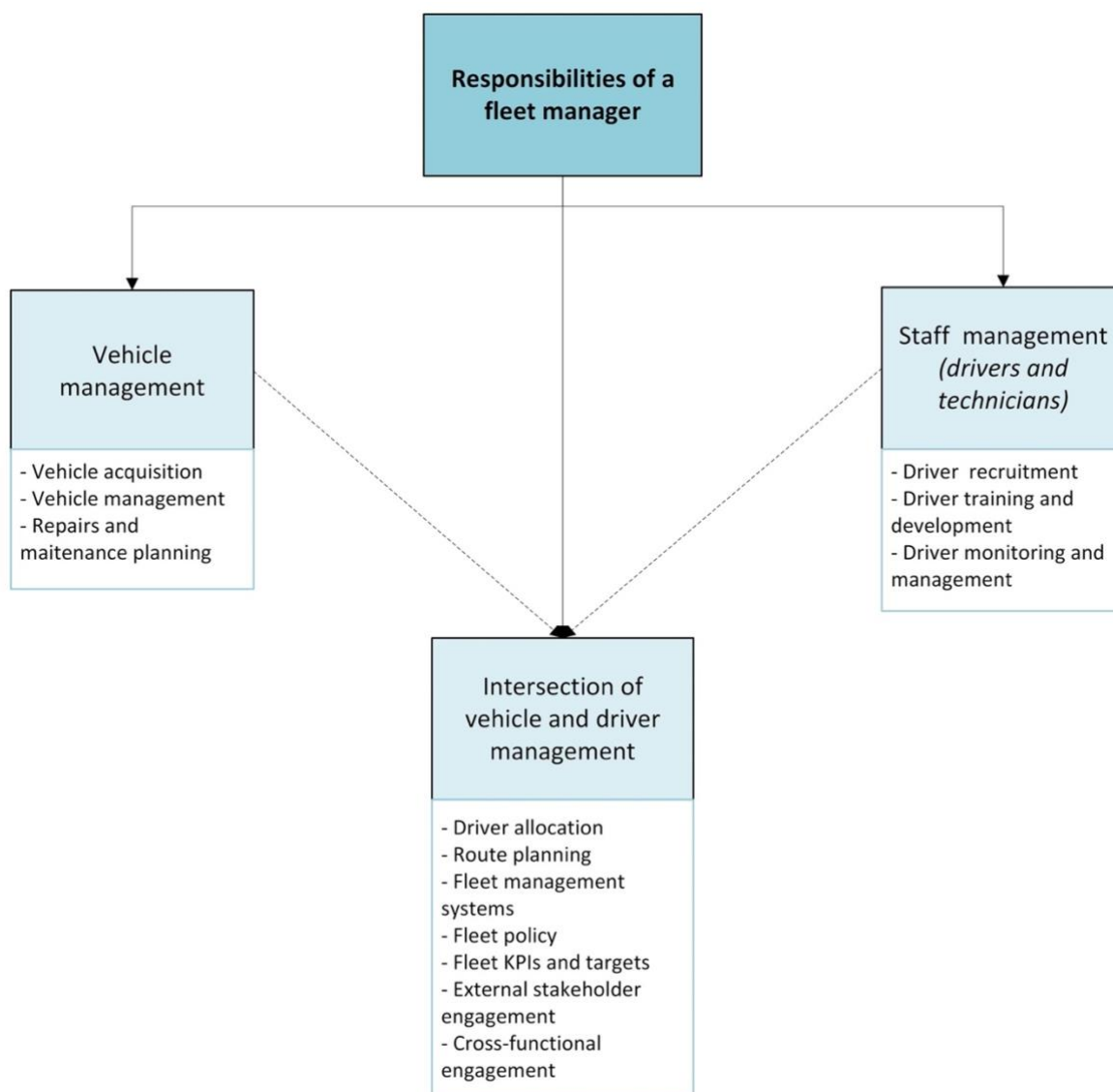

Figure 1: The responsibilities of a fleet manager

3.2.   A dedicated fleet manager: When does it exist?

The common practice found among the studied cases was that a dedicated fleet manager appears where the organisation has at least 20-30 vehicles in operations. Organisations with fewer than 20 vehicles in operation typically do not have a dedicated fleet manager. In these organisations, fleet management responsibilities are fulfilled by other functions (see subsection 3.3 for details). In addition to the number of the fleet, donors' willingness to fund the role was also found important in the existence of the role. Those organisations with more funder impositions, especially those with institutional funders (as opposed to private funders), are found to be typically less flexible in developing the role within their country offices and show less tendency for investing in training and development of the role.

3.3.   Delegation of the role's responsibilities to other functions

The next question we studied was "*Who carries out the responsibilities of a fleet manager when a dedicated role does not exist?*". We received varied responses showing that various operational functions might fill in for the role. This includes programme coordinator, logistics coordinator, supply chain officer, and security officer.

"*Many of them (country office supply chain specialists) are supply chain managers who are juggling fleet and other areas of logistics and supply chain. Only three out of 56 [of] our missions have a dedicated fleet manager or a fleet officer. For the rest, it is done by roles such as admin or logistics or security positions, or assistant coordinator.*"

"*In most cases, the transport management function is mutualised with another function which can be a stock management, for example, or procurement management. Just because the volume of activity would not justify a fully full-time position.*"

"*A lot of the national fleet managers have come up through the ranks from being a driver, a head driver and then a fleet manager. But no formal qualifications; Sometimes it has just been the longest serving driver.*"

3.4.   Organisational structure and fleet manager's position in the structure

In terms of organisational structure, all the organisations included in this research had a decentralised or federated structure. This is the most common organisational structure for large humanitarian and development organisations with global operations. In this structure, the organisation is headquartered in a developed

country, responsible for the strategic decisions, long term planning, and managing key donors. In the second layer, there are regional offices which oversee the operations in multiple countries within a geographic region and conduct advisory tasks. Finally, country offices which hold the technical capacity and perform the operations on the ground. We found this as the dominant organisational structure for the organisations included in this research, albeit with some differences. For example, some smaller organisations did not have a regional office (the second layer of the structure) and the headquarters directly dealt with the country offices.

At all three layers of the organisational structure roles related to fleet management exist. At headquarters, a global fleet manager is responsible to manage and advise on strategic fleet decisions. The global fleet manager also devises training, development, and mentoring programmes for fleet managers in all countries. Next, a regional fleet or supply chain specialist role sits at the regional level, where they manage fleet a portfolio of countries in the same region. Finally, at country offices, there is a country director, who makes decisions normally independently from the headquarters and the regional office, but their decisions should be aligned with the overall strategy provided by the headquarters and regional office. A fleet manager, the role investigated in this research, sits in the country office and involves making decisions related to the drivers and vehicles at the national level.

The role of fleet manager at the country office reports to country director or programme manager. Sometimes, in larger country offices, a logistics or supply chain manager role exists to whom the fleet manager reports to. Within organisational chart, there are normally two roles below a fleet manager: the driver role, and in some cases mechanics and vehicle technicians, if they exist, report to fleet manager. Figure 2 shows fleet-related roles at global, regional, and country levels as well as the position of fleet manager in the country office.

The decentralised or federated structure including headquarters, regional offices, and country offices provides an ideal structure for aid organisations to perform global operations, start or end operations in different countries based on the needs, and expand or limit their regional presence without the need to change their overall structure. However, the main drawback of such a structure is the divide between headquarters and country offices and poor visibility over the ground operations. Poor visibility is found to be a key barrier to proper fleet management in humanitarian organisations (Eftekhar & Van Wassenhove, 2016). This study confirms the findings of the previous literature. Global fleet managers in the headquarters highlighted the issue of visibility in the interviews.

"We can see what are spendings [in country offices] on through our accounting system, but we have no visibility of the budget that they develop for the vehicles. And for me, that's a huge gap! I cannot see their budget and how they are running in comparison to what they are budgeted."

Fleet management systems can be an efficient way to address the visibility issue by integrating the data between the country offices and the headquarters. Upon utilizing integrated fleet management systems, two cases reported gaining better visibility over fleet operations in the

field in terms of fleet training, safety and security, maintenance, and fuel monitoring. Fleet management systems will be discussed further in section 7.
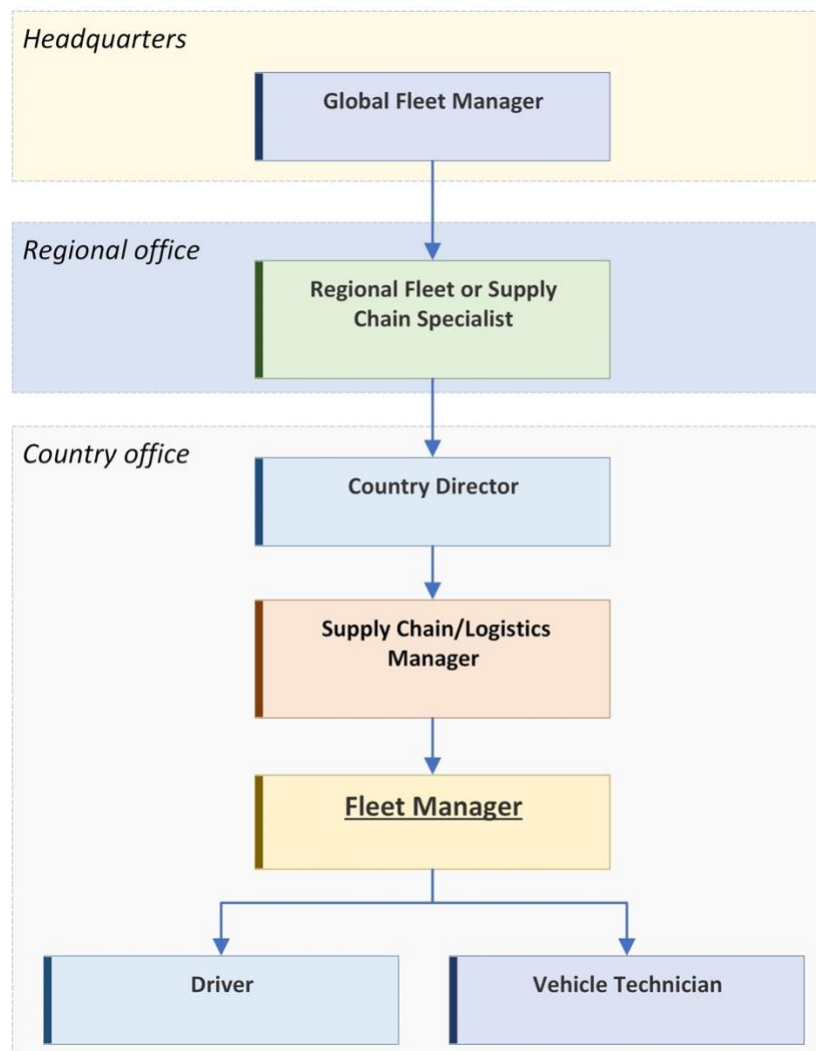
Figure 2: Fleet-related roles at global, regional, and country levels, and the position of fleet manager at country office

4. Fleet manager's role maturity

4.1. Developing a maturity model for the fleet manager role

A maturity model indicates the current state and the areas to improve for a role, in this case fleet manager. It suggests that implementing changes to improve the role is not an overnight shift, but rather a gradual and continuous process which requires changes in the people, processes, structure, and organisational relationships (Reck & Long, 1988). We have built upon the maturity model as suggested by Johnsen et al. (2018) to establish how mature the role of fleet manager in the aid sector is and how it can move towards higher levels of maturity.

Johnsen et al. (2018) maturity model synthesises the previous maturity models in the literature of supply chain and purchasing to suggest four distinct levels: clerical, developing, supportive, and strategic contributor. The model identifies a set of characteristics for each level vis-à-vis strategy, development, KPIs, and IT systems, among others. Ascertaining the current state for each characteristic gives an indication of the overall maturity of the role. It also shows what are the characteristics of the next level and how to propel the role to the next level. The maturity levels are sequential and jumping a level can be problematic (Reck & Long, 1988).

Based on the interviews, we have revised Johnsen et al. (2018) maturity model to adapt it to the role of a fleet manager in the aid sector. One of the interesting insights which emerged from the interviews was that those organisations with a dedicated fleet manager mentioned a "trigger" for having the role. The trigger can be a fleet related gap or problem. For example, Org P explained that speeding and road crashes became a serious problem for them in 2016, when they had not had the role of fleet manager at all. They started installing vehicle trackers to address the problem. As the time went by, they evolved from using the tracker just to prevent speeding and crashes:

"Now, it is not only looking at the location and speeding, but also within the same platform we record things like maintenance costs, fuel costs, and fleet-related costs. All the countries use the same platform. Every asset we own [whether with or without a tracker] is on that system. It creates a baseline, and year on year we are improving. Fleet managers now use the platform to build the capacity for the people in the country offices."

Therefore, we hypothesise that as aid organisations' fleet size grow, they start facing fleet-related issues. These issues act as triggers for having the role of a fleet manager. Once the role becomes a part of the organisation, the maturity journey starts. The role evolves based on the fleet size, operational complexity, financial resources, and other specifications.

Four levels of maturity were identified based on the interviews and building upon Johnsen et al. (2018) model: passive, developing, supportive, and strategic contributor. Figure 3 gives an overall view of the maturity levels. Table 3 shows the characteristics of each level of maturity.
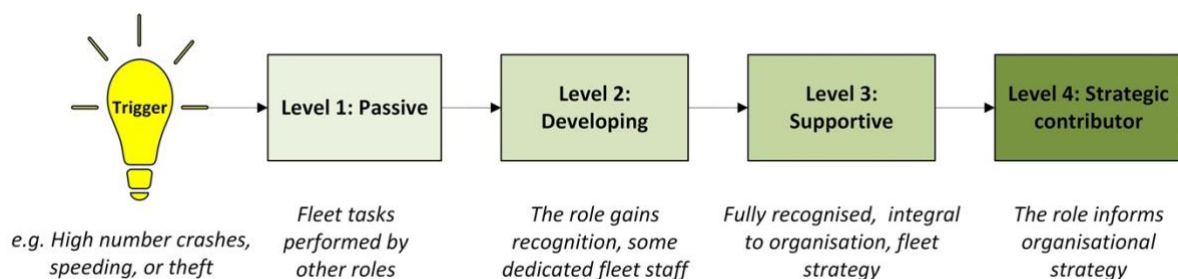

Figure 3: Overview of the maturity levels for the role of fleet manager

Table 3: Fleet manager maturity model

	Passive	Developing	Supportive	Strategic contributor
Fleet strategy	Firefighting, solving pressing fleet issues such as crashes, speeding, and theft	An emerging and informal fleet strategy focused on cost saving	A formal fleet strategy accounting for multiple measures including non-financial ones such as sustainability	A comprehensive fleet strategy accounting for a wide range of measures which also informs organisational strategy
Organisational recognition	It is recognised that fleet management is needed, but a dedicated role does not exist yet. Fleet related tasks are fulfilled by other roles.	The need to have a dedicated role to fleet is recognised. Some fleet managers are recruited in country offices.	The organisation fully recognises the role. The role becomes an integral part of the organisational structure.	The role is involved not only in fleet but also other related organisational decisions. It contributes to and informs organisational strategy.
Fleet size	Small – medium (less than 10 to 30)	Medium – large (30 – 60+)	Medium – large (30 – 60+)	Medium – large (30 – 60+)
Ownership model	Mostly rented vehicles	A mix of rental and self-owned vehicles	Mostly self-owned vehicles	Mostly self-owned vehicles
Operational complexity	Varied from low to high	Varied from low to high	Normally high	Normally high
Financial resources assigned to the role	Limited resources, ad hoc funding for fleet related activities	Fleet manager salary included in budgeting	Fleet manager salary, fleet management systems, and training and development included in budgeting	Budgeting includes level 3 items while additional budget allocated to trying novel fleet initiatives and advanced fleet monitoring and management systems
Fleet management systems	Non-existent, any data is recorded manually (pen and paper, Microsoft Excel)	Disintegrated management systems mostly for vehicle registration and tracking	A dedicated fleet system including tracking, maintenance, fuel monitoring, and fleet management	An end-to-end organisational system integrating fleet with other functional systems such as human resources, purchasing, and finance
Skills and competencies	No or very limited skills related to fleet	Basic fleet skills such as compliance, safety, and security	A range of technical skills related to fleet accompanied by some soft skills related to people and system management	A comprehensive set of fleet skills accompanied by soft skills related to people and system management as well as wider skills related to humanitarian domain

Training and development	No fleet training programmes. Learning through trial and error	Basic fleet training through third parties	Internal and external fleet training courses and development programmes based on the fleet strategy	Internal external fleet training courses and development programmes tailored for the organisation's fleet and operating context, aligned with the fleet strategy
KPIs	Focus on cost reduction only	A small set of easy to measure KPIs such as compliance, safety, and cost	A wider set of KPIs including non-cost fleet indicators (e.g. greenhouse gas emissions) aligned with fleet strategy	A comprehensive set of cost and non-cost fleet KPIs merged with non-fleet KPIs to advance organisational strategy
Career progression	Possible but through other related roles	Limited progression opportunities mainly based on years of experience	Incremental progression based on a set of fleet competencies and experience	A clear career pathway based on experience, fleet competencies, and non-fleet competencies (e.g. leadership and soft managerial skills)

4.2.   Positioning fleet manager role in the maturity model

After developing the maturity model, we use it to ascertain the role's level of maturity for the aid sector. We used interview data and cross-checked it with the data obtained from an online survey, as well as secondary documents. For each organisation, we evaluated the level of maturity against each characteristic in the model (fleet strategy, organisational recognition, etc.). Next, we took the average for the maturity level for all characteristics to ascertain the overall level of maturity for the organisation. Out of seven organisations, two were ranked level 1 (passive) and five were ranked level 2 (developing). No organisation included in this study was ranked at level 3 (supportive) or level 4 (strategic contributor) of maturity. Cross-checking the rankings with the data obtained from the online survey from a wider number of organisations confirmed more organisations are at level 2 (developing). Therefore, we concluded that across the humanitarian aid sector, the role of a fleet manager has just departed from level 1 (passive) and is currently at level 2 (developing). Figure 4 shows the positioning of the role within the maturity levels.

All the informants recognised the role and its significance in managing fleet. There was a consensus that the role can bring financial and non-financial benefits to organisations in terms of better vehicle maintenance, reducing crashes, managing fuel consumption, route optimisation, and compliance with local regulations. Several informants mentioned benefits related to sustainability and gaining visibility through fleet management systems. No informants were found to believe that the role is redundant to their organisation and therefore not required. It is noteworthy that the informants included this study were mainly global logistics and supply chain managers (see Table 2).
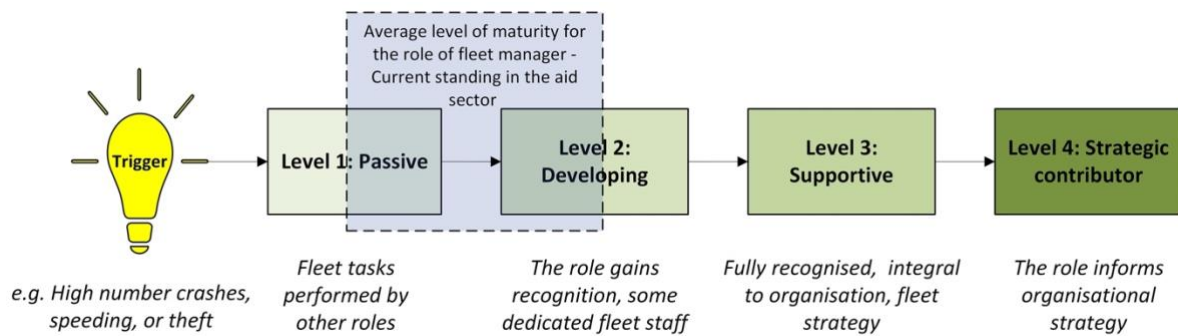
Figure 4: The average level of maturity for the role of fleet manager in the aid sector

Despite recognising the need for dedicated staff to fleet management (level 2 of maturity), some organisations have not yet operationalised having a fleet manager. This was mainly due to budget constraints and a lack of concrete evidence to support the return on investment the role would bring to the organisation (see section 8 for return on investment).

"We do have the information now. But the gap is proving to the leadership teams in the country that we need to invest in our people. If you invest in somebody to be expert in fleet management, what we're trying to say is that person will then save the organisation or the country office a substantial amount of money."

No organisation showed the characteristics beyond level 2 (developing). The data related to level 3 (supportive) and level 4 (strategic contributor) were related to future plans, not the current state. The quote below is an example from an organisation currently at level 2 of maturity, which is planning to develop its fleet data management systems and move to higher levels of maturity in the coming years.

"We are working on more holistically, from a supply chain perspective. We're trying to move towards a new end-to-end ERP system globally. We're gonna use Dynamic 365. It's been an ongoing transformation for a long time, many years, many dollars spent so far, but we are hopefully nearing the end. It includes supply chain and all the data for our fleet. It will [also] include warehousing, asset management, procurement, and project management. All of these will be linked together with monitoring and evaluation, and finance. It's all coming together in this one system, which has been painful, but hopefully we will get there and that will give us also much better visibility again at the other end."

The fleet manager role in the aid sector, at its current state, fits very well with the characteristics of level 1 of maturity (passive) moving to early level 2 (developing). All organisations recognise the role, but not all of them have dedicated fleet staff in country offices. Few organisations have a well-developed and comprehensive fleet strategy. Even fewer include fleet

managers at country offices in the development of organisational fleet strategy. As a result, a fleet strategy deemed to be feasible by a global fleet manager at the headquarters might be difficult or impossible to implement on the ground by a fleet manager at the country office. It also imposes a top-down approach where the voices of fleet managers at the country level remain unheard. Moreover, aid organisations lose thousands of dollars on mismanaged fleet, crashes, and noncompliance every year. Yet donors and leadership teams are hesitant to allocate financial resources to the salary for a dedicated fleet manager role or implementing fleet management systems. We have observed organisations with more than 20 million dollars spent on their fleet annually, with no or few fleet managers across their many country offices.

The learning for the role is mostly through trial and error and coherent training and development programmes are scarce. Several interviewees stated appointing fleet managers with no or very little experience. Skills and competencies required for the role are unclear and there are large disparities in terms of skill between the fleet managers at different organisations, and even across different offices within an organisation. The prospects of the job, entry salary levels, and career progression are too bleak to attract competent candidates.

By and large, the role is overly operational and does not have a say in the strategic decision making of aid organisations, which is the essence of levels 3 (supportive) and level 4 (strategic contributor) of maturity. Strategic decisions are made by global or regional fleet managers with no involvement of country fleet managers. On the contrary, the analysis shows a higher level of maturity for global fleet managers at the headquarters. It is an established role which is involved in strategic decision making. This fits well with the description of level 3 (supportive) and moving towards level 4 (strategic contributor) of maturity. This is a rather recent development, and the role of global fleet manager has paved a long way within the past decade to become a mature and established role.

"Traditionally the organisation didn't place a great emphasis on logistics and supply chain management. This is something that started 8 years ago. Logistics as a structure was created 7-8 years ago. Before [that], logistics was under programmes, and it was a support function without much technical capacity and skills. Without a lot of influence over management. It started to change in the organisation: there was a unit formed 8 years ago, it was transformed into a department 4-5 years ago, and it had a head of department for the first 2 years, and this year finally the role was promoted to director. So, now I sit with the rest of the executive team and have a place at the table with the executive team."

If the fleet manager role at country offices treads the same path as the global fleet manager, we would expect it to reach a higher level of maturity and become a supportive and then, strategic contributor within the years to come. However, aid organisations need to recognise that consistent investment of resources is required for the role to grow. Financial investment in the role and in the fleet management systems accompanied by comprehensive training and development will show long term returns in the form of reduction of fleet costs and crashes, better fuel management, lower greenhouse gas emissions, and an optimised and well-planned

fleet. Without proper investment and managerial support, the growth of the role remains merely wishful thinking.

"If you invest in these people, they bring benefits, both financial, but also I appreciate there's lots of non-financial benefits as well. This is what we need to help with advocating to our leadership teams. Because everywhere people are cutting staff and this is one of the first roles to go!"

The disparities between the maturity of fleet managers at country offices with global fleet managers create a performance gap. A considerable share of the planning made by global fleet managers at headquarters remains on paper due to a lack of knowledge and capacity at country offices where there are no dedicated fleet managers or when, for example, the most experienced driver becomes a fleet manager with little fleet management competencies, knowledge, and expertise. Despite devoting considerable time and energy by global fleet managers, sparse fleet management improvement has been observed at the country level due to this performance gap. A "levelling up" is imperative for country fleet managers to fill the gap with the global fleet managers. Investing in country fleet managers and propelling them towards a higher level of maturity fills this performance gap and allows for smoother coordination between country offices and headquarters, leading to better strategy implementation.

5. Training and development

Training and development programmes are the linchpin to having competent fleet managers. One of the objectives of this study was to assess the financial benefits of training for the role of a fleet manager and to better understand the key enablers and challenges of training and development. There was an overall agreement among the interviewed cases on the significance of training for fleet managers. However, in most cases training programmes were limited, underfunded, and impractical at the country level. In two of the organisations, for example, fleet managers with little experience started their training with Fleet Forum one year after they started their role. Within that year, the learning has been only through try and error, with many issues mismanaged related to vehicles and drivers. Worse, some organisations did not offer any fleet related training at all.

"How much training somebody gets within a country to help them in their role? I think it is fair to say none! The only way fleet people get any support is through us [in the headquarters]."

The provision of training was done through internal and external channels. Internally, the lion's share of training is provided by global fleet managers at the headquarters, where they hold "fleet clinics" to share fleet knowledge and also through one-to-one online meetings to support country fleet managers. Another internal channel of training provision is through online courses on the organisation's intranet. These are entry-level courses including basic knowledge and were only mentioned by one of the cases. External training takes place mostly through third party training providers such as Fleet Forum. The rest of this section identifies the drivers and challenges of training and development. Section 8 (return on investment) assesses the financial benefits and returns for the provision of training and development programmes.

5.1. Enablers of training and developments

We investigated the main enablers of training and development to better understand what motivates country offices to provide training to their fleet managers. Four main drivers were identified across the studied cases, as follows.

6. Headquarters' policymaking:

Headquarters can increase the uptake of training and development at the country level through different policies and mandates. Including fleet training in the supply chain and wider organisational policies is a promising way to promote training. These policies can recommend a minimum number of hours and the frequency of training to be taken by fleet managers. For example, Org P released their "global fleet manual" in 2020, which recommended the teams in the country offices which fleet training is required. The uptake of those fleet training recommended by the manual has increased in the country offices since then, despite the recommendation in the manual not being mandatory.

"In our fleet manual, we do stipulate that they [fleet managers] should do certain training. For example, every three years, they need to make sure that they're up to date with their first aid training and driver training. We also have online courses that we outlined in the manual and recommend that they do: Things around safety and security. And we also really try and push the Fleet Forum courses as much as possible."

"We are currently in the process of developing our fleet strategy for the next four years and one of the core pillars in that is going to be around our people and looking at training and ensuring that that they are receiving the training that they need to receive. We have a competency framework and I am looking at the pathway and gaps in terms of knowledge, skills, but also training opportunities and professional development, all of that is linked to what we want to do with our strategy."

7.   Periodic reports and newsletters:

These reports generated by the headquarters provide a periodic view of fleet performance across country offices. The performance measures include crashes, safety and security, and fuel consumption. They spark countries' interest especially when a country-by-country comparison is provided. Fleet managers see how their country's performance measures against other countries, and what areas they can improve.

"We have a monthly report, and I report on the safety and security because we have a system for incident reporting. So, we get some analysis we share with country offices, we see if we are reporting or under-reporting what should be on the system. So, this monthly report now has become very important. I get lots of feedback or questions from country directors. This is how we look at the performance of country offices in terms of fleet reporting, compliance, usage, utilization, all those KPIs."

"This is the compliance. I report on driver compliance, number of speeding instances on every country. We look at if there is any high [number of] over-speeding. I will highlight these, and we would reach out to those country offices saying what's going on. This is an example of one region APAC [Asia–Pacific]. You can see their service compliance and fuel. You can see this region is doing well, while if we look at another region, you might see that they need more support. And usually they pick it up, they come back to me saying: actually, we saw our performance was lower this month. How can we make it 100%? Or the manager or the country director will ask the teams to follow up with me."

8.   Recognition of development through certificates and awards:

Gaining internal and external recognition for the work is an important driver for mainstreaming training and development into the role of a fleet manager. These awards also raise the profile of the role among other organisational functions and highlight the attention given to the role by the headquarters to become a role with a say in strategy.

"We have had success in terms of doing external recognitions. We've pushed out and last year we had a fleet manager in Peru was one of the finalists for the fleet manager of the year for Fleet Forum awards. And we've had another submission this year for this year. So, we're trying to push for external awards."

9.   Internal workplace professional development platforms:

Finally, using internal platforms and organisational intranet to promote professional training and development was found to be an influential driver. The organisations using their internal platforms have observed a better uptake of training courses by country offices, probably because this is perceived as an extension of the day-to-day job offered in the same environment

and platform. Some interviewees referred to internal platforms similar to social media (e.g. Facebook), where they share the training news, country offices' achievements, and related fleet updates. Such activities have been shown to promote the role of a fleet manager across the organisation.

5.2.　Challenges of training and development

The analysis of qualitative data also identified several challenges in the way of professional training and development for fleet managers, as follows.

1. Lack of dedicated fleet staff:

One of the reasons for the low uptake of training courses is limited or no fleet dedicated staff in country offices. When a staff is doing some fleet management tasks among many other tasks related to their main role, there is little interest and drive for them to spend time on fleet training as this is perceived as an auxiliary responsibility which should be done anyhow. This report discussed this barrier from the perspective of the fleet maturity model (see sections 3.3 and 4.2) and showed that lack of dedicated fleet staff and delegating fleet tasks to other roles is a common issue in the early stages level of maturity, where most aid organisations are.

"The uptake [of training] is to be honest, uh, very low. Everybody's wearing six hats, they're not dedicated to fleet alone. They joggle between fleet and other tasks."

2. Volatile working environment:

The working environment in the aid sector is typically volatile with high uncertainty and unpredictability. The numbers, needs, and locations of service users are not as stable as in the commercial supply chains, and thus, planning for long-term training can be easily disrupted due to the nature of the work. With many operational priorities and a shortage of fleet dedicated staff, fleet training and development simply slide down the priority list.

"We do come up again against the issue of time and prioritization. So, professional development is often completely the wrong way around. Often left till last because they have so many operational things that they need to be doing."

3. Language barrier:

Another barrier identified on the path of training and development is language. One might surmise that internet access makes it easy for fleet staff to translate the training and online material into their native language. However, this is not always the case, especially when in the Global South where staff have limited knowledge of English language and computer skills.

"Language is certainly an issue. Many of the colleagues that we work with, even if it's in French and Spanish and Arabic, they're in Cambodia and you know, they speak Khmer and they can't access the training that we want them to be able to access."

4. Disconnect between training achievements and career progression:

Recognition of fleet training through awards, certificates, and celebrating achievement remain glib terms if they are not recognised via financial incentives and not incorporated into career progression. In case of an award, a fleet manager needs to make a case to show they excelled in leadership, innovative fleet operation, and creating customer value, and get an endorsement from the country director. This is an extensive process, which is self-led by the fleet manager. The same applies to completing a training course and getting a certificate of completion. In the end, the fleet manager might ask "*So what?*" if the achievement does not reflect in their career.

"So, we're trying to push for external awards. But again, very much based on whether those people have the time and the energy to make a submission, to get that recognition. And we'll support where we can, but it's country led. It's almost individual led actually."

"Recognition and reward is something that we need to work on. It's something that we realise that we're not there yet. At the end of the training, they all receive a certificate. Everybody's very happy about that. But in terms of career development and professional development, and also recognising our fleet colleagues more generally, I think that is something that we need to focus on."

5. Lack of a competency framework and career pathway for the role:

The role requires a clear competency framework and career pathway to delineate what competencies are needed, and how one would advance in their career should they become a fleet manager. As discussed in the maturity model, these are unfortunately missing due to the overall standing of the sector in lower levels of maturity. Some organisations stated they intend to develop such frameworks and pathways, but by and large, these remain just an intention without concrete actions taken from the headquarters.

6. High staff turnover:

One challenge very commonplace across the aid sector is high staff turnover and difficulties in replacing them. This is already identified as a barrier to improving efficiency (Van Wassenhove, 2006) and sustainability (Zarei et al., 2019) of humanitarian logistics. This study identifies it as a barrier to the training and development of fleet managers. Staff move to other organisations or are moved across different countries within the same organisation, for example, when a

country programme ends. A fleet manager at a country office who is trained and has gained some experience in the aid sector might see better job prospects in the commercial sector or another aid organisation and therefore, decides to leave their current job. The now vacant position is difficult to fill with a competent fleet manager considering the salary offering and the maturity level of the role (see section 4.2). Therefore, the position is likely to either be filled with a subpar candidate, who requires extensive training and development, or remains vacant, where the organisation delegates fleet related tasks to other functions.

"*As you know, in the humanitarian sector, the turnover is very high sometimes. So, if you have a good fleet focal point leaving, you might have a gap for months until this role is replaced. Then you go back to the training again try to help them to improve the performance.*"

6. Ownership models

We have analysed the ownership models in the studied cases to understand whether this has an impact on having a fleet manager and its responsibilities. We identified that between the two ends of the spectrum on the ownership model, i.e., outright ownership and fully outsourced, there are a range of other ownership types where some aspects of the job such as maintenance or insurance are outsourced, while the ownership remains with the aid organisation. Figure 5 shows the spectrum of ownership models in the studied cases.

Not only did the vehicles' ownership took many types, as shown in Figure 5, but also, we observed more than one type of ownership at each given organisation. Organisations with more vehicles tend to have full ownership of their fleet more and only rent when they are waiting for a purchase. On the other hand, smaller organisations with a lower number of vehicles tend towards the other end of the spectrum, where the vehicles' ownership and some or all of the services are outsourced to a third party. One reason for outsourcing was the concerns about dealing with vehicles upon ending a mission or project in a country. They seem to lack the capacity and interest to deal with the cross-border movement of a vehicle or dealing with its end of life.

The mandate of organisations also played a role in the ownership model. Those organisations involved in more long-term development were found to own more vehicles as compared to the organisations involved in emergency response. Furthermore, we found other factors in play. Sometimes, leaning towards outsourced models is not because of the short nature of operations or size of the fleet, but due to exogenous considerations related to the host communities. Two of the cases mentioned insourcing their drivers from the local community because of better access and acceptability of local drivers by local communities being served.

Finally, the qualitative data shows that organisations tending to outsource vehicles typically do not have a dedicated fleet manager. De facto, they believe that outsourcing moves fleet management responsibilities off their shoulder and passes to the third party. However, as the number of outsourced vehicles grows, firstly, the overall cost of outsourced fleet grows considerably, and secondly, it becomes clear that even though each vehicle and the services are fully outsourced, a fleet manager is still needed to organise and orchestrate the operations of all vehicles, plans routes, and manage drivers at country level.
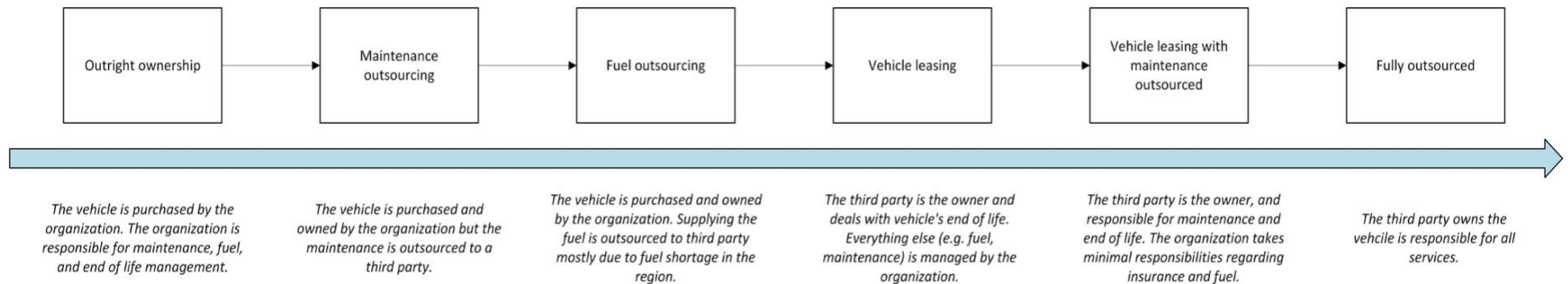

Figure 5: The spectrum of fleet ownership models

7.   Fleet management systems

Fleet management systems are essential means to manage the fleet at country level and provide visibility for the headquarters. The interviewed cases mentioned various fleet management systems, such as Fleet Wave, TracPoint, Central Accident Management Services (CAMS), and Dynamic 365 among others. This study collected detailed data about fleet costs and benefits from all the cases to calculate return on investment (see section 8). Organisations with fleet management systems were able to provide considerably higher quality data, as compared to the ones without one. In fact, we had to exclude some organisations without fleet management systems from the return on investment analysis due to missing and inaccurate data.

An important observation was that the implementation of fleet management systems, both the hardware such as tracking devices and the software such as computer software packages, evolve over time. No organisation made a one-off purchase to acquire the system and install it overnight. If the system is unified across country offices as it evolves, it makes fleet management as well as training and development smoother and more integrated. Headquarters should provide recommendations in the organisational fleet policies for certain fleet management systems which suit the operational needs of the organisation. This is important since it is the country offices that typically make the decision on the selection of local fleet management systems independently from the headquarters and from one another. We have seen organisations with different systems across their country offices, which led to a struggle for training. We also observed organisations with unified systems across their country offices, who acknowledged the role of unification in their operational efficiency and training programme.

"...It's been an ongoing transformation for a long time, many years, many dollars spent so far, but we are hopefully nearing the end. It [the management system] includes supply chain and all the data for our fleet system. It will [also] include warehousing, asset management, procurement, and project management. All of these will be linked together with monitoring and evaluation, and finance. It's all coming together in this one system, which has been painful, but hopefully we will get there and that will give us also much better visibility again at the other end."

Overall, the fleet management system is a "work in development" in the aid sector. Three out of seven interviewed cases installed their system within the past two years and were still experimenting with the new system. Some organisations had data systems only at the headquarters level while the country offices were still using Excel or pen and paper for recording their fleet data. By and large, the characteristics of the fleet management system fit well with the ones at level 1 (passive) and level 2 (developing) of maturity, confirming that there is still a long way towards integrated end-to-end fleet management systems.

8. Return on investment (ROI)

To calculate the return on investment (ROI), a couple of available data sources were explored. Those resources include *a)* the questionnaire sent to the organisations we interviewed *b)* an online questionnaire distributed among organisations through Fleet Forum, and *c)* development plans provided to Fleet Forum during delivered training modules. The collected data include both the provision of competency to fleet managers and the recruitment of fleet managers. Prior to collecting data, a guideline was provided to participants to provide the right value for each cost and benefit item.

8.1. ROI for the recruitment of a fleet manager

After collecting data from each organisation including the cost and benefit of recruitment of a fleet manager, The ROI for each organisation was calculated using the equation (1).

$$ROI_i^r = \frac{TB_i^r}{TC_i^r} \qquad (1)$$

where, ROI_i^r is the return on investment for organisation i for the fleet manager recruitment, TB_i^r is the total benefit of fleet manager recruitment for i^{th} organisation considering total benefits by saving on depreciation costs of vehicles, higher resale values of vehicles, saving on maintenance costs of vehicles, saving on costs of vehicle crashes, saving on fleet insurance, saving on vehicles' fuel costs, saving on fines and penalties, saving on emission-related costs, savings related to tax incentives, saving on total milage costs of vehicles, saving on less downtime of vehicles, and saving on less delivery costs, and TC_i^r is the fleet manager recruitment costs for i^{th} organisation including the cost of advertisement and interview, cost for the time of staff to process and interview applicants, annual salary for the hired fleet manager, and any other direct or indirect recruitment costs.

After calculating the ROI for each organisation, they were integrated to calculate the total ROI for the recruitment using equation (2).

$$ROI - Recruitment = \frac{\sum_{i=1}^{N} ROI_i^r}{N}, \qquad (2)$$

As can be seen in equation (2), we applied an arithmetic average rather than a geometric average. We utilised an arithmetic average to get a more accurate ROI due to the following reasons:

- The arithmetic average could be a good predictor of the expected return;
- Because of data availability, we were able to collect data from some humanitarian organisations. The data showed volatility, and the geometric average could be impacted by volatile data (Zvingelis, 2019).

It should be noted that to decrease the impact of volatile data in our analysis, outlier data were excluded from the calculation. We also excluded organisations with incomplete data from the analysis. Table 4 shows the extracted data from humanitarian organisations at the country level. Figure 6 illustrates the ROI for the recruitment of a fleet manager at each organisation included in this study.

Coventry
University

Table 4: Cost and benefit of fleet manager recruitment in the studied organisations

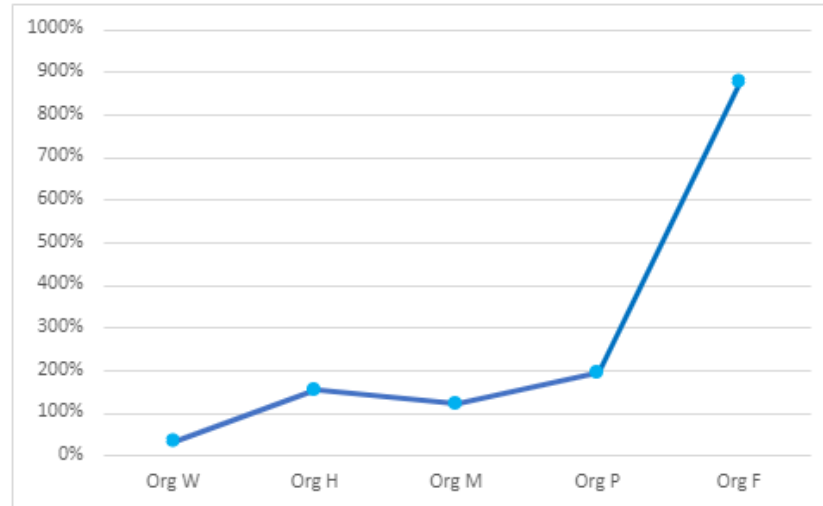| Organisation	Total Costs (€)	Total Benefits (€)
Org W	18,000	6,000
Org H	41,600	65,000
Org M	22,600	27,750
Org P	1,526,000	3,000,000
Org F	65,000	570,000

Figure 6: ROI for the fleet manager recruitment

The average ROI for fleet manager recruitment was 338%. This means for every dollar spent on the recruitment of a fleet manager (e.g. their salary and other recruitment costs), on average the aid organisation sees $3.38 in return. This is a key finding that shows for those organisations without a dedicated fleet manager role, recruiting a fleet manager is a financially feasible option.

8.2.   ROI for competency provision to fleet managers

A similar approach was applied to calculate the ROI for the provision of competencies to fleet managers. First, the ROI was calculated for each aid organisation using the equation (3).

$$ROI_i^c = \frac{TB_i^c}{TC_i^c} \qquad (3)$$

where, ROI_i^c is the return on investment of organisation i for the competency provision to the fleet manager, TB_i^c is the total benefit from provisioning competencies to fleet managers for the ith organisation considering total benefits by saving on depreciation costs, higher resale values of vehicles, maintaining costs, vehicle crashes, fleet insurance, fuel costs, fines and

penalties, emission, tax incentives, milage costs, downtime of vehicles, and delivery costs, and TC_i^c is the total costs for the provision of competencies to fleet managers in the ith organisation. The aggregated ROI for the competency provision was calculated using the equation (4). We utilised an arithmetic average for the aggregation, as explained in section 8.1. To achieve higher accuracy in the calculation of ROI, because of high volatility in the data, outliers were excluded from the analysis. After removing outliers, the collected data are summarised in Table 5. The calculated ROI for the competency provision of each organisation is shown in Figure 8.

$$ROI - Competency\ Provision = \frac{\sum_{i=1}^{N} ROI_i^c}{N}, \qquad (4)$$

Table 5: Cost and benefit of competency provision to fleet managers in the studied organisations

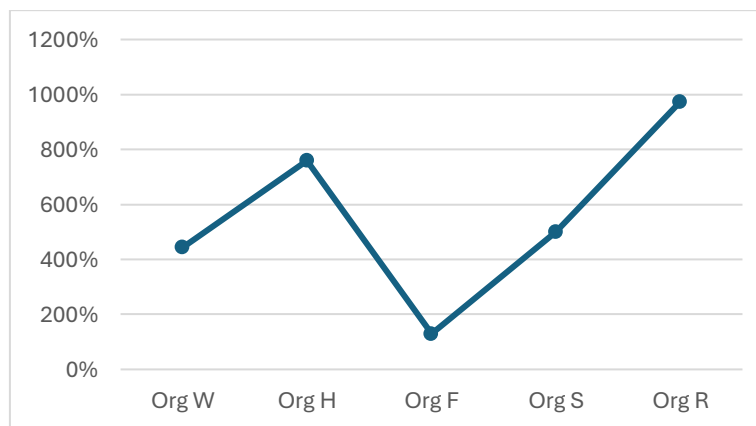| Organisation	Total Cost (€)	Total Benefit (€)
Org W	311,899	1,386,218
Org H	55,349	420,353
Org F	125,000	162,250
Org S	4,700	23,503
Org R	121	1,178

Figure 8: ROI for the competency provision to fleet managers (after exclusion of outliers)

The average ROI for the provision of competencies to a fleet manager was 561%. This means for every dollar spent on the competency provision to a fleet manager (e.g. on training courses, professional development, etc.), on average the aid organisation sees $5.61 in return. This is another key finding that shows investment in fleet training programmes, professional development, and initiatives that develop fleet related competencies in fleet managers is a financially feasible option with high returns.

8.3. Discussion of ROI results

An interesting observation on the ROI for all the organisations was that when the ROI for recruitment is low, the ROI for competencies is high, and vice versa. This applies to all the studied organisations (including the outliers). This means that those organisations employing less competent and less educated fleet managers, do not gain immediate benefits from their recruitment, but as training and development is provided to those fleet managers, the organisations start to see the benefits over time. Interestingly, this observation is supported by the salary levels too. The organisations with lower ROI for recruitment offer lower salaries for the role and therefore, the position attracts less competent candidates.

The opposite also holds. Those organisations who recruit more competent fleet managers, see higher benefits immediately upon the recruitment. They still have to offer training and development to these fleet managers, so that they keep bringing benefits to the organisation throughout their career. This group (organisations with higher ROI for recruitment) offer higher starting salaries and therefore, attract more competent candidates.

9. Recommendations

This report analysed various aspects of the role of a fleet manager: analysis of the role within the organisational structure, the maturity of the role, training and development, ownership models, fleet management systems, and the return on investment for the role. This is one of the first studies that delves down into the role of fleet manager at country offices to deepen our understanding of the role. Based on the findings of this study, several recommendations can be put forward. These recommendations are taken from different sections of this report and are provided in the following. They are developed to inform humanitarian practitioners and policymakers. The academic contributions of the study will be provided in the next work package in the form of a scientific journal article.

- The role of a fleet manager in the aid sector is found to be at early stages of maturity. To move the role to a more mature status, investment in the role and including fleet managers in the decision making are two key considerations. Overall, we observed a gap between maturity of global fleet managers and country fleet managers. To bridge this gap, we recommend that recruiting a global fleet manager should be followed by recruiting competent country fleet managers and providing them with continuous training and development programmes.

- Due to low maturity level and recognition, the role is currently seen together with or synonymous with the role of a driver. Currently, the training does not include the competencies needed for fleet management, but instead focuses on the requirements of driver role mostly. To propel the role to a more mature status and to close the existing knowledge and skills gap between the headquarters and country offices, providing role-specific training based on a wider set of fleet management competencies is essential.

- No matter the ownership model and the size of fleet, aid organisations need to develop an overarching fleet strategy "with" the country fleet manager, not "for" them. Aligned with the strategy, a fleet competency framework is also essential.

- Headquarters' policy and actions play a major role in encouraging country offices to take up fleet training, yet it is not all. The training should be embedded in the role through inclusion in the job requirements, career progression, and allocating work time to training.

- Training should be made available in the languages of all country offices as far as possible. Special effort should be devoted for the fleet managers in the least developed countries with non-mainstream languages.

- Fleet management system's hardware and software evolve over time at each country offices based on the operational needs and availability of budget, which would result in different systems across countries over time. Headquarters should recommend the most compatible system with their operating context from the outset in their fleet strategy. This will result in an integrated and homogenous fleet management system which facilitates better training and improves the visibility of headquarters over country offices.

- An organisation without a fleet manager would gain on average $3.38 for each dollar invested to recruit a fleet manager. An organisation already with a fleet manager would gain $5.61 on average for each dollar spent on the training and development of its fleet manager as well as its fleet management systems.

- Offering a higher starting salary attracts more competent fleet managers who generate higher financial returns for the organisation in the short term following their recruitment. On the other hand, less competent fleet managers recruited would provide more benefits to the organisation once they receive training and development in the longer term.

10.   Limitations

The study is not devoid of limitations. It is a multiple case study based on the data collection from seven aid organisations. Case studies are "inductive" in nature which delves down into the underlying constructs and dynamics of each case through in-depth interviews. However, they cannot be confidently generalised to the whole context (in this case humanitarian sector). Although efforts were made to increase the generalisability of findings by involving more organisations in the second round of data collection through online questionnaire, the ROIs calculated in this study might differ from the actual average ROI for the recruitment and competency provision of the sector, if calculated. This study has made the first attempt to estimate the ROI for the role of fleet manager in the humanitarian sector in the face of incomplete and poor data availability. To best of our knowledge, no other studies exist in the academic or grey literature that analyse the role and calculates the ROI. In order to generalise the findings, especially the ROI, to the whole sector, "deductive" studies are needed in future entailing a larger sample of aid organisations which can statistically represent the whole sector.

Second, this study was "cross-sectional" as opposed to "longitudinal", meaning that the data was collected in a relatively short span of time (4.5 months). We initially endeavoured to gather data of the past five years from each case, but often such data were simply not recorded by humanitarian organisations. To tackle this, we revised our questionnaires to collect data about the current benefits and costs of the role. In order to better observe the development of the role, we recommend longitudinal studies in future, which goes back to each case every 6 months for a period of 2-3 years, for example. This would give a more accurate picture of the role's evolution and the ROI through time.

References

Eftekhar, M., & Van Wassenhove, L. N. (2016). Fleet management policies for humanitarian organizations: Beyond the utilization–residual value trade-off. *Journal of Operations Management*, *44*(2016), 1-12. https://doi.org/10.1016/j.jom.2016.03.008

Johnsen, T., Miemczyk, J., & Howard, M. (2018). *Purchasing and supply chain management: A sustainability perspective* (Second Edition ed.).

Kunz, N., Van Wassenhove, L. N., McConnell, R., & Hov, K. (2015). Centralized vehicle leasing in humanitarian fleet management: the UNHCR case. *Journal of Humanitarian Logistics and Supply Chain Management*, *5*(3), 387-404. https://doi.org/10.1108/JHLSCM-07-2015-0034

Reck, R. F., & Long, B. G. (1988). Purchasing: A Competitive Weapon. *Journal of Purchasing and Materials Management*, *24*(3), 2-8. https://doi.org/https://doi.org/10.1111/j.1745-493X.1988.tb00631.x

Van Wassenhove, L. N. (2006). Humanitarian aid logistics: supply chain management in high gear. *Journal of the Operational Research Society*, *57*(5), 475-489. https://doi.org/10.1057/palgrave.jors.2602125

Zarei, M. H., Carrasco-Gallego, R., & Ronchi, S. (2019). To greener pastures: An action research study on the environmental sustainability of humanitarian supply chains. *International Journal of Operations & Production Management*, *39*(11), 1193-1225. https://doi.org/10.1108/IJOPM-12-2018-0703

Zvingelis, J. (2019). Arithmetic, Geometric and Other Types of Averages.