

SUSTAINABLE MANAGEMENT IN THE DELIVERY SECTOR

Lavinia IANCU ^{a*}

^a Bucharest University of Economic Studies, Romania

ABSTRACT

The world has witnessed unprecedented population growth, reaching 8 billion by 2023. Factors such as technological advancements, medical breakthroughs, and improved living conditions have fueled this surge. With heightened life expectancies and rapid population increments, efficient resource management is essential. Our ecosystems, which evolved over billions of years, have been significantly impacted by the mere 200 generations of modern civilization, particularly since the Industrial Revolution. As we navigate the fourth Industrial Revolution, marked by the Internet of Things (IoT) and smart technologies, there is a palpable need for sustainable business models. Notably, transportation, a major environmental offender, contributes 16.2% to global greenhouse emissions, with road transport alone accounting for 11.9%. This paper focuses on innovative sustainable strategies in the delivery sector, targeting a holistic approach grounded in the three pillars of sustainability: People, Planet, and Profit. Following the in-depth research interviews undertaken with top-management executives in the traditional delivery businesses, therefore the current paper attempts to assess the good practices in sustainable management, following the 5 management principles: planning, organizing, directing, staff and controlling, in the context of the AI-driven business models and find paths for further improvement following the three pillars of sustainability: People, Planet and Profit.

KEYWORDS: *delivery, GIG, sustainability.*

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1. INTRODUCTION

In the demographic trends, it is evident that the world's population trajectory has followed an accelerating curve, especially over the last century. Tracing back to the year 1000, historical estimates suggest the global population stood at approximately 275 million. This figure saw a modest increase to 320 million a century later. By 1200, the count was around 360 million, experiencing a brief decline in 1400 to 350 million. The subsequent centuries saw consistent growth: 450 million by 1500, 500 million by 1600, and a notable surge to 610 million by 1700. However, the most significant and rapid growth occurred from the 18th century onwards. By 1800, the global population had reached the 1 billion mark. In 1900, it was recorded at 1.6 billion, and a remarkable acceleration was observed as it touched 6 billion by the year 2000. Recent estimates for 2023 indicate that we have surpassed 8 billion, marking an ongoing and rapid demographic expansion. This acceleration becomes even more apparent when examining the milestones of the past century alone. The global population reached 2 billion in 1927, 3 billion in 1960, 4 billion in 1975, 5 billion in 1987, 6 billion in 1999, 7 billion in 2011, and the most recent 8 billion in 2023

* Corresponding author. E-mail address: lavinia@sustenobil.ro

(Worldometers, 2023). This exponential growth, especially in the latter half of the 20th century and into the 21st century, underscores the urgency and significance of research in the world's sustainability, forming the foundation of this thesis.

Technological advancement, the latest research endeavours conducted, the discoveries in medicine and therefore the access to proper healthcare treatment, contributing to overall better living conditions, have led to the massive and rapid pace change of the population. In the context of longer life expectancy and exponential growth in the population, a proper system for the management of resources is highly imposed. The ecosystems of the planet Earth, which sustain our health, wealth-creation and wellbeing, have evolved over billions of years; however, modern civilisation first emerged around 5,000 years ago, calculating 70 human lifetimes of 70 years or around 200 generations.

2. TECHNOLOGICAL ADVANCEMENT

For the past 300 years, the Industrial Revolution, which started in Britain in the 18th century, has radically changed the evolution of the environmental ecosystem. After the first industrial revolution, also known as the Bronze Age, characterised by metal usage, the second industrial revolution brought steam engine mechanisation, after the mass-production era, facilitated by electric power and the mass-automation of production, enabled by electronics and information technology (de Ruyter et al., 2018), now the fourth Industrial Revolution (4IR) or the 4.0 Industry, initially described by Professor Klaus Schwab, occurs. Today, the internet has reinvented the objects around us, offering them new functions, such as remote monitoring and controlling, that were otherwise impossible before the Internet of Things (IoT) era. Smart phones, smart cars, smart homes and intelligent traffic have become ordinary aspects of people's lives that have changed how humans interact with digital and physical assets for entertainment, study and even work. Operations management has been reshaped by the Industrial Revolution's 4.0 technology used to apply front-end technologies, such as intelligent manufacturing, smart supply chain, smart working and smart products, and base technologies, such as Internet of Things, Cloud Computing, Big data and Analytics, that can provide more visibility, which leads to enhanced operational performance (Bag et al., 2021)

3. THE STRINGENT NEED OF REDESIGNING SUSTAINABLE BUSINESS MODELS

Given the scarcity of the resources and the predictable pace the natural resources consumption, a sustainable business model is highly required. In this scenario, transportation is the third largest source of pollution, responsible for 16.2% of worldwide greenhouse gas emissions. Of that percentage, 11.9% comes from road transport (Ritchie & Roser, 2020). The rising trends in car manufacturing and energy use suggest more concerning future impacts, leading to essential discussions about the sustainability of procedures, businesses, and nations. A significant amount of pollution stems from the transportation sector. Therefore, this paper explores management strategies in both established and budding areas, referred to in academic circles as GIG (Cano et al., 2021) business models, a side or project-based type of job meant to augment their income (Sprague, 2015). The goal is to identify a comprehensive sustainable business approach that addresses the three pillars of sustainability: People, Planet, and Profit. To gain a comprehensive understanding, I employed a rigorous qualitative approach. Semi-structured interviews were carried out with representatives from both traditional delivery companies and those operating under GIG business models. This methodology allowed for nuanced insights and a comparative analysis of the two business paradigms and explore a theme that was not much covered by the existing literature.

4. SUSTAINABLE MANAGEMENT IN EMERGING BUSINESS MODELS IN THE DELIVERY SECTOR

According to ListăFirme.ro, in 2021, in Romania, out of 845,728 companies, 4,488 were delivery companies, making up 0.53% of the total. This was a 31% increase from the previous year. In 2020, there were 819,356 companies in total, with 3,432 being delivery companies. This made up 0.42% of the total, a 35% increase from 2019. In 2019, out of 794,491 companies, 2,540 were delivery companies, making up 0.32% of the total. This was a 17% increase from 2018. In 2018, there were 758,477 companies in total, with 2,170 being delivery companies. This made up 0.29% of the total, an increase of 11% from 2017. In 2017, out of 732,860 companies, 1,948 were delivery companies, making up 0.27% of the total. This was a 14% increase from 2016. In 2016, there were 699,220 companies in total, with 1,704 being delivery companies. This made up 0.24% of the total, a 9% increase from 2015. In 2015, out of 680,136 companies, 1,558 were delivery companies, making up 0.23% of the total. This was an 11% increase from 2014. In 2014, there were 674,834 companies in total, with 1,407 being delivery companies. This made up 0.21% of the total, a 12% increase from 2013. In 2013, out of 662,618 companies, 1,260 were delivery companies, making up 0.19% of the total. This was a 16% increase from 2012. In 2012, there were 657,074 companies in total, with 1,082 being delivery companies. This made up 0.16% of the total, a 7% increase from 2011. In 2011, out of 652,099 companies, 1,007 were delivery companies, making up 0.15% of the total. This was a significant 47% increase from 2010. In 2010, there were 614,598 companies in total, with 684 being delivery companies. This made up 0.11% of the total, a 4% increase from 2009. In 2009, out of 631,988 companies, 659 were delivery companies, making up 0.10% of the total. This was a 3% increase from 2008. In 2008, there were 662,803 companies with 641 being delivery companies, constituting 0.10% of the total.

From the analysed data, it is evident that the total number of companies in Romania is on an upward trajectory, signalling a robust and growing economy. Simultaneously, there has been a consistent annual increase in the number of delivery companies, reflecting an escalating demand for their services in the region. Despite this growth, delivery companies still represent a minor portion of the overall business sector, indicating that the delivery industry, while expanding, remains a specialized segment within the larger economic framework. This trend might be attributed to the higher initial investments needed for transportation and the uneven road infrastructure, which often limits delivery businesses to more developed urban areas, leading to intense competition. Notably, certain years, such as the period following the 2008-2009 economic crisis and the pandemic years of 2020-2021, saw remarkable growth spurts in the delivery sector - 47% and 31%, respectively. These increases highlight the sector's resilience and adaptability, propelled by factors like technological advancements and a shift in consumer behaviour towards more online shopping and home delivery services.

5. PEOPLE IN THE DELIVERY SECTOR

In traditional business models at the entrepreneurial level, the primary aim has been generating economic value for shareholders, whereas the sustainable management approach emphasizes not only financial gains, but also the importance of creating a positive environmental and social impact, focusing on driving beneficial changes for society as a whole (Iancu, 2022, p. 177).

To gain a deeper understanding of the sustainability of delivery companies, I undertook a thorough exploratory qualitative research. This involved conducting semi-structured research interviews with managers within the delivery sector. This exploration aims to assess the management principles in relation to the three pillars of sustainability, namely People, Planet, and Profit, in traditional business models in the delivery sector. Under the umbrella of management functions, various

dimensions are considered. In the realm of **Planning**, aspects such as **Recruiting**, **Retention**, and **Exit** strategies are dissected to understand their alignment with sustainability goals. Under **Organizing**, procedures for assessing and compensating for the CO₂ emissions impact are scrutinised, alongside optimising interactions both within and outside the business. An examination of the organisational chart and underlying business processes is also undertaken to ensure a thorough understanding of the structural and procedural aspects. The exploration extends to encompass various operational facets, with a particular focus on sustainable practices. The business model further delves into hourly-based and task-based structures, and the contract types, whether full-time, part-time, or contractor-based, are also evaluated for their sustainability impact.

The traditional delivery operations often have established headquarters with centralised control over fleet management, route optimisation, and operational efficiency. In staffing, a multi-tiered structure comprising **Headquarters**, **Operational**, and **Contractor** roles is evaluated with a keen eye on their environmental footprint. The assessment broadens to encompass resources spanning from natural resources like air, water, and energy to technological, human, and even natural capital (Van Zyl, 2022). The essence of optimal pay rate and its alignment with sustainability goals forms a critical part of the discourse. Directing and Coordinating function explores procedures, decision criteria ranking, and coordination flows, with an inclination towards understanding sustainability's impact and potential enhancement. The innovative use of AI-driven algorithms, reporting mechanisms, and key performance indicators are brought into the limelight to gauge their effectiveness and alignment with sustainability. Lastly, the research extends to **Budgeting**, where staff roles across different tiers are analysed. The discussion envelops resource allocation, from natural resources to technological assets like cars, phones, and office equipment.

The traditional employment elucidates a complex interplay of labour rights, income predictability, and motivational strategies, each with advantages and challenges. As the modern workforce continues to evolve, understanding these dynamics is crucial for policymakers and organisations aiming to foster a fair, motivating, and productive work environment.

Stress, **work**, and **responsibility** are the three words that pop out in a courier's mind when thinking of the traditional delivery sector and he appreciates it is up to the driver to maintain control over time. In Romania, job expectations often exceed the formal job description, unlike in countries like Germany where employees, such as couriers, experience a stress-free environment by strictly adhering to their defined roles. For instance, a courier in Germany solely focuses on his designated responsibilities without additional tasks. The main sources of stress for employees in the delivery sector, mainly for drivers, are a) **the daily traffic safety** that depends on the infrastructure and the differences from one place to another, from one country to another; b) **physical effort** - being at the steering-wheel for 9 hours and lifting weight, c) **work conditions and adapting** to the delivery environment that implies waking up early; d) **pressure to arrive in a certain time**; e) ensuring the goods arrive in optimal conditions, which are normal for the cargo;

The driver starts with the first load at the beginning of the working day, and returns the parcels refused or not delivered during the day at the company's headquarters and he hands over the parcels to another courier to deliver it. In traditional employment, a structured work schedule, usually from 9 to 5, mandates employees to start delivering with attendance meticulously recorded. In some companies, drivers are subordinate to a dispatcher overseeing the overall drivers' team responsibility. In others, the hierarchy includes a column chief above the dispatcher. The delivery process consists of 1) order placing, 2) loading the parcels to be delivered, 3) ensuring all the security and technical checks and procedures to avoid any damage that might disintegrate the parcels, 4) transporting the goods for which the driver is responsible, 5) reaching the destination and delivering the parcels. The driver makes sure that the goods transported are well stored in the car.

At the delivery and transport companies V.G. (52 years old) has been interacting with, the planning is made by an employee using the software at the beginning of each working day, following specific

criteria, such as the distance between the destinations and driving hours involved, the vehicle category, the weight and volume of the freight, as well as weather conditions that might influence the workflow, major force such as snow, strong wind or other special conditions. It is noted that many delivery companies operate with an initial team of couriers and a subsequent team responsible for redelivering undelivered parcels throughout the region.

Unlike transport companies, which employ stricter rules and regulations, delivery companies are more flexible because they can use multiple types of vehicles to run their business, mixing heavy and with medium and small-size vehicles and allowing them to accommodate multiple market segments. Weekends may be included as working days and bonuses for target accomplishment are frequent incentives in the delivery companies and night shifts are also part of the logistic efficiency. In most delivery companies, automation has taken over lately, therefore sorting the goods is made automatically, with scanners that read bar codes, thus the new employees need to learn company's procedures, as well as how to handle the GPS or use for the bar-code scanner, pick-up points such as easy-boxes recently implemented by large delivery companies such as SameDay or Fan Courier. Often, support and guidance come from fellow couriers, highlighting the importance of peer relationships in this industry, irrespective of these structural differences. This strong professional kinship facilitates knowledge transfer, benefiting both management and staff. Moreover, demanding jobs in delivery sector may benefit from the protection of various syndicates and professional associations. For example, Romania has ARTRI - the Romanian Association for International Road Transport, while many European countries have dedicated Drivers' Unions. These national or company-specific syndicates may choose to affiliate with larger trans-organizational entities or remain independent. When considering avenues for improvement, it is posited by couriers that delivery company policies ought to exhibit greater empathy and understanding. They advocate for a reduction in individual workloads, highlighting that **under-allocation** of staffing can culminate in costlier repercussions over time. The assertion is made that managerial decisions frequently result in work being assigned to a single individual that would be more appropriately distributed among two or three. Such **misallocation** can precipitate a cascade of issues: **forgotten** parcels, **compromised** service quality, and even workplace accidents stemming from rushed efforts to meet aggressive key performance indicators. These inefficiencies not only diminish customer satisfaction, but might also incur financial damages that exceed the initial perceived savings from resource allocation.

6. OUTSOURCING IN THE DELIVERY SECTOR

A delivery and transport company based in Dolj county, affiliated with Urgent Cargus since 2014, manages operations across the Oltenia region. Its fleet covers regular routes connecting cities such as Reșița, Petroșani, Craiova, and Slatina, serving both B2B and B2C sectors. The firm's workforce includes drivers who function as couriers and staff assigned for parcel sorting, with a requisite for all to provide a criminal record. An auxiliary "**ship-and-go**" service is provided, retaining undelivered parcels for a maximum of five days for client collection. Within this segment, two employees are tasked with digitally recording orders. The company adheres to a non-discrimination hiring policy, welcoming candidates from diverse backgrounds and living situations, and ensures pay parity throughout its ranks. Recruitment in this delivery and transport company is facilitated through unemployment agencies. Employees function under a predefined contract that stipulates delivery volume and pricing. They often operate from delivery depots located in cities such as Sibiu, Brașov, and Craiova. The operational team consists of 9 primary truck drivers, 1 backup driver, and 2 couriers using minivans for in-city distributions. A notable industry challenge is its high attrition rate, with many staff members leaving within a short span, typically 2 to 5 months, as documented in the REVISAL HR system. Long-serving employees, with tenure exceeding 4-5 years, undergo evaluations and are eligible for financial rewards. However, this firm has ceased

providing meal vouchers or daily allowances. Only Christmas and Easter bonuses are granted. The managerial observation is that fewer companies in this domain continue to offer meal vouchers. Employees are entitled to lunch breaks in addition to compensation and bonuses for completing their tasks. The company implements monitoring through entry cards, with a dedicated software generating reports for the finance department. The company's manager highlights that the reliability of new employees often falls short, and this is not solely linked to wage levels. The working hours, especially the early morning shift from 5 AM to 9 AM and the afternoon shift from 3:30 PM to 7:30 PM, from Monday to Friday, might be a factor. Truck drivers predominantly work night-time, starting their journey at 5 PM to reach destinations within a few hours. On demanding days, couriers handle between 50 to 100 deliveries on a single route. Business activity also undergoes seasonal variations, typically witnessing a decline from January 15th to March 15th.

The recent engagement of a venture capital fund with the parent company has initiated cost-reduction strategies, pausing recruitments and maintaining modest salary levels. Cargus now retains only its internal managerial and office personnel, offloading the costs related to fleet maintenance and staff salaries to the contractors. Consequently, contractors now shoulder greater responsibilities, including financial burdens. Within the parent company, meticulous organization and stringent enforcement of rules, such as adherence to safety protocols and mandatory submission of employment documents prior to badge distribution, cultivate a well-regulated working environment. The logistics HUB representatives manage contractors and drivers, delegating specific routes. This arrangement provides couriers with a lucid comprehension of their responsibilities. Managing returns presents a direct yet financially burdensome task in this industry. Often, customers decline parcels due to a change in preference or insufficient funds, resulting in the business absorbing the costs. Delivery company managers grapple with an array of managerial and financial hurdles. These include expenses per kilometre, increasing fiscal taxes with immediate implementation, rising fuel costs, extended payment timelines from contractors that can reach up to 60 or 90 days, tire replacements and car maintenance, GPS systems, various compliance and ISCIRT (vehicle inspection) documents, and costs associated with service hours. Such challenges considerably tax their resources. There is a prevailing sentiment of disparity favouring foreign delivery companies, like those from Poland, over local Romanian firms. Despite operating under the same parent company, these foreign entities allegedly receive more favourable compensation.

Additionally, the frequent transitions in venture capital participation, typically every half-decade, result in managerial and staff changes, thereby interrupting the seamless execution of projects. Local firms face additional financial pressures, including branding expenses. For example, they incur costs for painting their trucks white and showcasing the parent company's logo. This means they effectively market the parent brand using their own funds. On top of this, they are liable to penalties, which can accumulate to significant sums. These penalties are further subtracted from their billings. This multi-faceted financial challenge demands skilful management and strategic adjustments to ensure the continuity of operations in a challenging and monetarily rigorous landscape.

At the age of 50, the manager of a delivery company undertakes operations as a subcontractor for Bookourier, specifically catering to deliveries in District 5 of Romania's capital. This business initiative emerged after a former courier's employment contract was terminated, leading to the foundation of an SRL (Limited Liability Company) in the delivery realm. The operational framework has since expanded, comprising three staff members and utilizing a fleet of two Dacia Logan cars along with two minivans for delivery purposes. However, challenges persist, potentially signalling the strains of inadequate staffing against delivery demands. Partnering with Bookourier equips the subcontractor with essential gear, including t-shirts, vests, and long-sleeve blouses. Moreover, the fleet vehicles prominently feature the Bookourier branding, symbolizing a collaborative arrangement beneficial in terms of branding and equipment provisions.

Operational challenges frequently emerge, such as incidents resulting in the suspension of a courier's license. These situations necessitate internal shifts, like repositioning the impacted courier to a co-pilot role. One of the primary concerns among management is the pronounced turnover and perceived inconsistency of younger employees, specifically those below 30. This demographic is often perceived as seeking high returns for minimal effort, creating an obstacle for small enterprises aiming for a stable and dedicated workforce. Despite these issues, it is noted that the delivery industry offers a source of income, though with limited potential for significant savings. There is an indication of previous operations with leased vehicles, but changes occurred post-lease, possibly hinting at financial limitations or an altered resource management approach. Furthermore, the pandemic has distinctly influenced consumer patterns, promoting online shopping, especially in light of vaccination-imposed restrictions. This trend seemed to continue even after these restrictions were lifted. While physical visits to shopping centres remain prevalent, the allure of doorstep deliveries for a diverse product range - from apparel to large pet food packages - underscores a consistent incline towards e-commerce. The narrative highlights a demanding yet practical operational environment for couriers, who are tasked with achieving an 85% delivery target.

Fortunately, return instances are sparse, but this demands continuous diligence from couriers to guarantee effective deliveries. Obstacles emerge when recipients are not available at the specified address, provide inaccurate contact details, seek alterations in the delivery site, or decline the package outright. In these situations, couriers keep the non-delivered parcels in their vehicles until they can transport them back to the central HUB, illustrating adaptability and proactive problem-solving in their roles. Parking challenges, notably in urban areas, create hurdles for couriers who often resort to illegal sidewalk parking due to the lack of designated spaces, leading to potential confrontations with residents and fellow motorists. This highlights the operational obstacles that couriers navigate daily. Furthermore, due to budgetary restrictions of some smaller delivery firms, couriers might use their personal mobile devices for GPS guidance to find delivery points. However, there is an upside: couriers, with time, become well-acquainted with their assigned delivery zones, diminishing their dependence on GPS and facilitating quicker route planning. This adaptation showcases the couriers' capacity to adapt and enhance their proficiency despite resource constraints and logistical challenges.

Typically, a courier's workday commences early, at around 5:30 or 6 AM, split into two primary tasks: morning deliveries and afternoon collections. Customer preferences, such as the desire for deliveries after 3 PM, call for on-the-spot modifications to the couriers' itinerary, underlining an inherent need for adaptability in their planning. A distinctive service provision is the "open-on-delivery" option, allowing customers to examine items prior to finalizing the payment. While this caters to customer assurance, it can at times instigate disputes between the courier and the consumer, possibly due to mismatched anticipations or ambiguities concerning service provisions. For returned items, couriers employ specific codes to chronicle the cause of non-delivery, whether stemming from the recipient's absence, alterations in the delivery address, or rescheduled delivery timings. Some courier firms adopt a lenient stance, retaining undelivered items for several days before rerouting them back to the sender, demonstrating a compromise between consumer satisfaction and operational practicality. These delineated procedures and hindrances offer a glimpse into the intricate dynamics and malleable character of the delivery industry, which perpetually adjusts to cater to consumer demands whilst circumventing logistical and functional impediments. The narrative also underscores certain operational and ethical dilemmas in the delivery domain. The sporadic personal use of work vehicles by couriers or their overlooking of necessary maintenance is problematic, even though the subsequent repair expenses fall on the delivery firm's account. This suggests a financial strain borne by the enterprise due to such behaviours. For this reason, most delivery companies constantly track their vehicles using 24/7 GPS monitoring, often employing software like TomTom and Navicom. These systems provide real-time

updates on traffic, road closures, and suggest alternative routes when possible. Sometimes, these alternatives ensure timely deliveries, even if it means a longer drive. However, in areas without bypass roads or multiple access points, drivers may have no choice but to stick to a single route. Typically, there are set routes for starting and ending points for deliveries.

7. PROFIT IN THE DELIVERY SECTOR

With a strong component of transport, the delivery sector is highly impacted by economic factors with immediate enforcements. A significant operational expense, varies based on workload and fluctuating fuel prices are a few of them. A spike in fuel prices can substantially escalate weekly delivery costs, impacting the financial outlook of the delivery operations. Insurance costs for business-use vehicles, represented by the RCA mandatory insurance, constitute another fixed expense, further contributing to the operational costs in 2023. Moreover, most delivery companies have goods insurance and apply strict rules when sorting the parcels they handle, forbidding the transport of dangerous goods or those that require special transportation conditions, such as washable or flammable that in Romania require an ADR (road transportation of dangerous goods regulatory institution). All these aspects lead to average earnings for personnel.

On the positive side, couriers have the potential to augment their earnings through tips, which, although varying, provide an additional income stream. The volume of daily deliveries, between 80 to 100 parcels, reflects a demanding work schedule yet also opportunities for earning tips. However, a serious ethical and trust issue is highlighted in instances where inexperienced couriers misappropriate cash collected on delivery. One egregious case mentioned involved a courier retaining a significant amount of collected cash as self-compensation. The lack of legal action against such misconduct, justified by the time-consuming process and the need to report at the contractor's headquarters, suggests a gap in accountability and enforcement measures. This incident and the implied tax requirement on criminal records indicate a broader challenge of ensuring trustworthiness and integrity among couriers. This aspect underscores the need for more robust monitoring, accountability, and possibly, stringent hiring practices to mitigate such unethical behaviours and protect the financial and reputational interests of the delivery companies and their contractors.

8. PLANET IN THE DELIVERY SECTOR

Regarding their natural impact, traditional delivery models tend to have a higher carbon footprint than the GIG businesses, due to fixed routes and potentially older, less fuel-efficient vehicles, as they operate on long routes and usually use diesel engine-powered vehicles as a more cost-effective solution. Multiple types of vehicles can be utilised in the delivery sector: 1) regular cars - up to 1.5 tons; 2) vans ranging from 1.5 tons to 3.5 tons and up to 7.5 tons, used specifically for deliveries; 3) heavy trucks - assembly of 7.5 tons; 4) truck and a tractor-trailer combination - used for international road transportation (TIR) and large volumes over long distances. Trailers or semi-trailers are directly attached to the truck or tractor vehicle. A trailer can also be attached using a tow hitch or other variant to trucks. The weight limits for each category of vehicles include the load and freight. Cargo vehicles fall under category C driving licence, whereas driving a trailer requires a C (or C1) + E driving licence. The car lorry used for delivery returns to the company's headquarters, while the drivers can hold small cars overnight.

In terms of assets and equipment, traditional delivery operations often have standardised vehicles and equipment, which may or may not be optimised for environmental efficiency. More recently, delivery companies have started using the latest generation trucks, with Euro 5 and even Euro 6 coefficients, with low fuel consumption, lower CO₂ emissions and higher performance than their

older versions. For efficiency reasons, few delivery companies have installed their own fuelling stations at their headquarters, and most of them maintain a certain standard of cleanliness.

To tackle the environmental impact, certain municipalities and areas of the city impose traffic restrictions and higher rates that need to be paid by the high-polluting vehicles with Euro 4 or even lower coefficient engines. For instance, in Germany, delivery companies pay electronically a tax charged by the City Halls per day, which is normally supported by the beneficiary of the goods. Nevertheless, most of the delivery companies use diesel as their fleet's main fuel because of its performance on the engine; however, they might have multiple sizes of vehicles to allocate the orders more effectively, using a combination of trucks, vans and normal vehicles. To discourage high-polluting vehicles, in Germany, there is a differentiated tariff for gasoline: trucks with Euro 3 pay 0.35 cents/km, Euro 5 – 0.15, and Euro 6 – 0.08 cents per thousand km in 2 days, as in the year 2015. Some of the delivery trucks use a combination of LPG gasoline and diesel, but only authorized and homologated solutions by the manufacturer are allowed.

In recent times, delivery companies have undergone a paradigm shift in their operational methodologies by embracing technological advancements. Investments have been made towards acquiring modern technological equipment, with a notable emphasis on mobile point-of-sale (POS) systems and near-field communication (NFC) technology. These innovations have significantly diminished the prevalence of cash-on-delivery transactions, which used to be the favoured payment method in Romania. This transition has contributed to a reduction in the black economy and the potential for unauthorised money withdrawals. Delivery within this context involves intricate flows and processes. The use of Air Waybills (AWBs) and specialized software enables meticulous tracking of merchandise, noting whether items are refused or logged at the hub. A heightened level of monitoring, including video surveillance, is employed given that some envelopes could contain money. In the event a parcel goes missing, it is either likely to be found at the HUB or flagged as stolen, triggering an internal investigation to track the last recorded system entry for that item. At the day's end, couriers can reconcile the in-and-out movement of items. In some companies, any undelivered parcels are directed to the “ship and go” department, ensuring a systematic handling of goods and accountability at various stages of the delivery process. Moreover, a substantial portion of investments has been allocated towards the procurement of electric vehicle fleets and the establishment of the so-called “easy boxes” equipped with SMS unlocking mechanisms within neighbourhoods. These strategic initiatives are poised to diminish the environmental footprint and increase operational excellence. They achieve this by minimising travel distances and facilitating the utilisation of electric vehicles, which are inherently more eco-friendly alternatives.

Sameday, a leading courier company in Romania, operates on a hybrid business model, utilizing its own fleet within Bucharest and its vicinity while outsourcing to regional partners for last-mile deliveries from HUBS. This model, primarily adopted during high-volume delivery periods like Black Friday, Christmas, or Easter campaigns, leans towards staff leasing for cost efficiency. Regional partners are periodically audited and gain from the company's expertise, adhering to stringent company guidelines and monitoring key performance indicators (KPIs) pertaining to delivery quality and quantity, client interaction, and complaint count, all of which directly impact their earnings. According to a company representative, Sameday invests in training their couriers and affiliate agencies, dubbed the “smile team”, as they represent the company to customers, emphasizing interaction and people skills. Additionally, they offer leadership and training programs to Level 1 and Level 2 employees across all departments to foster a conducive organisational culture for growth. Bi-annually, consumer surveys are conducted to garner insights for development. Last-mile delivery planning employs AI-powered software that integrates Google Maps and GPS data for micro-mapping, complemented by courier input, enabling the system to learn over time. Couriers handle about 50-70 stops daily. Other operational metrics include stage-segmented delivery times, evaluated at individual, team, and regional agency levels, along with

sorting and HUB operations that could cause delays, and maintaining hygiene standards. Catering to 90% of online store clientele, Sameday pioneered in the Romanian delivery sector by introducing a nationwide network of automated lockers known as Easy boxes, slashing CO₂ emissions by 95% compared to more time-intensive and polluting door-to-door deliveries. Approximately 50% of deliveries now utilize Easy boxes, significantly enhancing resource efficiency. While traditional delivery allowed for around 70 parcels daily, couriers can now manage 500 parcels using this method. The innovation did not stop there; they even tested an autonomous electric version of the Easy box, aiming to eventually convert all boxes. Injecting 100 million euros for rapid development in recent years, they anticipate reaching a breakeven point in the near future. In a move towards environmental sustainability, Sameday has also adopted packaging made from 100% recycled plastic collected from nature. By 2023, they transitioned to electronic contracts from paper-based ones for over five years. The company is keen on better tracking its CO₂ emissions and is exploring auditors for ESG reporting. Having already invested in a fleet of 100 electric vehicles, Sameday plans to further augment this investment in the years ahead.

Less innovative than Sameday, Cargus' contractor company practices differentiated waste collection, segregating cardboard and paper from plastic and glass, showcasing Cargus' commitment to environmental stewardship. Various factors like fuel consumption, weight of the load, price per kilometre, truck speed, landforms, road types, and the number of drivers involved play a significant role in determining the tariffs. Despite these complexities, there is a noted absence of time for financial performance planning and forecasting due to the pre-booked trips and the necessity to adhere to truck schedules and mandated resting hours, suggesting a highly operational and perhaps reactive nature of the business in managing its logistics and financial planning.

9. CONCLUSIONS

In conclusion, the delivery sector stands at the crossroads of technological progress and eco-conscious practices, signifying a promising avenue to curtail environmental repercussions while upholding social welfare and economic viability. Although there is a noticeable increase in the usage of electric cars, the full transition to electric vans and trucks, particularly for bulk deliveries, sustainability remains a prolonged endeavour. These vehicles require substantial power and longer charging intervals, constituting challenges to their mainstream adoption. While governments and local entities offer perks like CO₂ green certificates and fiscal benefits to electric vehicles, the transition to a greener model necessitates considerable initial outlays, predominantly for fleet upgrades. Moreover, the narrative brings to light a pressing issue of personnel retention in the delivery sector. Amidst operational and logistical challenges, companies grapple with high turnover rates, especially among younger employees. The perceived unreliability and the mounting expectations of younger staff present obstacles to firms aiming for a consistent and dedicated workforce. The struggle to retain personnel is further intensified by the balancing act between profitability and offering competitive wages and benefits, which would otherwise aid in employee retention. Equally vital is a strategic approach to human resource management, ensuring the attraction and retention of quality personnel, which will be instrumental in driving the sector forward in a sustainable and efficient manner. Additionally, the prevailing profit-driven mindset among companies occasionally results in the side-lining of quality and environmental standards, as evident in their vehicular preferences. The ecological benefits of using modern, low-emission vehicles like those compliant with Euro 5 or Euro 6 standards are undeniable. However, their associated upkeep costs often deter companies from such investments. Operating within stringent budgets, these firms commonly prioritize cost efficiency, occasionally at the environmental and quality standards' detriment. This situation epitomizes a frequent business quandary: the pursuit of profits can sometimes be at odds with wider goals like environmental commitment or ensuring

quality. Yet, a combined effort towards environmentally conscious measures, the adoption of standardized vehicles, and sustainable packaging becomes crucial.

While providing a grounded view of the sustainability aspects within the delivery sector, this thesis underscores the necessity to conduct a detailed analysis of quantitative data concerning the financial, environmental, and social sustainability of the delivery industry within a wider economic context. Furthermore, it paves the way for developing a comparative analysis between traditional business models and gig economy strategies in the delivery sector.

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