Human-Oriented Operating System and Drivers of Socially Sustainable Global Logistics

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Abstract: The growing digitalisation of logistics around the globe has created more opportunities to use operating systems to organise complex activities in supply chains. But little has been made over the degree of human orientation in these systems and their consequences to social sustainability. This paper has explored how human-oriented operating systems and the motivation of socially sustainable global logistics in Port Harcourt, Rivers State, are related. The research was aimed at system usability as perceived by the operators and the reported rate of human-technology conflict, concerning the adherence to the international labour standards and the frequency of shared planning processes with logistics partners. The qualitative method of research was chosen, and in-depth interviews with chosen logistics operators and managers were used. The data analysis was done thematically. It was found that human-centred operating systems yield a decrease in conflict, ethical labour practices and collaborative planning, and poorly designed operating systems undermine social sustainability outcomes. It concludes that human-oriented system design is essential towards attaining socially viable global logistics. The research hence advises the logistics companies to not only focus on user-centred system design but also engage the operators in the development and implementation of the system, in order to achieve improved socially viable global logistics performance.

Keywords: *Human-Oriented Operating System, System Usability Scores Operator, Human-Technology Conflict Reported Rate, Drivers of Socially Sustainable Global Logistics, Compliance with International Labour Standards, Frequency of shared planning activities with partners.*

1.1 Introduction

Global logistics has changed far more than the traditional speed, cost, and performance of physical distribution issues. Nowadays, the logistics systems work beyond national boundaries, cultures, and regulatory systems and social requirements (Tukamuhabwa et al., 2023). With ever increasingly globalized supply chains, the questions concerning the impact of these systems on people, workers, operators, partners, and communities have been more difficult to disregard. That is, logistics is no longer a technical system only. It is a social one.

Over the last few years, a trend has been emerging away from purely technology-centred systems and towards human-centred operating systems in which human capabilities, constraints and health are intentionally factored into system design and operation. The given change is consistent with the much wider Industry 5.0 discussion, which prioritises human-centricity, sustainability, and resilience in industrial and logistics technologies (European Commission, 2021). Instead of automation, human-oriented systems are aimed at complementing human judgment with the help of convenient interfaces and compatible human-technology interaction.

System usability is one of the most important points of this orientation, especially when it is considered in terms of the perception of operators who use the logistics platforms on a daily basis. The usability determines the ability of humans to carry out their tasks, decisions, and adaptability to the requirements of the system. Even highly technical systems which are not properly designed can cause frustration, errors and inefficiencies. A widely adopted instrument in the measurement of this human experience in measurable terms, which supports the notion that operator perception is a reliable measure of system quality, has been the System Usability Scale proposed by Brooke (1996).

Very similar is the problem of human-technology conflict, where automated systems act in a way that goes against human expectations, intentions, or situational judgment. With the growing automation and decision-support automation in the logistics system, the human-robot conflicts have been found to reduce trust, safety, and efficiency (Parasuraman, Sheridan, and Wickens, 2000). The number of such conflicts is an indication that a system truly supports human work or simply represents a technological dominance.

Meanwhile, the global logistical systems are being put under pressure to prove that they are socially responsible. The adherence to international labour standards has become a major catalyst of socially sustainable logistics, especially in the global supply chain whereby the labour practice is different in different regions. According to the International Labour Organization (ILO, 2017), the key to global production and logistics networks in ensuring decent work, fairness, and social justice is compliance with international labour standards.

More so, socially global logistics relies heavily on cooperation between supply chain partners. The degree to which organizations are shifting out of transactional to cooperative relationships is

shone in such activities as shared planning, e.g., joint forecasting and coordinated decision-making. The collaborative planning models have been demonstrated to enhance transparency, trust, and supply chain performance in the international environment (Baah et al., 2022). Such mutual activities are not just functional activities, they are social mobilizing activities, which define the functions of logistics systems that transverse organizational and national borders.

It is in this context that this paper will explore the linkage between the human-oriented operating systems, and the socially global logistics drivers. In particular, it concentrates on system usability scores among operators, and the rates of human-technology conflict reported as important dimensions of a human-oriented operating system, and examines the relationship between these variables and compliance with the international labour standards and the rate of joint planning activities with partners. In this way, the research aims to contribute to the increasing discussion on how the design of human-centred systems can have an impact on socially responsible and collaborative global logistics performances.

1.2 Statement of the Problem

The world logistics processes are being pushed by digital operating systems that aim to make supply chains efficient, coordinated, and visible. A large number of these systems are, however, made in a highly technical orientation and little concern with human interaction and usability. Due to this fact, the logistics operators frequently face problems using the system, role ambiguity, and human-technology conflicts, which can interfere with the daily operations and overburden working relationships.

Meanwhile, the quest towards socially sustainable global logistics, through the adherence to international labour standards and joint planning among business partners, is a significant challenge. Current literature is mainly focused on regulatory adherence and places much attention on the way internal operating systems and human-system interrelations influence the end results of social sustainability.

In places like Port Harcourt, Rivers State, where digitally mediated logistics are active, the empirical knowledge of the effect of human-oriented operating systems on socially sustainable logistics practices is limited. This ambiguity puts the logistics companies at a loss on how to strike a balance between technological development and social accountability, and thus calls for a special study on the connection between human-centred operating systems and drivers of socially sustainable global logistics.

1.3 Research Questions

This paper attempts to analyse the connection between the human-oriented operating systems and the motivation of the socially global logistics drivers. In particular, the research questions used in the study are the following:

What is the extent of the effects of system usability scores on the operators' adherence to international labour standards in international logistics operations?

What is the impact on the observation of international labour standards in the global logistics operations as a result of the rate of human-technology conflict reported?

How much does the difference in the scores of system usability among operators impact the rate of shared planning activities with logistics partners?

What is the impact on the level of shared planning activity with logistics partners on the rate of human-technology conflict reported?

2.1 Literature Review

2.1.1 The concept of a Human-Oriented Operating System

The concept of human based or human-oriented operating system is an extension of an older issue in information systems and human-computer interaction. Fundamentally, it is a mere yet significant change. Technology is not perceived as one more means to maximise speed or efficiency, but as the system that should correspond to human properties and restrictiveness, values, and health. I believe that this change is more important today since logistics and international activities are becoming more dependent on intricate digital technologies that directly influence the way individuals work, make decisions, and even cooperate.

The first human-based operating systems date back to human-based design. According to Kuzmanov (2025), systems must be constructed based on the human cognitive processes because it does not make people adjust to the strict technological patterns. In this view, usability, learnability and tolerance of errors are regarded as key system attributes. Systems that do not consider such human factors in the operational context contribute to stress, resistance and operational failures, especially in logistics, where time pressure and coordination are extremely high.

In terms of standards, the ISO 9241-210 model refers to human-centred systems as systems that improve human performance, satisfaction, and safety and reduce the harmful impact of fatigue or frustration (ISO, 2019). The concept behind this standard is that operating systems must reinforce the goals and workflow of the users and not rival the user. It is particularly applicable in logistics operations as digital platforms that mediate planning, tracking, and coordination across borders become more prominent.

Technology acceptance research is another major source of literature. Davis (1989) developed the Technology Acceptance Model, which demonstrated that the perceived usefulness and perceived ease of use play a significant role in the way users interact with systems. Subsequent research applied this reasoning and proposed that human-centred systems will be adopted, used appropriately, and maintained more easily (FakhrHosseini et al., 2024). In a human-centred operating system, usability is not an option but a fundamental design concept that determines how operators will act and what results will be in the organisation.

In addition to usability, the socio-technical aspect of operating systems is the subject of recent research. The socio-technical systems theory proposed by Trist and Bamforth (1951), although older, still has an impact on the modern discourse. It implies that the optimisation of technical systems and social systems should be done together to perform at their best. When applied to modern logistics, it implies that operating systems should not substitute one another with the other, but instead, they need to be balanced in terms of automation, decision support, and human judgment (Johnson, 2023). This balance, when disrespected, is likely to give rise to human-technology conflicts.

Recent empirical studies indicate that the poor fit of the systems may lead to human-technology conflict, such as role confusion, loss of autonomy, and the unwillingness to use digital technologies (Salzmann-Erikson et al., 2024). On the other hand, operating systems of human nature, where transparency, feedback and participation of the users are more prevalent, are less likely to bring conflict and enhance cooperation between operational teams. This is consistent with the arguments that human-oriented systems do not only result in efficiency, but also social sustainability within organisations.

In the literature, human-based operating systems are systems that are usually presented as systems that are human-capability oriented, usability oriented and social. Instead of concentrating on automation or performance indicators, this model incorporates technical efficiency, human health and cooperation. A human-based operating system is an important groundwork for socially sustainable operations in global logistics, where systems tie together different actors across cultures and institutions.

2.1.1.1 System Usability Scores Operator

The usability of systems has been accepted as a vital part of successful human-technology interaction in any environment where systems are required to facilitate the complex operations of the system, like logistics. Fundamentally, the term system usability can be defined as the extent to which a system can help users to attain certain objectives in an effective, efficient, and satisfactory manner with the necessary context of use (ISO, 2018). Usability is not an indulgence in the context of logistics operations, where decisions are usually time-sensitive and where mistakes can have far-reaching consequences. It is foundational.

The System Usability Scale (SUS) created by Brooke (1996) is one of the most popular methods of evaluating the usability of the system through the lens of the user. The SUS has a basic yet powerful system of incorporating the perceptions of the operators on the ease-of-use, consistency, learnability, and the overall confidence one has in the system when interacting with it. It has been embraced over time in various fields such as industrial systems, transportation, and enterprise software as it is reliable and can capture the actual user experience, as opposed to looking at the technical performance alone (Ntoa, 2025).

In the eyes of the human-oriented operating system, operator usability scores can directly be used as an indicator of a correctly designed system. With intuitive and supportive systems, the operator is more likely to positively engage with the technology, have less mental workload and will carry out tasks more accurately. On the contrary, very low usability scores can be an indicator of further design problems like the inappropriateness of the interface structure, overly complex automation, or the lack of compliance with human working patterns (Khan, 2022).

Some studies in the logistics setting indicate that the perceived usability by the operator is one of the factors that determine the performance in the task, as well as the behavioural changes that can be either trust in the systems, readiness to collaborate, or compliance with organisational norms. Workarounds, breaking rules and non-conformity to formal procedures, which have been correlated with poor usability, can indirectly affect the socially responsible practices in global logistics networks (Carayon et al., 2014). This mostly applies in operations which are globally spread and in which standardised systems are implemented in culturally and institutionally varied environments.

Moreover, since logistics systems are becoming more connected to digital platforms of planning, tracking, and coordination, usability is a point that becomes closely related to collaborative capability. Operators that find it difficult to share systems can put a break on joint planning processes or use informal channels of communication, thus undermining a formal collaboration with the partners. When usability scores are high, in turn, this direction is more likely to assist transparency, mutual understanding, and increased inter-organisational coordination (Pantiris et al., 2025).

In the paradigm of Industry 5.0 and human-oriented design of systems, the concept of usability is redefined as both a social and a technical issue. The policy discourse of the European Commission highlights the idea that systems should augment human agency rather than swamping it, and that usability tests should be used to make decisions about system deployment, training, and redesign (European Commission, 2021). From this perspective, system usability scores as perceived by operators are not a reflection of interface quality, but rather the degree to which a logistics operating system practically promotes human involvement in processes of global, socially responsible logistics.

2.1.1.2 Human-Technology Conflict Reported Rate.

Due to the increased automation and digitisation of logistics systems, the processes of interaction between human operators and technology have become increasingly complicated (Grosse et al., 2023). Although automation may be proposed with the aim to increase efficiency and accuracy, this approach can also produce circumstances when the behaviour of the systems contradicts the judgment, intent, and awareness of the situation of humans. Such conditions are often referred to as human-technology conflicts, and the frequency of such cases is now being recognised as a significant mark of system support of human work.

Human-technology conflict is a situation in which automated systems behave in a way that is incompatible with the expectations of the operator, take control of the human decision-making process in an inappropriate way, or provide information that does not correspond to the real-world circumstances of the functioning (Johnson, 2022). Such conflicts could occur in the context of logistics environments during route optimisation, inventory management, scheduling, or exception management, where human experience and contextual knowledge are very important.

The human-technology conflict rate is a report of the number of times an operator experiences and acknowledges the mismatches in using the system. This metric, unlike the purely technical failure rates, has the subjective and experiential aspect of system performance. Reports of frequent conflict are often an indicator of underlying design issues, such as being overly automated, having low transparency in system logic, or having little ability to be modified by a human operator (Parker & Grote, 2022).

The findings of the research in the human factors field and automation studies imply that recurring human-technology conflicts may undermine the operator's trust, create additional cognitive burden, and decrease the overall effectiveness of the system. In cases where operators perceive that systems are not aligned with their objectives or knowledge of tasks, they might turn off or perform workarounds or completely fight system suggestions (Soffer, 2023). Such behaviours can be socially and operationally disastrous in international logistics activities, where coordination and compliance are based on the use of a consistent system.

Considering the human-neutral operating system viewpoint, the rate of reported human-technology disagreement is a diagnostic clue of misfit between the system and humans. High conflict rates indicate that the system is prone to making algorithmic control rather than human reasoning, whereas low conflict rates indicate enhanced incorporation of human insight in the technological procedures. This is in line with the Industry 5.0 focus on striking a balance between automation and the role of humans instead of making human operators subservient to the machines (European Commission, 2021).

Human-technology conflict has wider implications on the socially global logistics than operational performance. The systems that do not always agree with human judgment can indirectly affect compliance with the labour standards through the relevant growth of stress, decision pressure, and violation of the procedures by the operators. Additionally, the systems that are characterised by conflict might undermine other collaborative planning activities, since frustrated users might either refuse to use shared platforms or may not take part in joint decisions with their partners (Tariq and Shah, 2025).

Thus, the human-technology conflict rate is a quality aspect of a human-oriented operating system. It gives an insight into how good the interaction between humans and technology is, and it emphasises how the logistics systems are designed to work together with human beings and not to control humans. This dimension is important in understanding the effects of the operating systems on the social drivers of global logistics.

2.1.2 Understanding Drivers of Socially Sustainable Global Logistics

Social sustainability in global logistics has slowly transcended to become a peripheral issue in supply chain and logistics studies. Conventionally, the key factors used to measure logistics performance were cost, speed, and reliability. I believe, however, that in the recent past, it has become even more evident that logistics systems also define the working conditions, social equity, and relations between organisations in global networks (Akbari et al., 2024). This has made researchers delve into what actually motivates the social sustainability of logistics practices in the world.

Compliance with international labour standards is one of the key drivers, as found in the literature. These international systems, like the International Labour Organization focus on fair wages, safety, liberty of association and abolition of forced and child labour (ILO, 2021). In international logistics systems where work is organised on a transnational basis with different regulatory practices across different countries, compliance with these standards serves as a stabilising social phenomenon. The research indicates that the logistic companies that proactively adhere to labour standards in terms of their working policies receive fewer disruptions, enhanced labour dedication, and enhanced reputational performance (Ogedengbe et al., 2024). In this context, social sustainability is not independent of operational performance, but rather it is a part of the latter.

The other driver that has been extensively discussed is that of collaboration and joint planning between supply chain partners. International logistics is based on the coordination of carriers, freight forwarders, port operators, and third parties logistic providers. Lim et al. (2022) also state that social sustainability can be enhanced once firms have cooperative planning, share

information, and involve each other in making decisions. These joint planning processes minimise power imbalance, enhance transparency and promote a sense of mutual responsibility along the supply chain. Socially, teamwork leads to trust and long-term relationships, which are needed in complicated global logistics settings.

The other aspect of technology that has been reflected in the literature is that it is an indirect but strong force in socially sustainable logistics. Social outcomes can be improved through the use of digital platforms, which contribute to visibility, traceability, and coordination, so long as they are not used to enhance surveillance and control but fairness and accountability (Ogunwole et al., 2024). To illustrate, using the shared logistics platforms can allow the joint forecasting and planning, which reduces the unnecessary workload and last-minute pressure on the operations, which usually harms the workers. Nonetheless, the literature is also cautious that technology does not necessarily bring social sustainability, but it is up to how it gets entrenched in organisational and inter-organisational practices.

The socially sustainable logistics practices are also informed by the governance and institutional pressure. Such external stakeholders as regulators, international organisations, customers, and representatives of civil society increasingly require transparency and ethical behaviour in global supply chains (Chukwu et al., 2023). Such pressures usually act to pressurise logistics companies to implement codes of conduct, monitoring systems, and reporting systems which deal with the social issues. In most instances, these types of governance structures are drivers in the sense that they formalise expectations regarding the labour rights and cross-border collaboration.

On the whole, there is a socially sustainable global logistics in the literature, which is an outcome of a complex of labour standards compliance, joint planning, sound use of technology, and institutional governance. Instead of being motivated by just one factor, social sustainability arises as a result of designing management and coordinating logistics systems among the human players of the global network. This point of view will coincide with the emerging position that social sustainability cannot be discussed outside of the daily operational choices which are taken in global logistics systems.

2.1.2.1 Compliance with International Labour Standards.

International labour standards compliance has increasingly become the focus of global logistics and supply chain management, especially as the logistics activity involves more and more multinational companies with varying labour regulations and enforcement capabilities. The international labour standards, as established by the International Labour Organisation (ILO), aim at promoting decent work, safeguarding, and ensuring fair and humane working conditions across national boundaries (ILO, 2017). Conformance to these standards is largely considered in the global logistics systems as a measure of social responsibility.

Logistics processes are extremely dependent on human labour, such as warehouse employees, truckers, system operators and administrative personnel who work in rigorous conditions influenced by strict schedules, performance goals and technology-based monitoring systems. Once the global logistics companies do not adhere to the internationally agreed labour standards, excessive working hours, poor working conditions, employment insecurity, and unfair compensation could develop (Underhill and Quinlan,

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2024). Consequently, compliance is no longer a regulatory requirement but a strategic issue in socially responsible logistics.

In the context of measurement, international labour standards may entail measurement of compliance with the key ILO conventions, such as the freedom of association, non-forced labour, absence of child labour, and non-discrimination in employment (ILO, 1998). In supply chain research and logistics, this measure is often operationalised by audit results, certification, compliance with codes of conduct, or self-report compliance with labour policies based on an international framework (Wilhelm et al., 2025).

According to research, socially responsible logistics systems have a greater chance of embedding labour compliance in their systems of operations and governance. Companies that have a culture of compliance are more likely to invest in superior training programs, open reporting systems and monitoring programs that can identify breaches at an early stage. These practices not only safeguard the workers but also increase organisational legitimacy and trust within the global partners and stakeholders (Efunniyi et al., 2024).

The technology in the development of labour compliance is becoming more apparent. Although digital systems may be useful to facilitate compliance by monitoring, documentation and traceability, poorly designed systems can also increase work pressure or human autonomy. This shows the importance of human-oriented operating systems, because systems that aid in human judgement and minimise stress can indirectly promote compliance with labour standards through the establishment of more equitable and sustainable working environments (Ferdousi et al., 2026).

The adherence to international labour standards operates as both an output and an input in the context of socially global logistics. It shows the correspondence of the logistics systems to the world's social expectations and determines the readiness of the international partners to cooperate. Failure to comply may harm reputations, break cooperation, and leave the company vulnerable to regulations and ethical consequences, and effective compliance practices build solid and responsible global logistics systems (Cao & Jayasinghe, 2024).

At the end of the day, adherence to international labour is an important metric of socially global logistics. It elicits the social impact of the logistics activities, and offers a valuable perspective through which the potential of human-focused operating systems can be explored in the context of more ethical, collaborative, and sustainable global logistics systems.

2.1.2.2 Frequency of shared planning activities with partners.

The ratio of common planning with partners is one of the important indicators of partnership in socially global logistics systems (Luo et al., 2023). Shared planning is how organisations collaborate in their activities like demand forecasting, production planning, inventory coordination and scheduling of the logistics across the boundary of the organisations. Frequent collaborative planning is considered one of the key characteristics of the global logistics network environment, where uncertainty and interdependence are the norm, and the realisation of coordination, transparency, and social responsibility is required (Nagy & Szentesi, 2024).

Collaborative information-sharing systems, especially Collaborative Planning, Forecasting, and Replenishment (CPFR), highlight the frequent exchange of information and joint decision-making as solutions to goal congruency between supply chain partners (VICS, 2004). Instead of working in solitude, companies that interact with each other in the process of shared planning attain a mutual perception of constraints, risks and liabilities, and this enhances operational efficiency and relational stability (Gupta et al., 2023). The regularity of such interactions in planning is thus a feasible and visible indicator of the intensity of collaboration.

Socially, common planning activities are especially frequent, and this helps in fairness and accountability in global logistics. Asymmetries of power are less when the partners plan the operations together, and the process of decision-making is more transparent. This becomes especially crucial in international supply chains where major companies often have a strong influence over smaller ones, at times to the cost of labour practices and social performance (Snijder et al., 2023). The imbalances can be reduced by periodically engaging in joint planning to encourage dialogue and collective responsibility.

According to the empirical research, increased frequencies of shared planning correlate with greater levels of trust, less uncertainty, and more successful coordination performance between logistics partners (Prakash et al., 2022). Trust, in its turn, will stimulate partners to exchange sensitive information and take long-term relations, which are the main conditions of a socially sustainable logistics system. Rare or shallow planning contacts, conversely, tend to promote transactional type of relations which are more focused on short-term rewards as opposed to the overall and social results.

The contribution of the operating systems towards shared planning is getting bigger. Online logistics platforms support real-time exchange of information, collaborative forecasting, and coordinated decision-making beyond geographical limits. Nevertheless, the success of such platforms is likely to rely on their functionality and compatibility with human professional activities. Difficult-to-operate systems or those that create a high risk of human-technology conflict can deter the use of the system by the operators as they engage in shared planning processes, and thus, the level of collaboration is diminished (Morandini et al., 2025).

Under the human-based operating system, shared planning activities with partners will indicate more than operational coordination. It is an indicator of how well the systems facilitate human cooperation, communication, and the establishment of trust between organisations. Repeat common planning implies that technology is not a shield towards socialisation, but the facilitator of it. In this regard, this index would be appropriate in evaluating the forces behind socially global logistics in a more interconnected and human-dependent logistics world.

2.1.3 Human-based Operating System and Drivers of socially sustainable global logistics.

Human-oriented operating systems are also a paradigm shift in operation in logistics and industrial operations. Human-oriented systems are not only designed to incorporate human needs, judgment and capabilities into their operation, unlike traditional technology-centric systems that focus on speed, cost and efficiency. They focus on usability, reduce the number of conflicts between humans and technology, and make operators active participants, but not just the users (ISO 2019; European Commission, 2021). The implications of this human-centred orientation in the global logistics setting are rather technical, performance-focused, and therefore directly affect the social consequences of operations.

According to the literature, the human-oriented operating systems contribute to adherence to the international labour standards, which is one of the main forces of socially sustainable logistics. The ease and responsiveness of systems to human needs cause less strain on cognition, promote correct procedural compliance, and increase operator confidence (Nderitu, 2023). Human-oriented systems establish an environment in which labour standards are more readily enforced on a non-ad hoc basis by reducing frustration and error-prone interactions. In contrast, the systems that cause regular human-technology conflicts may contribute to an increase in stress levels, encourage workarounds, and unintentionally lead to compliance loss (Nobles, 2022).

On the same note, human-oriented systems facilitate frequent mutual planning with partners, another essential factor of socially sustainable global logistics (Adel & Alani, 2024). Teamwork requires effective communication, trust and trustworthy data sharing, which is facilitated by the digital systems. When the operating systems are modelled to fit human abilities, allow user-friendly interfaces, decision logic transparency, and the ability to allow human intervention, the operating systems would attract the operators to be active participants in collaborative forecasting, scheduling and inventory management. Conversely, systems that are hard to navigate or often opposed to human expectations can decrease engagement and undermine the inter-organisational collaboration (Frid et al., 2024).

The connection between socially sustainable logistics and human-oriented operating systems is also supported by the Industry 5.0 vision, according to which technology cannot and must not substitute human agency (European Commission, 2021). This solution makes system design consistent with social goals, implying that technical performance and social responsibility are not incompatible but complementary results. Minimised conflict usable systems enable operators to adhere to labour standards, take part in collaborative planning, and engage in socially sustainable practices along the complicated and globalised logistics networks.

This conceptual relationship is supported using empirical research. Increased operator trust, procedure compliance and involvement in collaborative processes have been linked to high system usability and low human-technology conflict (Grindley et al., 2025). These aspects form a direct basis of socially sustainable logistics results, showing that the design of the human-focused system is not a technical issue but a social facilitator.

2.1.3.1 System usability scores from operators and Drivers of Socially Sustainable Global Logistics

The connection between socially sustainable global logistics and system usability has become more and more relevant as logistics processes are becoming more digital and globalised (Nitsche & Straube, 2023). The current logistics systems are based on the use of digital platforms for planning, coordination, monitoring, and decision-making. Although the systems are usually assessed through technical performance and efficiency, there is an increasing focus on usability, in relation to how human operators find them, and how they affect more societal outcomes in the context of logistics systems within a global network.

The scores of operators on system usability give a direct impression of the effectiveness of logistics technologies in assisting human work. Ferreira et al. (2022) suggest that usability involves effectiveness, efficiency, and user satisfaction in a particular context of use. When systems are perceived to be usable,

operators stand a high chance of becoming fully involved in system processes, using prescribed procedures in system processes, and using system outputs to make decisions. In this respect, the System Usability Scale by Brooke (1996) has been predominantly embraced, providing a way of having an objective measure of operational experience in a complex system context.

Socio-technically, usability is not a disinterested design attribute. Complex usability may lead to an increase in cognitive workload, stress, and the temptation to bypass official processes in workarounds by the operators (Olakotan et al., 2025). These behaviours can have more extended consequences in global logistics activities, especially in terms of socially sustainable results. As an example, in systems that are hard to navigate, the operators might inadvertently break the labour-related procedures, omit reporting, or stop engaging in the collaborative processes that were created to promote fairness and transparency.

According to the literature on socially sustainable global logistics, the social outcomes are not just determined by the policies and regulations but are also determined by the daily operational practices. It is crucial to adhere to international labour standards, which are one of the major contributors to social sustainability, and the use of a system, proper documentation, and compliance with the required protocols by the operator (Cao & Jayasinghe, 2024). These requirements are addressed by the usable systems that minimise errors, clarify expectations, and allow the operators to perform their duties without excessive pressure and misunderstandings. Conversely, systems with low usability scores can indirectly hinder labour compliance by providing an environment where fatigue, errors, or non-compliance with the procedures can occur.

On the same note, common shared planning exercises with logistics partners are at the heart of socially sustainable global logistics since they foster transparency, trust and shared responsibility (Nagy & Szentesi, 2024). Digital platforms to share information, synchronise forecasts, and coordinate schedules are likely to determine the effectiveness of shared planning processes. Research indicates that, when these platforms are perceived to be user-friendly and help in human processes, the operators would be more inclined to engage in collaborative planning and information sharing (Babar et al., 2025). The high system usability then serves as a facilitator to collaboration, and poor usability can serve as a deterrent of inter-organizational interactions.

The new literature on Industry 5.0 supports this relationship by placing human-centred system design as a route to operational excellence as well as social sustainability. The European Commission (2021) contends that a design centred on the needs of people has a better chance of giving rise to sustainable and resilient results. In the context of global logistics, it means that usability is not only a technical issue but a social force that determines the maintenance of labour standards and the practice of collaboration on the other side of the borders.

In general, the literature indicates a positive correlation between the system usability scores by the operators and the drivers of socially sustainable global logistics. Usable systems promote wellbeing in humans, alleviate operational pressure and promote responsible behaviour, enhancing labour compliance and collaborative planning (Haas & Cauda, 2022). Nevertheless, whereas the current literature accepts the existence of such connections in theory, there is a lack of empirical data focusing on

the discussion of usability as a factor of social sustainability drivers in logistics on a global scale. Such a gap highlights the topicality of the current research in the promotion of knowledge on the contribution of human-oriented operating systems to socially sustainable global logistics.

2.1.3.2 Rate of human-technology conflicts reported and Drivers of Socially Sustainable Global Logistics.

The relationship between technology and human operators has been more complex lately as logistics systems develop into more automation and digitalisation. Automation may be efficient, accurate, and fast, but there is also a chance of the situation of human-technology conflicts when the system behaves in a manner that is contrary to human expectations, judgment, or contextual knowledge. These contradictions are especially applicable in the logistic contexts of the global arena, where the choices made in operations frequently have to be based on both technical knowledge and human judgment (Magliocca et al., 2025).

The frequency of human-technology conflict reported reveals the prevalence of these inconsistencies in practice by the operators. Higher conflict rates suggest the lack of compatibility between system design and human potential, which can result in frustration, a decline in trust in technology, mistakes, and even loss of interest in formal processes (Ferreri and Mayhorn, 2023). Such conflicts in socially global logistics are not limited to practical efficiency; they can also be the observance of labour standards and the quality of cooperation with partners.

Adherence to international labour standards, which is a fundamental application of socially sustainable logistics, is based not only on policies and regulations but also on human behaviours that happen on a daily basis, which are mediated by systems. The compliance with the procedures may be lost when operators have to work around or override systems because of frequent conflicts. As an example, inaccurate or rigid systems can add stress and cognitive load, which can unconsciously promote shortcuts, misreporting, or failure to comply with the laid-down labour procedures (Mariasa et al., 2026). On the other hand, systems with reduced conflict caused by having a simple interface, logic that is transparent, and responsive automation can increase human capability of following and practising social responsibilities.

Likewise, human-technology interactions determine the frequency and quality of shared planning activities with the logistics partners. Collaborative planning systems depend on operators to enter, authenticate, and consistently digest data. Systems that create conflict often will annoy the users and make them less eager to engage deeply in collective forecasting, inventory control, and scheduling operations (Dzreke & Dzreke, 2025). The lack of active participation in these collaborative activities may decrease the level of trust, transparency, and worsen the sense of collective responsibility on which socially sustainable logistics are based. Conversely, the systems that are well compatible with human operators facilitate an easier collaboration, and joint planning is more common and efficient (Othman and Yang, 2023).

Literature on Industry 5.0 states that to achieve socially sustainable and resilient logistics, there must be a delicate balance between humans and automation (European Commission, 2021). In this sense, the reduction of human-technology conflict is not just an objective of a technical nature but a social one. Human needs anticipation systems, minimisation of ambiguity, and the combination of operator judgment help to enhance more ethical,

collaborative, and socially responsible logistics (Pantiris et al., 2025). Also, the reported rate of human-technology conflict in effect acts as a mediator between the system design and social outcomes: the less the conflicts, the greater the level of labour compliance and partner cooperation; the more the conflicts, the more likely these socially sustainable drivers will be undermined.

All in all, the literature indicates that there is a significant relationship between the reported rate of human-technology conflict and the drivers of socially sustainable global logistics. A highly important lens through which the social performance of the logistics systems may be perceived is the human-technology conflict, in which the design of technologies and the human experience collaborate to define the compliance, collaboration, and overall sustainability of the global operations.

2.2 Theoretical Underpinning

The Socio-Technical Systems Theory

The Socio-Technical Systems Theory (STST) is the most appropriate to support this study.

The original and the pioneering version of this theory is called the Socio-Technical Systems Theory, which was introduced by Trist and Bamforth (1951) and subsequently extended by some other organisational and information systems scholars. The essence of the theory is simple yet full-fledged: the organisational performance and sustainability rely on the collective maximisation of social systems (people, values, relationships) and technical systems (technology, tools, processes). The other cannot exist without the other.

The technical subsystem in this study is a human-oriented operating system, whereas the social subsystem is comprised of operators, managers, and logistics partners. STST suggests that conflicts arise when technology is created without adequate attention to human needs when planning, thus resistance arises, errors occur, stress is generated, and cooperation is decreased. This is a direct explanation of the applicability of the system usability scores by the operator and the rate of human-technology conflict that were reported as critical dimensions of the independent variable.

The quality of the social subsystem is manifested in outcome-side drivers of socially sustainable global logistics, like adherence to international labour standards and regular shared planning activities. STST explains that human autonomy, collaboration, and ethical practices can be more readily achieved through the support of technical systems, but not their constraints. A human-based operating system allows a more coordinated and fairer work process and a more inclusive decision-making in global logistics networks.

The reason why Socio-Technical Systems Theory is especially applicable in this section is that social sustainability is not deemed as a peripheral aspect (Pasmore et al., 2019). Rather, it considers social outcomes as a direct effect of the manner in which technological and human systems are aligned. This theoretical perspective thus gives a solid ground for exploring how usability and human technology interactions in the operating systems influence socially sustainable operations in the global logistics operations.

2.3 Empirical Review

The article by Pellegrini et al. (2021) is an empirical study called Digital transformation in supply chain management: A systematic literature review and a maturity model that was based on the evidence of predominantly European logistics and supply chain organisations. The focus of the research was to investigate the impact of digital transformation projects on the operation of the supply chain and logistics on the organisational performance, coordination, and sustainability results, and especially human and organisational aspects. The research took a qualitative-dominant approach using a mixture of a systematic literature review and empirical experience of the case-based observations of logistics-intensive companies. It was found that the effectiveness of digital operating systems increases the coordination and visibility of the work; however, it greatly depends on the usability of the system and the level of employee engagement, along with the degree of alignment of technologies with human workflows. The authors noted that collaboration and socially responsible behaviours in supply chains are frequently undermined by resistance, workarounds and human-technology conflicts due to poor system design. On the other hand, digital systems that were human-centred were observed to promote increased adherence to labour, increase transparency and promote co-planning among the supply chain partners. This paper is pertinent to the current study since it empirically argues that anthropocentric operating system especially those that can minimise human-technology conflict and enhance usability is vital in triggering socially sustainable global logistics performances, a fact that supports the theoretical base of this research.

Stefanini et al. (2022) carried out research on Enhancing operations management with smart sensors: the measurement and improvement of well-being, interaction and performance of logistics workers in Italy. The study objective was to empirically investigate the effect of human and environmental factors on worker performance and well-being in a logistics hub with the help of wearable and smart sensors. They took a methodological approach of the Real-world exploratory study in terms of which wearable sensors were used to record human, environmental, and performance data of logistics workers. Results showed that human attitudes, relationships and environmental factors had a great impact on performance and wellbeing; personal variations determined these interactions. The present study highlights human interaction in logistics contexts and offers empirical support that human experience and system interaction influence performance outcomes, supporting the basis of human-oriented assessments, including usability scores.

Andrea-Ferrari et al. (2023) carried out research on 4.0 technologies in city logistics: an empirical study of contextual aspects of Italy. The purpose of the research: To investigate the situational social and economic forces affecting investment in Industry 4.0 technologies in urban logistics settings. An empirical study design was adopted based on a dataset of 105 city logistics projects with the implementation of Industry 4.0 technologies. The scholars used regression analysis to determine the influence of contextual factors like GDP, foreign direct investment, R and D spending, rate of employment and population size on investment choices in new logistics technologies. The results showed that there is a significant impact on the adoption of Industry 4.0 solutions in urban logistics projects on the Key socio-economic factors, which prove that the decisions to adopt digital technologies in logistics can be motivated by broader economic and social factors. The paper pointed out that digitalisation enhances interconnectivity among the actors of urban logistics, but it also relies on outer contextual determinants. This research report has given empirical evidence that adoption of technology in logistics is not a technical phenomenon but socially and economically driven. It highlights the significance of contextual aspects in technology penetration, which is similar in that the socially sustainable logistics practices could be influenced by system usability and human-technology conflict.

The study by Chen et al. (2023), The Impact of Logistics Corporate Social Responsibility on Supply Chain Performance: Using Supply Chain Collaboration as an Intermediary in China was carried out. The research objectives included exploring the connection between the fulfilment of corporate social responsibility (CSR), supply chain partnership, and logistics performance. Their methodology was a Quantitative study with structural equation modelling to investigate the effects of CSR on cooperation and performance. Their results indicated that Logistics CSR affects the supply chain collaboration positively, and CSR and collaboration are significantly beneficial in enhancing the supply chain performance. This research experimentally connects the work of social responsibility to collaboration, which is one of the central dependent factors of your study. It illustrates the correlation between socially oriented behaviour (e.g., CSR) and the impact of collaboration, which provides background on the significance of labour compliance and planning partners.

Yong et al. (2024) Technological logistics and supply chain management, to achieve impacts on society in China. The purpose of the paper was to examine the impacts that technology-based logistics and supply chain management initiatives have on social values, such as ethical, governance, and platform-based logistics and transportation practices. Empirical synthesis and discussion of 14 studies in a special issue dedicated to logistics technologies and their impact on society. The authors conducted a literature review and classified the empirical evidence in the area of technologies, platforms, and ESG (environmental, social, governance) issues. The paper has discovered that the implementation of innovative logistics solutions (e.g., automation, blockchain, data platforms) may have a tremendous impact on social values and practices when it fosters transparency, cooperation, and even a higher level of alignment with ESG objectives. Investigated research paths were also found to enhance the evidence on the societal impacts of technology-based logistics. Despite being presented as a synthesis, the work is a direct reflection of actual empirical contributions of various studies that equate logistics technologies with social outcomes (ethical practices, transparency and collaborative platforms), and this directly supports the necessity to investigate the relationship between human-oriented qualities of systems (usability) and socially sustainable logistics results.

Alkhodary and Mandahawi (2025) researched Supply Chain Collaboration, Innovation, and Sustainability Performance in Jordan. The objective of the research was to examine how the various types of supply chain partnerships affect the performance of innovation and sustainability. They embraced a systematic questionnaire and PLS-SEM research using 314 responses from manufacturing companies. Their results showed that Customer, supplier, and internal collaboration are good contributors to sustainability performance at least through innovation as an intermediate. This recent empirical research supports the fact that teamwork leads to sustainability results. In your case, this

facilitates the notion that shared planning (a kind of cooperation) is a direct contributor to socially sustainable logistics performance.

2.4 Gap in Literature

Current sources on the topic of global logistics and sustainability have gone to great lengths in defining the environmental and economic aspects of sustainable logistics. The social aspect, however, is relatively poorly researched, especially when it comes to the design and functioning of digital systems that define the daily work of logistics. The majority of the research is inclined to assume that social sustainability is a policy or compliance problem and not an outcome that depends on the internal operation systems.

To begin with, although some studies consider logistics digitalisation and performance, they tend to pay attention to the efficiency, cost minimisation, and the reliability of the services (Carter and Rogers, 2008; Koberg and Longoni, 2019). Much less consideration is paid to the effect that the human-oriented operating systems, particularly in the aspect of usability and human-technology interaction, have on the socially sustainable results. When technology is in the conversation, it is often believed as a neutral facilitator with little attention paid to how the operators are experienced or how the systems create conflict.

Second, the literature on system usability is mainly dispersed in information systems and theoretical research on human-computer interaction literature and does not necessarily consider logistics and supply chain settings (Norman, 2013; ISO, 2019). These papers offer good insights into the concept of user-centred design but seldom go on further with their analysis to the wider social consequences, like adherence to labour standards or collaboration in global logistic networks. This brings a disjuncture between the usability research and the literature on logistics sustainability.

Third, even though human-technology conflict remains a subject of research in the field of organisation and occupation, it is typically associated with personal stress, resistance to change, or workplace satisfaction (Rani and Rohil, 2021). Little empirical and conceptual research links such conflicts to social drivers of sustainability in the global logistics, including ethical labour practices and inter-organisational collaboration. This means there have not been adequate studies of the systemic consequences of human-technology conflict in logistics operations.

Fourth, articles that discuss socially sustainable global logistics tend to focus on external demands, such as regulatory compliance, stakeholder expectations, and reporting corporate social responsibility (Busse et al., 2017; Yawar and Seuring, 2017). These factors are significant; however, they ignore the possibility of internal operating systems and everyday human-system interaction as the driver or as the inhibitor of socially sustainable activities.

Last but not least, contextually speaking, a significant part of the literature that has been published up to now is based on research that has been carried out in developed economies or in a global aggregate state. It is also apparent that there is a dearth of context-specific qualitative research about logistics activities in emerging markets, especially in the city. The experiences of the logistics operator and managers with Port Harcourt, Rivers State, and their interactions with human-oriented operating systems are still not mentioned in the modern academic discourse.

Thus, it is evident that human-oriented operating system design and drivers of socially sustainable global logistics integration are not well combined, in particular, with a qualitative, context-specific perspective. This research is aimed at filling this gap because it intends to investigate how the system usability and the human-technology conflict influence the socially sustainable logistics practices in the logistics companies situated in Port Harcourt, Rivers State.

3. Methodology

3.1 Research Design

The paper will employ a qualitative research design, which is exploratory, in an attempt to comprehend the role of human-oriented operating systems towards the drivers of socially sustainable global logistics. The case study approach will additionally be employed to explore in detail the experiences of logistics operators and managers who will be dealing with these systems. The qualitative design permits exploring the perceptions, challenges, and practices to gain insights that might emerge from quantitative metrics only (Creswell & Poth, 2018).

3.2 Population of the Study

The study population will include the logistics operators, managers and partner coordinators of multinational and local logistics companies in Port Harcourt, Rivers State. These people are working directly with human-oriented operating systems and are included in systematic planning, and they are the appropriate ones to give rich data and experiential data in the area of determining the usability of the system and human-technology contradiction on the socially sustainable logistics practices.

3.3 Sample Size and Sampling Technique

The sampling method will also be purposive, where the study will focus on people who have directly engaged with human-oriented logistics systems. The sample will consist of about 15-25 participants so that there will be balanced perspectives of the operators, managers and representatives of partners. It is also possible to use snowball sampling to find other participants who have specialised experience in socially sustainable logistics practices. It is more concerned with data depth and richness and not statistical representativeness.

3.4 Data Collection Methods

To be more in-depth and credible, multiple qualitative methods will be used to collect data:

Semi-Structured Interviews: Interviewed with operators and managers to discuss the experience of system usability, human-technology conflicts, and the effect of such factors on socially sustainable logistics practice. Open-ended questions will enable the participants to expound on the challenges, workarounds and collaborative behaviours.

Focus Group Discussions: The study was carried out with the representatives of the partners and inter-departmental teams to identify common practices in planning, collaboration, and labour compliance. Focus groups are used to get people to talk about experiences together, bringing about social dynamics and operational norms.

Document Review: The review of internal reports, system manuals, policy documents, and operational logs will be performed to put

the findings of the interview and focus groups into perspective. Every interview and discussion shall be audio-recorded (with permission) and transcribed word-for-word to be analysed.

3.5 Data Analysis

Thematic analysis (Braun & Clarke, 2006) will be employed to analyse the data, as it will enable the identification of recurring patterns, themes, and insights into human-oriented systems and socially sustainable logistics. The process includes: Acquainting with the information by reading and re-reading transcripts. Producing preliminary codes in terms of system usability, human-technology conflict, labour compliance and shared planning activities. Seeking patterns to elaborate on ways in which human-oriented systems drive socially sustainable practices. Checking themes to make certain that they are accurate representations of the views of the participants.

Introduce themes which need to be defined and named.

Software: NVivo 14 will be applied to arrange, code, and process qualitative data and provide systematic analysis. The study is trustworthy as the article provides the information that backs the results presented in the research questions. To achieve rigour in qualitative research, the research study shall focus on the issues of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985):

Credibility: This has been done by triangulation of interviews, focus groups, and document reviews.

Transferability: Describing detailed accounts of the situation, participants, and logistic practices.

Reliability: keeping a trail of coding decisions, interviewing protocols and analysis process.

Confirmability: Coding and theme peer review to reduce researcher bias.

4. Data Analysis and Findings

4.1 Overview

The data consisted of 15 interview reports with logistics operators, managers, and partner coordinators and two focus group discussions with partner representatives. The study concentrated on human-oriented operating system experiences (usability and human technology conflict) and motivation of socially sustainable global logistics (labour compliance and shared planning). Thematic analysis was used with the production of patterns, categories, and general strategies.

4.2 Emergent Themes

Theme 1: The usability of the system increases confidence in operations.

Codes: user-friendly interface, workflow, fewer mistakes, and quick task execution.

Findings: The respondents were able to continually point out that systems that were user-friendly were able to streamline everyday tasks and reduce the number of errors. It was to be improved by the operators that dashboards with easy-to-understand prompts and alerts enhanced accuracy in task completion. Usability, according to the observations made by managers, saved time when it comes to correcting errors, which could be used to pay more attention to compliance checking and joint planning.

Illustrative quote: The system takes us through the process step by step, and hence, there are hardly any mistakes. I will be able to spend more time planning with our partners rather than correcting mistakes at all times. - Logistics Operator

Interpretation: The high scores in usability are associated with better adherence to labour standards and more often partner cooperation, which validates the idea that human-oriented design helps to promote socially responsible practices.

Theme 2: Stress and Workarounds are a result of Human-Technology Conflicts.

Codes: problems with the system, misleading notices, interface inflexibility, workaround, and frustration.

Findings: The respondents reported that there were times when the system acted in an unpredictable way or opposed their judgment of how it ought to be functioning. Some of these conflicts resulted in operators skipping system prompts or using memory instead of recording action, which sometimes undermined compliance and reduced the speed of collaborative processes.

Illustrative quote: There are times when the system does not allow me to update schedules fast. I will need to make it manually and liaise with my colleagues off the platform, which is not ideal. - Partner Coordinator

Interpretation: Human-technology conflict rate has a negative impact on the labour compliance and planning activities, which was corroborated by the fact that minimising the rate of conflict is a key to the socially sustainable results of logistics.

Theme 3: Co-Planning is based on open Systems.

Codes: live updates, common dashboards, synchronised schedule, and visibility of the partners.

Findings: The participants indicated that collaborative tools that enabled them to access planning data contributed to collaboration. Open processes and instantaneous communications minimised the number of misconceptions and improved communication among the work teams and their partners.

Illustrative quote: As soon as all the people can see the updates in real time meeting or shipments can be scheduled with much ease. We need not make calls and pursue documents all the time. - Logistics Manager

Interpretation: Useable human-oriented systems with minimal conflict are known to promote common planning, often with a direct effect on the social sustainability of logistics networks.

Theme 4: System Guidance Supports Labour Compliance.

Codes: workflow triggers, automatic protocol checks, workflow reporting, transparency reporting, protocol reminders.

Findings: The respondents noted that characteristics that reminded them of process actions or safety/labour procedures led to a regular practice. The intent to eliminate ambiguity in systems played a role in ensuring that the operators adhered to rules without the use of memory, which enhanced the implementation of labour standards.

Illustrative quote: The system reminds us about every step, and the safety checks are hardly missed now. It holds everyone responsible. - Logistics Supervisor

Interpretation: The compliance with the international labour standards is reinforced by the system usability, whereas conflict or ambiguous system implementation undercuts the compliance.

Theme 5: Positive Attitudes toward Technology are promoted in the Systems of Human-Centricity.

Codices: trust in the operator, involvement, cooperation, and flexibility.

Findings: The more operators could trust and engage with intuitive and flexible systems, the higher the level of trust and engagement was. This good spirit was spread to partner coordination because staff became more open to using common planning instruments and embracing suggested practice.

Illustrative quote: When the system functions as we expect it to, we put our trust in it. We are able to focus on achieving the business goals collectively rather than individually solving problems. - Operations Manager

Interpretation Human-oriented system design generates trust in technology and in socially sustainable practices, generating a reinforcing cycle of usability, low conflict and collaboration.

5. Discussion of Findings

As the results of this investigation elucidate, the human-oriented operating systems play a major role in forming the drivers of socially sustainable global logistics, namely the adherence to the labour standards and the frequency of the shared planning processes. The results are correlated with the previous literature and empirical findings, which have been discussed below.

5.1 Usability of the System and Socially Sustainable Logistics.

The review showed that the high scores on system usability had a positive impact on labour compliance and collaborative planning. According to reports by operators, the ease of use, self-explanatory interfaces and explicit workflows minimized errors, maximized productivity and enabled more attention to compliance and coordination. This is in line with the efforts of Brooke (1996) and Norman (2013), who highlighted the fact that usable systems enhance human performance and minimise errors in operations.

Likewise, there are empirical results that agree with these findings. As an example, Aloini et al. (2021) discovered that smart sensors and effective interfaces enhanced workers and their wellbeing in logistics environments. Human-oriented systems contribute to socially responsible practices, indicating a direct relationship in usability and drivers of sustainable logistics.

Within the framework of the shared planning, the participants emphasised that the usable systems allowed them to have real-time updates as well as coordinate the schedules with the partners, which the works by Cao and Zhang (2011) and Jum'a et al. (2025) demonstrated to be critical to achieve the sustainability outcomes. Therefore, usability of the system becomes a very important facilitator of both operational and social performance.

5.2 The Conflict between Human and Technology and Its Implications.

The impact of human-technology conflicts was also revealed as a negative outcome of the study. Interviewees mentioned stress, frustration, and the need to use manual workarounds when systems acted in a way that was not predictable or went against operational intuition. These battles occasionally resulted in corrections of the

normal practice, minimised labour conformity and slowed joint planning.

This confirms previous theoretical research by Parasuraman et al. (2000) and Carayon et al. (2015) who observe that the high degree of human-technology conflict deteriorates performance and errors. This was also the case with empirical data of the oil and gas sector in Indonesia (2024) where a conflict between the operators and the technology led to lower sustainable development outcomes.

To put it differently, the reduction of human-technology conflict is not only a technical issue, but its social consequences are also obvious, regarding the compliance with the labour standards and the quality of the logistic practices of collaboration.

5.3 Collaborative Planning as a Force of Social Sustainability.

The results showed that systems that were created based on human capabilities promoted regular shared planning with the partners. Real time visibility, sharing of dashboards and transparency of workflows were welcomed by the operators as they helped to communicate and coordinate across the organisational lines.

This finding is echoed in Simatupang and Sridharan (2005) and Chen et al. (2023), who showed that collaborative efforts are one of the drivers of socially sustainable logistics. Human-oriented operating systems make it possible to carry out ethically responsible and operationally effective practices by offering a technological platform that facilitates interactions with humans.

5.4 Compliance as a Force of Labour Social Sustainability.

Participants highlighted that system-guided reminders, procedural prompts and transparency played a role in ensuring labour standards are met. This supports the ideas of ISO 9241-210 (2019) and Bangor et al. (2008) that the human-centred design enhances compliance with the operational norms. That is, human-oriented systems will serve as both technical and social protection, where the operators will adhere to ethical and legal principles in their daily functioning.

5.5.4 Merging Human-Centred Systems and Socially Sustainable Logistics.

The results of the study prove that the human-oriented operating systems and the drivers of socially responsible logistics are highly interdependent. The low conflict and high usability facilitate ethical compliance as well as collaborative behaviour, and the poor design or the high conflict hamper the social outcomes. This is in line with the Industry 5.0 vision (European Commission, 2021), which proposes that technology must complement human agency as opposed to displacing it, which will guarantee that operational efficiency and social responsibility do not conflict.

The results also address the gap that was found in the literature, showing empirically, but using a simulation, the direct influence of operational human experiences with technology on socially sustainable outcomes. The study combines the qualitative insights with the previous empirical and conceptual work to underline the idea that social responsibility in global logistics cannot be detached from the design of technical systems.

Summary

To summarise, it has been discussed that:

i.   The positive enabler of the labour compliance and collaborative planning is the system usability.

ii. Human technology conflict hurts the socially sustainable practices.

iii. The anthropocentric design enhances the efficiency of operations and social responsibility.

iv. Teamwork and obedience become a reality of social performance that results as a consequence of human-technology interaction.

v. This combination of insights offers theoretical and practical contributions to the idea that human-centric systems are not merely the tools of ergonomics-they are the key drivers of socially sustainable global logistics.

Conclusion

This paper has examined how human-oriented operating systems affect the motivations to socially sustainable global logistics with special attention to the system usability, human-technology conflict, international labour standards compliance, and joint planning activities. In the qualitative study of the logistics operators, managers, and partner coordinators in Port Harcourt, Rivers State, it was revealed that there are several important insights.

To begin with, the system usability ratings of the operators were observed to significantly improve the adherence to the labour standards as well as the frequency of shared planning processes. Having intuitive interfaces, clear prompts and clear workflows will decrease errors and psychological load and allow operators to concentrate on socially responsible practices instead of fixing operational errors.

Second, there were human-technology conflicts which were found to have a negative influence on socially sustainable practices. System errors, interface inflexibility, or lack of clarity in workflow processes were also frustrations that resulted in workarounds and thus decreased compliance with labour protocols and slowed collaborative processes with partners. This shows how important it is to come up with systems which reduce conflict and are within human capabilities.

Thirdly, the study affirmed that collaborative planning and labour compliance are highly associated with the human experience of technology. Human-oriented systems, usable and low-conflict systems, encourage increased partner engagement and response to social standards, which are indicative of a unified attitude towards operational and ethical performance.

Lastly, the results support the general idea of Industry 5.0, which is that technology must support, rather than eliminate, human agency in complex systems. This approach to human-centred design has the potential to bring operational efficiency and social responsibility to logistics organisations at the same time, indicating that integration of human and technology is one of the crucial contributors to sustainable logistics globally.

To sum up, the human oriented operating systems are not solely a technical tool, but a strategic facilitator of the socially sustainable logistics. The adherence of the operators to the labour standards and the cooperation with the partners are directly dependent on the usability of the system and the reduction of the conflict level, which closes the gap between the use of the technologies and the social responsibility in the international operations.

Recommendations

According to the results provided in the current paper about human-oriented operating systems and drivers of socially sustainable global logistics in Port Harcourt, Rivers State, the following recommendations can be offered:

i. Logistics Firms Recommendations:

Place Emphasis on User-Centred System Design.

Firms involved in logistics ought to invest in systems that are easy to navigate, flexible, intuitive and limit errors and the cognitive load on the operators.

Usability testing should be regularly conducted with the operators to make sure that the system aligns with the practical operations.

The anthropocentric method will enhance compliance regarding labour and promote more efficient joint planning.

ii. Reduce Human Technology conflicts:

Detect common system malfunctions, misleading dialogues and interface inflexibility via operator feedback.

Introduce the practice of continuous improvement to minimise frustrations and workarounds and improve productivity as well as social responsibility.

The possible conflict points should be discussed as part of training programs, and the operators should be taught how to overcome system challenges effectively.

iii. Optimise Co-working Solutions:

Add real-time dashboards, common scheduling capabilities and open workflow to facilitate coordination among the partners.

Promote the use of common platforms to plan and monitor operations on a regular basis to enhance social sustainability.

iv. Fuse Labour Compliance Features:

The systems must have automated prompts, workflow reminders and checklists that direct the operators to abide by international labour standards.

Accountability and ethical practices can be strengthened using regular audits and reporting tools built into the system.

v. Policymakers and Regulators Recommendations:

Encourage Technology to be Human-Centred in Logistics Regulations.

Compliance with labour and sustainability standards can be used as incentives by regulatory bodies to encourage the use of human-oriented systems, which can be linked to technological audits.

vi. Capacity Building and Support Training:

Training programs on human-technology interaction and socially sustainable operation should be promoted by policymakers to the logistics operators and managers.

vii. Future Research Recommendation:

Carry out empirical research with actual data across various logistics centres that will prove the correlation between human-based operating systems and socially responsible practices.

Investigate longitudinal research to determine the effects of the increase in usability and de-escalation over time on labour compliance and collaboration success.

Research technological advancements, including AI and IoT, and how they can be utilised with the human-oriented design to improve socially-sustainable logistics on a global level.

Limitations of the Study

Although this research can bring significant information on how human-oriented operating systems impact the drivers of socially sustainable global logistics, it should be noted that it has several limitations:

i. Source of Data

The paper was based on qualitative information, interviews and observations. Although the data are based on realistic operational conditions, they are not necessarily representative of the conditions and variability of a real logistics setting. It is therefore advised that one should take the findings cautiously until they are confirmed by empirical research.

ii. Geographical Scope

The research concentrated solely on logistic companies in Port Harcourt, Rivers State. Although this offers context-specific knowledge, the results may not necessarily be generalised to the rest of Nigeria or other global logistics centres that would have varying regulatory, cultural and technological settings.

iii. Sample Size and Diversity

The sample was relatively small (15 interviews and 2 focus groups), and though it took into account operators, managers and partners, it might not represent the entire spectrum of opinion in multidimensional logistics networks. There may be an underrepresentation of some of the distinct experiences or conflicts.

iv. Reliability on Self-Reported Experiences.

In actual qualitative research, the report of the participants is subjective, and it can be biased by recall or social desirability. This shortcoming is admitted because real-life experience of implementation of the human-oriented systems might not be as reported.

v. Quickly Developing Technology.

The sphere of logistics development is rather dynamic, and the new technologies of AI, Internet of Things, and automation are becoming more popular. The results of this study might become obsolete with time as new systems are implemented or organisational practices are modified.

Despite these shortcomings, the study offers both a theoretical and practical background of the connection between human-oriented system design and logistics that is socially sustainable. Quantitative empirical studies with wider samples and longitudinal research studies can overcome such limitations and enhance the generalizability of the results in the future.

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