sustainability

MDPI

Article

Embracing the Potentials of Intermodal Transport in Ethiopia: Strategies to Facilitate Export-Led Growth

Benjamin Nitsche

Chair of Logistics, Berlin University of Technology, 10623 Berlin, Germany; nitsche@logistik.tu-berlin.de

Abstract: Ethiopia has one of the fastest growing economies in the world, and by 2025 Ethiopia aims to become the manufacturing hub of Africa. To maintain growth, the Ethiopian government heavily supports industrial development in different industry sectors. However, Ethiopia is still a developing, low-income country that has to overcome several barriers in order to attract foreign companies to become a middle-income country. Therefore, efficient intermodal transport is seen as one of the key contributors to facilitating export-led growth. This study seeks to map the current state of intermodal transport in Ethiopia by synthesizing a holistic picture of current challenges and to propose strategies for dealing with them. A moderated nominal group technique (NGT) exercise was applied among 38 experts from local manufacturing industries, domestic and international logistics services, academia, and associations as well as governmental and non-governmental institutions. Through the NGT process, the study condenses 19 challenges for intermodal transport in Ethiopia that are grouped into eight different clusters and assesses the importance of resolving those challenges in order to facilitate logistics performance. Moreover, strategies are proposed to improve the current state of intermodal transport and assessed according to their effectiveness and complexity. Consequently, recommendations and implications for four stakeholder groups are given: (1) governmental institutions; (2) non-governmental institutions; (3) foreign investors/manufacturers and local manufacturers; as well as (4) local and international logistics service providers.

Keywords: intermodal transport; hinterland; logistics; low-income country; Ethiopia; nominal group technique

Citation: Nitsche, B. Embracing the Potentials of Intermodal Transport in Ethiopia: Strategies to Facilitate Export-Led Growth. *Sustainability* **2021**, *13*, 2208. https://doi.org/10.3390/su13042208

Academic Editor: Jason Monios

Received: 12 January 2021
Accepted: 15 February 2021
Published: 18 February 2021

1. Introduction

The development of intermodal freight transport systems can contribute to lower transportation costs and more sustainable logistics networks [1–3] and has been discussed by an increasing number of researchers [4]. For developed countries, research often focuses on technology improvements and the contribution of intermodal transport to more sustainable transport solutions [5–7]; developing countries, however, for example, in sub-Saharan Africa (SSA), first need to implement a more efficient logistics environment, e.g., through intermodal transport systems, in order to participate in global trade [8]. This is the case because SSA countries are often prone to very high transportation costs that contribute to a large proportion of total landed cost when exporting goods from Africa [9]. Therefore, transportation costs in SSA countries need to be lowered in order to facilitate more sustainable export-led growth [10,11]. The role of logistics performance on a national level in contributing to increased global trade and sustainable economic development is widely accepted but still needs to be strengthened by many developing countries [12]. Acknowledging this circumstance, several SSA countries are aiming to facilitate more efficient intermodal transport, and some researchers have contributed with studies focusing on South Africa [13,14], and also on low-income countries in East [15,16] and West Africa [17,18].

Among low-income countries in SSA, Ethiopia has the most promise of becoming a middle-income country in the near future because it has had one of the highest average

annual GDP growth rates in SSA (around 10%) over the past decade [19]. This economic development is heavily supported by the government, which set itself the goal of becoming the manufacturing hub of Africa by 2025 and has defined several projects and strategies to promote intermodal transport and other logistics-related initiatives [20]. Nevertheless, regarding the development of efficient logistics systems, including intermodal transport, Ethiopia is still in the early stages of development, and studies on intermodal transport in Ethiopia are sparse [18]. Without a lowering of the cost of transportation in Ethiopia, economic growth will be dampened, and foreign companies will hesitate to invest.

To contribute to a better understanding of the current state and development potential of intermodal transport in Ethiopia, this study aims to fulfil the following research objectives (RO):

RO1: *Outline the current challenges of intermodal transport in Ethiopia that dampen export-led growth.*

RO2: *Propose and assess strategies to improve the current state of intermodal transport in Ethiopia.*

The intent of this study is to condense multiple views on this topic through a multi-stakeholder approach. Therefore, a nominal group technique (NGT) exercise [21] was conducted among 38 logistics and supply chain management (LSCM) professionals coming from local manufacturing industries, international and domestic logistics services, and academia, as well as governmental and non-governmental institutions. The participants met on-site and were guided by neutral moderators through a rigorous research process. Subsequently, the challenges described, and strategies developed were assessed through a post-group-exercise questionnaire.

The remainder of the article is structured as follows. The next section outlines the theoretical background of this study. To that end, the current state of industrial development and intermodal transport in Ethiopia is analyzed. Additionally, challenges and strategies in other countries that are seeking to strengthen intermodal transport in order to promote sustainable growth are introduced. The research design is then described in detail. Subsequently, the current challenges of intermodal transport in Ethiopia as well as potential mitigation strategies are discussed using the results from the NGT group exercise and questionnaire among participants. Then, implications for research and practice as well as research limitations are discussed.

2. Theoretical Background

To lay the theoretical foundation for this study, this section will first provide an overview of the current state of Ethiopia's industrial development strategy, including the associated efforts to strengthen intermodal transport in the country in order to achieve export-led growth in the long term. In this context, the characteristics of Ethiopian domestic transport will also be presented. Secondly, challenges and solutions for improving intermodal transport in other countries will be explained in order that Ethiopia's results can be related to them later in this study.

2.1. Overview of Industrial Development and the Current State of Intermodal Transport in Ethiopia

Ethiopia's economy is heavily dependent on agricultural products (for example, coffee, cut flowers, oilseed crops, and grain), which make up two-thirds of all exports, with coffee constituting about half of these. The remaining third mainly originates from gold, textiles, animal hides, cotton, plastics, and others [22,23]. To reduce dependency on low-value agricultural products, the Ethiopian government has strengthened economic development by supporting the construction of several industrial parks, often near major cities. Building on the Chinese model for industrial development, these industrial parks are mostly government-owned, dedicated to certain industrial sectors where labor-intense processing steps are required (i.e., textiles and apparel, leather and leather products, pharmaceuticals, and agro-processing [24]), and provide foreign manufacturers with everything they need

to locate production within these parks [25–27]. Currently, over ten industrial parks have been built, and more than ten additional parks are in the planning stage [28].

Ethiopia is a landlocked country; therefore, exports are dependent on foreign seaports, mainly the Port of Djibouti, which handles about 95% of the exports of Ethiopia [29]. To strengthen the connection between industrial parks and the Port of Djibouti, reduce domestic transportation times, and thereby facilitate export-led growth, the Ethiopian government seeks to invest more in infrastructure that enables an intermodal transport system [20]. Therefore, several dry ports are planned or under construction near industrial parks to consolidate goods for export. Modjo Dry Port is already operational and is the most important of these [20]. One dry port is already operating near the capital, Addis Ababa, but many others are in planning. These dry ports are due to be connected to a railway network that will connect the major industrial zones with the Port of Djibouti, with each other, and with Ethiopia's neighboring countries. However, it should be noted that most of those railway tracks are still in the planning stage. The main line between Addis Ababa and Djibouti is already operational, and a new track connecting Mekelle with this main line was finished in 2020.

Although important infrastructure projects that will further facilitate intermodal transport have not yet been finished, the Ethiopian government has a clear vision on how to support export-led growth through intermodal transport. However, improving logistical performance in Ethiopia also requires integrating the goals and mindsets of the different stakeholders in the transportation process. In general, the main stakeholders can be broken down into four groups: (1) governmental institutions (including regulatory bodies); (2) non-governmental institutions; (3) foreign investors/manufacturers and local manufacturers; and (4) local and international logistics service providers (e.g., freight forwarders, transport operators, dry port operators, and the Port of Djibouti).

Figure 1 provides an overview of Ethiopia's main exports, existing and planned industrial parks, and their connection to the intended railway network. Analyzing this map makes it obvious that an intermodal transport system that includes the Ethiopian railway is being targeted and will become increasingly relevant in the near future.

However, the logistics performance of domestic transport in Ethiopia, including intermodal transport, is low, thus leading to unsatisfied customers, long transportation times, and high costs [18]. The reasons for this are manifold and can only be understood if one understands the characteristics of the current state of domestic transport in Ethiopia. Among many others, one reason for low logistics performance of Ethiopia is bad road conditions. The total Ethiopian road network consists of nearly 100,000 km of roads, but only 17% are paved and only about 29 of all roads are in good condition [30]. Additionally, the connectivity of more rural areas with roads in good condition is insufficient. Only about 22% of the rural population are connected to roads in fair condition. Consequently, 63 million rural residents are unconnected to roads in acceptable condition [30]; a lot, considering that the total Ethiopian population is about 109 million people. These poor road conditions also have diverse side effects that lead to poor logistics performance and high logistical costs. Currently, if an operator is serving the main import–export route from Djibouti to Addis Ababa (Modjo Dry Port), one truck is only able to serve this track with 2.5 trips per month, meaning that the transportation times are extremely high, considering that this track has a length of about 900 km [31]. Due to these circumstances, truck utilization in Ethiopia is extremely low compared with utilization in other countries. The average truck utilization in South Africa is between 120,000 and 140,000 km per year and truck, whereas the average Ethiopian truck utilization is less than half of that, at about 50,000 km per year [31]. Moreover, the truck fleet in Ethiopia is old and does not meet modern standards, thus leading to high operating costs, unreliability, and inefficiencies in operations.

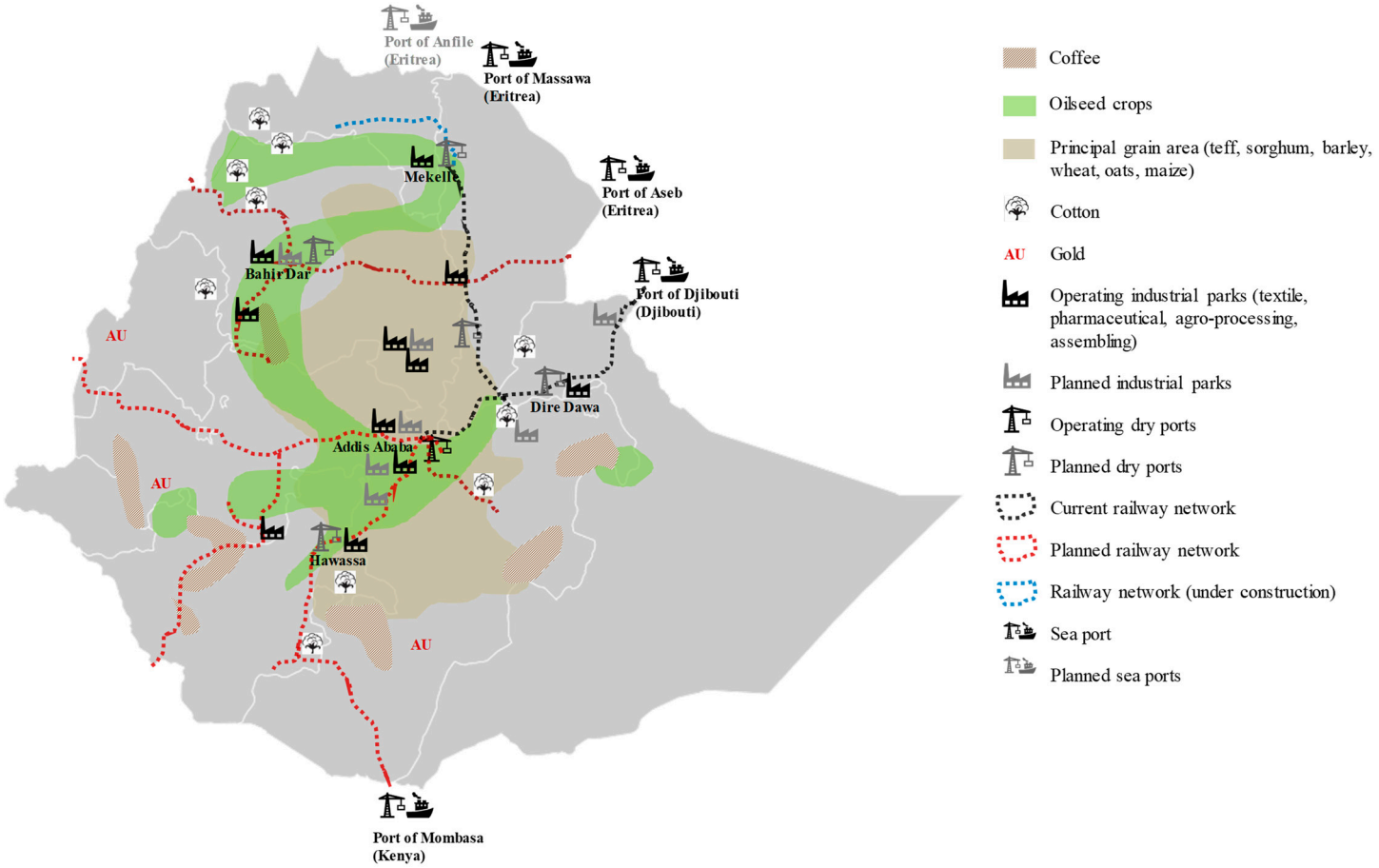

Figure 1. Overview of the main export goods, industrial parks, and intermodal transport network of Ethiopia.

Furthermore, the imbalance in Ethiopia's imports and exports impacts the logistics performance of the country. Road and railway transport are the two leading means of transport in Ethiopia, with road transport accounting for the movement of about 95% of total Ethiopian cargo. Ethiopia's import volumes are much higher than its export volumes; therefore, most trucks are empty on their way back from the port to Addis Ababa [32].

In addition, the Modjo Dry Port is one of the main bottlenecks in the Ethiopian domestic transport system for containerized cargo. For import customs clearance, the majority of containers have to pass through this dry port. However, 86% of the total transport time is spent at this dry port, thus leading to very long overall transport times [33]. There are many reasons for the poor logistical performance of this dry port, which ultimately leads to very long import and export transport times and also discourages foreign investors from locating production in the country. Among other issues, the dry port has insufficient cargo handling equipment, and it lacks facilities to store, load, or unload import and export containers. Furthermore, missing management systems, such as a proper terminal operation system, lead to delays in locating containers and other inefficient operations [33].

The discussion of the current state of the Ethiopian transport system clearly shows that there is still a long way to go before the vision of more efficient logistics with intermodal transport described at the beginning of this chapter can be realized. The considerations regarding the expansion of the rail network and the creation of industrial parks connected to them are conclusive, but not yet consistently implemented. Therefore, a more in-depth analysis of the current situation and the challenges that are dampening logistics performance is necessary, and strategies for improving the efficiency of intermodal transport must be identified.

2.2. Challenges and Opportunities of Intermodal Transport—Evidence from Other Countries

The role of intermodal transport in the sustainable economic growth of regions is already widely recognized. Especially for developing and emerging countries, the development of efficient intermodal transport systems represents a hurdle on the way to becoming developed, middle- and, ultimately, high-income countries. At the same time, the specific challenges in improving intermodal transport and thus the related strategies depend, in each individual case, on the respective region or country. Even though the literature in the case of Ethiopia is rather sparse, there is a whole range of literature on challenges and approaches for more efficient intermodal transport in other countries. Even if a comprehensive analysis of the challenges and solutions for all developing and emerging countries is not the focus here, the following examples of selected countries will show which hurdles are increasingly encountered in the development of intermodal transport systems. For the case of Brazil, research has shown that a variety barriers dampen the development of efficient intermodal transport system; of these, institutional and regulatory barriers play an important role [34]. For example, dry ports were only accorded secondary importance, which led to many regulatory uncertainties. Fragmented, non-interlocking policies hindered their development, because the interaction between the seaport and the dry port was not clarified from a regulatory point of view, which led to a lack of acceptance [34]. Additionally, inefficient, very bureaucratic customs processes that hinder the flow of goods as well as poor logistics and transport infrastructure were identified as among the main barriers in Brazil [35].

In India, intermodal transport is an important future perspective for sustainable economic growth, but there are also various challenges ahead. Among various factors, poor rail infrastructure, low frequency of freight trains, poor delivery reliability of trains, and the lack of a holistic approach to domestic transport are cited as significant barriers [36]. However, the lack of privatization of the transport sector, insufficient connection of roads to dry ports, and inappropriate dry port infrastructure also slow down the development of intermodal transport chains [37,38]. To improve the current situation would require opening up the freight market to private partnerships; to that end, research suggests

creating appropriate incentives to attract experienced logistics service providers and create more competition [36,37].

In the case of Malaysia, several challenges regarding dry ports are also well documented in the literature. Although Malaysia belongs to the category of upper-middle-income countries, some of the reported barriers, such as insufficient railway infrastructure and capacity as well as single track railway operations, are barriers that are often reported for developing countries. Jeevan et al. [39] present an exhaustive list of the challenges faced by Malaysian dry ports. Among these, inefficient operational processes and missing process standards are of significance. In addition, competition among stakeholders in intermodal transport, e.g., between dry ports and seaports, dampens logistical performance [39,40]. In addition to increasing double-track railway mileage as well as train frequency, Jeevan et al. also suggest more cooperation between stakeholders involved in intermodal transport—e.g., the sharing of estimated arrival and departure times between dry ports and seaports—which would be beneficial for all parties.

Another example of a developed country that still needs to improve the performance of intermodal transport can be seen in the case of China. Domestic transport in the past mostly focused on truck transport and inland waterways; the rail network was underdeveloped and existing dry ports competed against each other without a holistic approach for optimization [41]. However, especially with the initiation of the Chinese Belt and Road Initiative, more efficient intermodal transport that better utilizes railways has come more into focus for the Chinese government [42]. Nevertheless, the development of highly efficient intermodal transport systems is still in its early stages and the domestic transport system still lacks freight capacity and aligning processes [38], and an ever-increasing number of dry ports and inland container terminals are competing with each other, which decreases overall logistical performance [38,42].

Even if the analysis of the countries shows that there are often similar, recurring problems in the development of efficient intermodal transport systems, studies such as that of Gu et al. [38] (a comparison of intermodal developments in China and India) also show that each country must be considered separately when seeking to approach the challenges. The final severity of the challenge is different in each country and therefore different measures are required in the final design, even if they pursue the same mechanisms on a higher level—e.g., improved interaction between the stakeholders of intermodal transport, efficient regulation, and policies by governmental institutions or the development of the transport infrastructure. That said, a more in-depth analysis of the actual and potential challenges and strategies for the improvement of intermodal transport in Ethiopia is still necessary, and has not yet been performed through applying a multi-stakeholder approach.

3. Research Design

To contribute to the above-mentioned ROs, an NGT group exercise was performed among 38 LSCM professionals from Ethiopian manufacturing industries, global and domestic logistics services, and academia, as well as governmental and non-governmental institutions. Through a rigorous and moderated group-exercise process, building on the nominal group technique (NGT) that allows structured exchange of thoughts among experts while everyone is enabled to equally contribute to the discussion, the current challenges of intermodal transport in Ethiopia that dampen logistical performance were depicted and strategies to mitigate those challenges were proposed. Subsequently, professionals were asked to assess the importance of the challenges as well as the effectiveness and complexity of the strategies proposed through a post-group-exercise questionnaire, as proposed by Nitsche [42]. The detailed research procedure is outlined in Figure 2.

For group compilation (total sample as well as sub-groups during the NGT), the intent was to bring together professionals with different expertise and views on this vital topic, and thereby integrate multiple stakeholders. Therefore, participants were invited to meet on site for a group exercise in Addis Ababa, Ethiopia, in November 2019 to discuss the topic of intermodal transport in the country. The group exercise was conducted as part

of the Logistics Solutions Conference 2019, taking place on the second day at separate premises. The conference was specialized, focusing on the subject of transport and logistics in Ethiopia and addressed a broad group of targeted stakeholders. A heterogeneous group of participants in the group exercise were invited, several weeks in advance, to participate in the workshop at the conference. Similarly, additional conference participants could also register for the workshop, which was attended by 38 professionals in total. The demographics of the professionals participating in this group exercise are displayed in Table 1. The average work experience in LSCM of the people participating was 13 years (median 11.5 years).

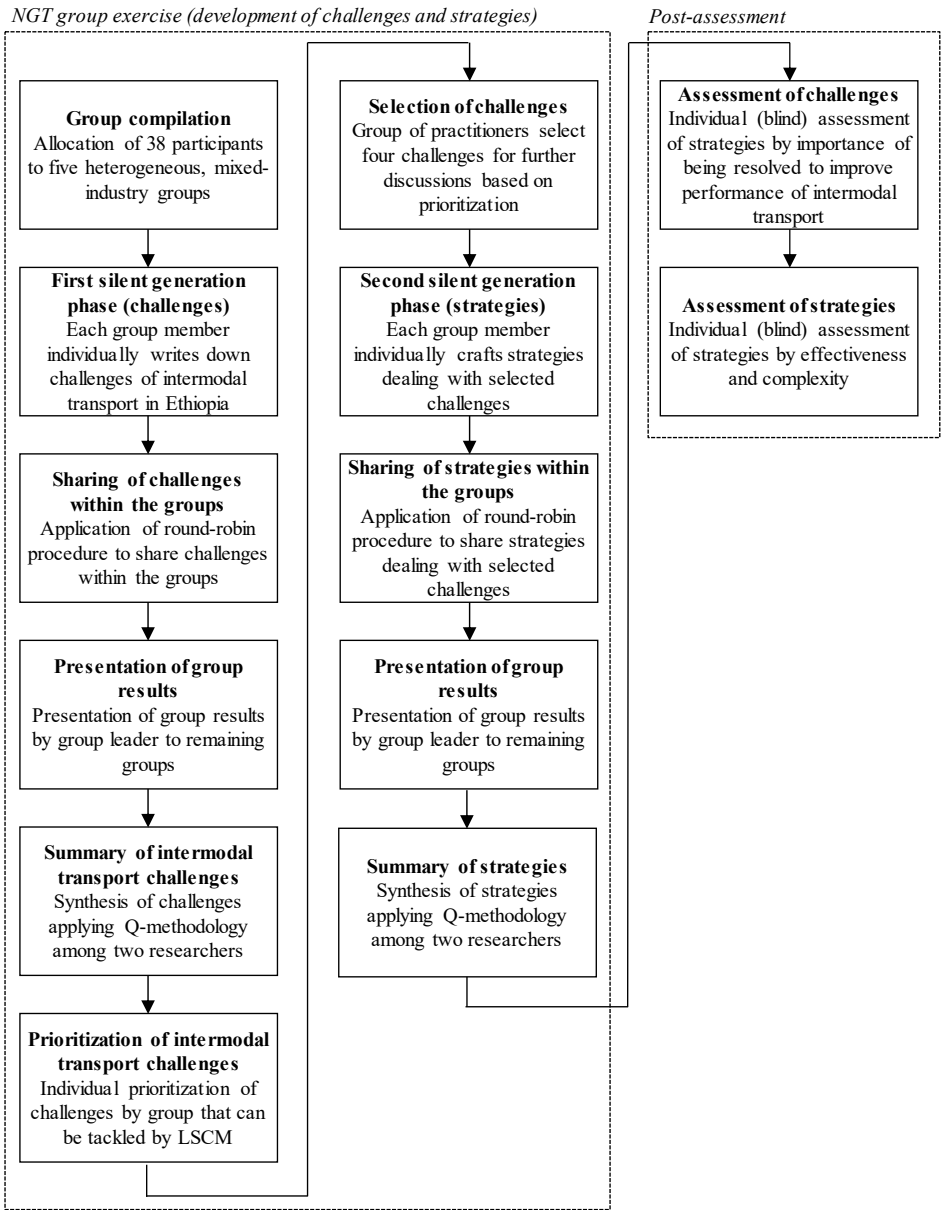

Figure 2. Research procedure.

Table 1. Sample demographics for the group exercise.

Industry Type	Total Number of Employees	Revenue (USD)
Manufacturing (n = 5)	Up to 50 (n = 10)	Up to 10 million (n = 12)
Logistics service provider (international) (n = 9)	50–250 (n = 11)	10–50 million (n = 6)
Logistics service provider (regional) (n = 8)	251–1000 (n = 6)	50–250 million (n = 3)
Academia (n = 8)	1001–2500 (n = 4)	250–1000 million (n = 2)
Governmental organizations (n = 2)	2501–5000 (n = 3)	1–5 billion (n = 1)
Non-governmental organizations (n = 3)	5001–10,000 (n = 2)	Above 10 billion (n = 4)
Associations (n = 3)	Above 10,000 (n = 2)	n/a (n = 10)

The NGT was chosen as the primary research method because it provides a rigorous process and has been proved to be efficient in the LSCM domain for extracting experts' knowledge on a certain topic [42–45]. The NGT clearly separates "problem description" from "problem solution" into two stages [21,46], and seeks to overcome the shortcomings of Delphi and focus-group techniques [46,47]. Traditional Delphi groups, on the one hand, do not allow on-site meetings and interaction among group members, which hinders the exchange of ideas and thoughts among peers [47]. Focus groups, on the other hand, can induce bias in the case of very dominant group members who tend to lead discussions if those dominant group members take most of the assigned time to express their thoughts, while shy group members, who may have equally important contributions to make, cannot do so because of the dominance of the others [46]. In contrast, the NGT seeks to provide a structured process for groups to meet on site and discuss vital topics while enabling everyone in the discussion to contribute equally [48,49].

In preparation for the NGT, the group was divided into five subgroups of seven to eight people [50]. It was intended to assign actors from different fields (industry, logistics services, academia, governmental and non-governmental institutions) to every group to enable mixed-industry discussions. Every subgroup performed the same procedure throughout the two-stage NGT process and was moderated by one neutral moderator; this ensured that NGT guidelines were met [21].

During the first stage, problem description, each group member individually thought of current challenges for intermodal transport in Ethiopia during a silent generation phase and wrote their identified challenges down on single cards. Afterwards, to share the challenges within the subgroups, a round-robin procedure was applied that enabled each group member to express one idea, one after another. This meant that one group member read out loud one of their cards and explained the challenge and its impact on intermodal transport in Ethiopia. Questions of clarification could be asked, but discussions were interrupted by the moderator, to avoid the potential suppression of less dominant group members; this is a means of avoiding the shortcomings of a traditional focus group, which is one of the major reasons for using the NGT. Subsequently, the next challenge was read and explained by the next group member. Following this procedure, all ideas from the silent generation phase were collected within the subgroup. Afterwards, each subgroup presented its results to the assembly. Based on the input of all subgroups, the Q-methodology [51] was performed by two researchers to synthesize the challenges, as proposed by Nitsche and Durach [45]. This methodology provides a structured, bottom-up approach that assists the synthesis of a broad set of variables (here, challenges) to higher-level/meta-level groups. To apply this approach, each researcher was provided with a set of challenges written down on single cards (one card per challenge) and read each card one after another. The researcher then either opened up a new group of cards or placed the card in an existing group of already assigned cards if thematic overlap was observed by the researcher. On the basis of this procedure, each researcher proposed a Q-sort and explanation of the synthesized groups of challenges. Similarities between both Q-sorts

were identified, and differences were discussed, leading to an overall synthesis of the challenges of intermodal transport in Ethiopia.

In preparation for the second stage, problem solution, the synthesized challenges from the first stage were presented to the assembly and each group member had to individually vote for four challenges that they would like to develop strategies for and for which LSCM could contribute to the mitigation of the challenge. A quantity of four challenges was chosen, because that was most appropriate for discussions according to the time restrictions on this group exercise. Moreover, this procedure was chosen because it is possible that overcoming some challenges is of very high importance for mitigating their negative effect on exports, but overcoming them is hard for LSCM to achieve and is more closely related to governmental or other regulations. Therefore, the participants were asked to choose the four challenges for which they would like to develop strategies based on their LSCM experience. After the individual votes were compiled, four challenges were chosen for further discussion during the NGT group exercise. However, the strategies developed during the second stage were not necessarily applicable only to one particular challenge, and could have positive effects on solving some other challenges as well.

For the problem solution stage, the same procedure as for the first stage was applied within four subgroups. Each member of a subgroup had to individually think of strategies for solving each of the four challenges during a silent generation phase. Afterwards, a round-robin procedure was applied within the subgroups to share the strategies developed. Following this procedure, each subgroup's results were presented to the assembly.

After the NGT group exercise, participants were asked to perform an individual online questionnaire-based post-assessment of the challenges and strategies developed. Each participant was asked to: (1) assess the importance of the resolution of each challenge for facilitating efficient intermodal transport in Ethiopia (7-point Likert scale, 1 = low to 7 = high); and (2) assess the strategies developed according to their effectiveness and complexity (7-point Likert scale, 1 = low to 7 = high). Effectiveness was defined as the impact a strategy would have on the resolution of a challenge without considering the resources necessary to implement that strategy. Complexity was defined as the amount of resources needed in order to implement the strategy [42].

4. Results

Based on the aforementioned research procedure, the current challenges for intermodal transport which dampen export-led growth in Ethiopia were synthesized and assessed. Moreover, strategies to improve the current state of intermodal transport were condensed. The results of this process are presented in the following two sections.

4.1. Current Challenges of Intermodal Transport in Ethiopia

In total, 19 challenges were synthesized and clustered into eight groups that contribute to three dimensions of challenges.

Figure 3 provides a condensed overview of the challenges. Within the transport dimension, all challenges were included that are connected to the physical transport of goods, as well as the corresponding information flows. More precisely, communicational, rail-related, road-related, ship-related, and transshipment-related challenges are condensed. The environmental dimension included challenges that are induced exogenously to the supply chain and can only be influenced indirectly by the stakeholders involved. In total, four challenges have been synthesized within this dimension, which are regulatory as well as financial challenges. The human factor dimension includes challenges that are related to the people involved in the process of intermodal transport. Figure 4 additionally outlines the post-assessment of the identified challenges according to the importance of their being resolved for facilitating more efficient intermodal transport.

Communicational challenges: This cluster included challenges that relate to communication and information exchange among the stakeholders involved in the process of intermodal transport. Professionals from the group exercise stated that missing co-

operation between all stakeholders dampens the efficiency of the whole system. All the actors involved—for example, port operators, freight forwarders, rail operators, and ocean carriers—optimize their own interests instead of working more closely together to provide more satisfying service for the customer. According to the practitioners' understanding, silo thinking must be overcome to facilitate intermodal transport because too many stakeholders are involved. This is supported by the post-assessment; this challenge is one of those whose resolution was identified as most important and it also displayed relatively low standard deviation between the answers, which indicates a comparatively high level of agreement among participants. Additionally, the level of digitalization of the stakeholders involved is relatively low, thus leading to either non-usage of information systems or a low level of their integration. According to professionals, missing transparency on locations, capacities, and prices further dampens exports because transport cannot be planned efficiently in advance because no one knows when and where transport capacity will be available, or at what price.

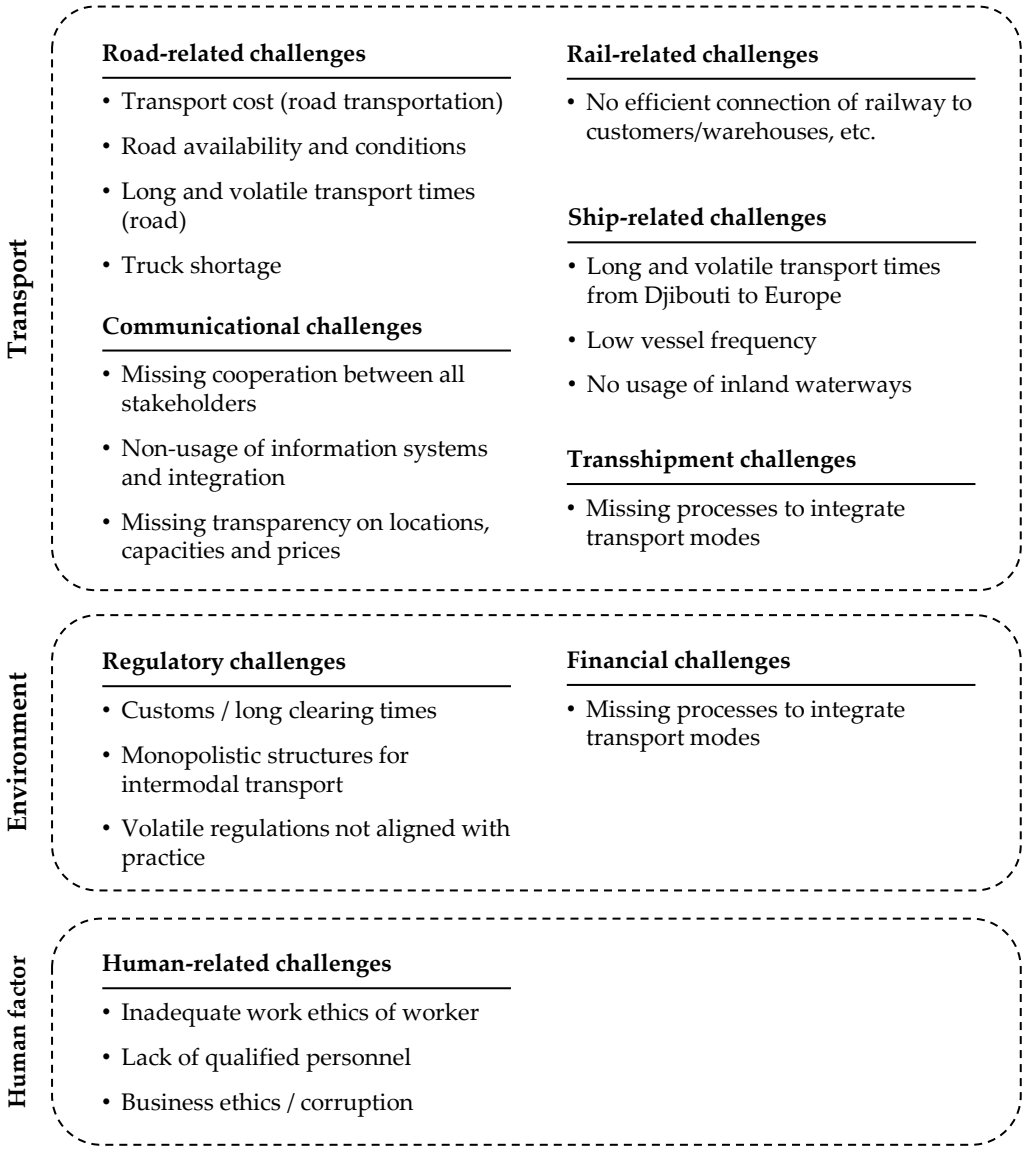

Figure 3. Overview of current challenges of intermodal transport in Ethiopia.

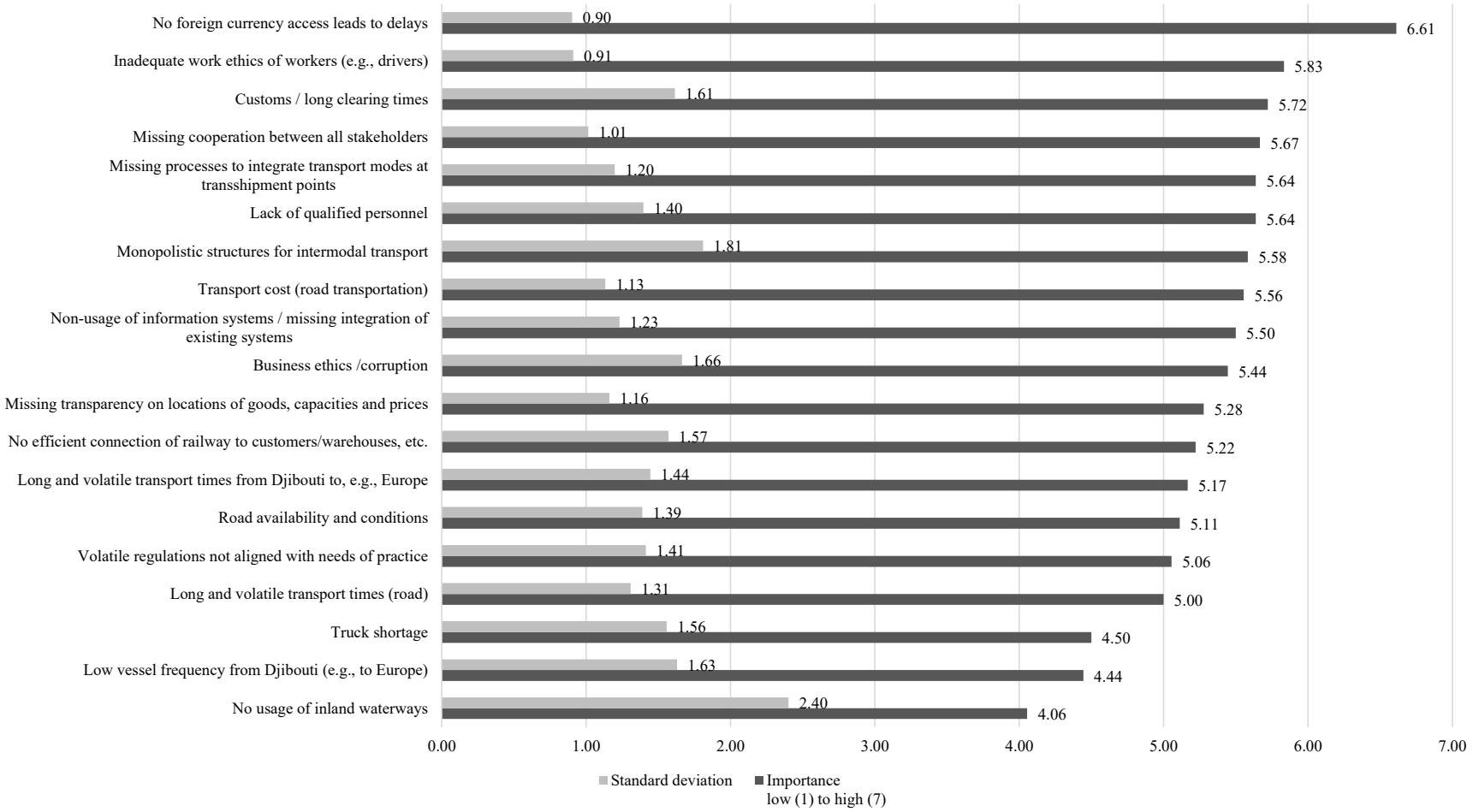

Figure 4. Assessment of challenges of intermodal transport in Ethiopia.

Rail-related challenges: Although it was stated by practitioners that they acknowledge the support the government is providing to facilitate more rail transport, multiple participants also stated that there is no efficient connection of the railway to customers, warehouses, etc. This means that there are rail tracks available, but they are not located near important industrial zones, which leads to more road transportation between these zones and dry ports or train terminals.

Road-related challenges: According to the expert panel, domestic transport for export from Ethiopia currently relies heavily on road transportation, which includes many challenges that need to be tackled. The most important among these challenges is the transportation cost for road transportation. Participants stated that transporting a container via road from Addis Ababa to the Port of Djibouti (around 900 km), which is the main connection for exports, costs between USD 3000 and USD 4000 (excluding insurance), which is at least four-fold higher than requesting a similar transport distance in Europe and has an impact on every business case. Additionally, road availability and conditions are an issue because, even between important nodes such as Addis Ababa and the Port of Djibouti, roads are partially unpaved or sometimes very narrow, and thus only accessible to a single lane of traffic, which leads to multiple accidents just because of the road conditions that drivers face. This also affects transport times, which are, in the professionals' opinions, too long and volatile to attract foreign investors.

Ship-related-challenges: Ethiopia is a landlocked country; therefore, it is dependent on the seaports of neighboring countries for exporting goods, mainly the Port of Djibouti. However, the current circumstances at the Port of Djibouti dampen the export efficiency of Ethiopia. According to the practitioners' insights, long and volatile transport times from Djibouti to Europe, together with a relatively low vessel frequency of departures from Djibouti, discourage foreign investors from setting up manufacturing sites in Ethiopia. Transporting a container from Djibouti to a major seaport in northern Europe takes about 30 to 36 days, which is a long time compared to similar or shorter transportation times from major Chinese seaports to Europe. For Djibouti, this is mainly because ships departing from Djibouti serve as feeders for even bigger vessels departing, for example, from the port of Yemen, thus leading to long waiting periods. Additionally, some participants stated that there is currently no usage of inland waterways but, according to the post-assessment, this was rated as the least important challenge, although with a comparatively high standard deviation among the answers, indicating contrasting opinions on this challenge.

Transshipment-related challenges: Although Ethiopia has a lot of means in place to facilitate more efficient intermodal transport, including utilizing the railway, participants in the group exercise expressed that missing processes to integrate transport modes hinder current developments toward more efficient transport. According to their understanding, if Ethiopia wants to develop intermodal transport, important network nodes and stakeholders such as dry ports, railway operators, port authorities, and freight forwarders must work hand in hand and integrate their planning processes, especially to ensure timely transshipment at the change of transport mode. However, processes are not currently connected and aligned; leading, for example, to the departure of trains before additional loads arrive.

Regulatory challenges: Among regulatory challenges, long customs clearing times were assessed as the most important challenge that needs to be tackled to facilitate more efficient intermodal transport. As stated by the participants, customs clearance times contribute heavily to overall transportation times when exporting goods from Ethiopia. According to their experience, it takes between two and ten days to clear goods for export in Addis Ababa before transporting them to Djibouti. When arriving at the Djibouti border, goods have to be cleared again, which takes an additional two to three days before permission is granted to export those goods from Djibouti. Additionally, monopolistic structures for intermodal transport have been raised as an important challenge. Currently, the rail track is operated by the Ethiopian Shipping Line (ESL). If freight forwarders want to utilize the railway for faster transportation, they must choose ESL as the railway operator.

According to many of the participants, the suppression of competition leads to many inefficiencies, especially for intermodal transport in Ethiopia, and ESL uses its strong position in the market and the scarcity of capacity to achieve higher prices. However, it should be noted that opinions on this particular challenge were very diverse, as indicated by the high standard deviation in the post-assessment survey.

Financial challenges: According to the post-assessment, the most important challenge for intermodal transport in Ethiopia is that lack of access to foreign currency leads to delays when exporting goods. Ethiopia itself is opposed to an increasing trade deficit due to high-value imports and low-value exports [52]. Consequently, Ethiopia lacks reserves in foreign exchange, for example U.S. dollars, and restricts access to them. Thus, it often happens that international freight forwarders, port operators, and others have to be paid, but the restricted access to U.S. dollars delays these payments and therefore increases the total transportation times of goods.

Human-related challenges: Inadequate work ethics of workers has been assessed as the second most important challenge. More precisely, participants expressed the issue that typical Western work ethics, such as being on time and compliant to schedules and processes, does not apply in the case of Ethiopia. Workers, for example drivers, are not used to such work ethics, which leads to unplannable delays to deliveries. Additionally, professionals stressed the lack of qualified personnel in the field of LSCM that they are facing on a regular basis. Finding qualified personnel with adequate work ethics is one of the major challenges of companies when seeking to expand their businesses. Moreover, it was explained that, even today, an unequal understanding of business ethics/corruption dampens efficiency improvements in intermodal transport because transports are intentionally delayed to gain more profit from them.

4.2. Strategies to Improve the Current State of Intermodal Transport in Ethiopia

Based on the second NGT phase, strategies dealing with four pressing challenges of intermodal transport were derived and, later, assessed according to their effectiveness and complexity. More precisely, the four challenges—missing cooperation between all stakeholders, missing processes to integrate transport modes at transshipment points, lack of qualified personnel, and monopolistic structures for intermodal transport—were discussed to develop strategies for dealing with them. Firstly, it should be noted that, although these were not the most important challenges from the post-assessment, they were among the more important ones. However, during the group exercise, participants were asked to choose challenges for which they would like to develop strategies for dealing with on the basis of their LSCM experience. As an example, the highly important challenge of foreign currency access is not amenable to be tackled by means of LSCM.

Table 2 outlines the strategies developed as well as their assessment according to effectiveness and complexity (the values shown for complexity and effectiveness represent the mean values of all answers). Although the strategies were developed for dealing with a certain challenge that was derived from the first part of the NGT group exercise, it can be observed that similar approaches were developed for dealing with more than one challenge. Moreover, a closer examination of the strategies reveals that the strategies developed do not necessary tackle one particular challenge but could also have an impact on the mitigation of additional challenges. Therefore, based on the strategies developed and assessed, the following five strategy clusters were proposed that need to be tackled to improve the current state of intermodal transport in Ethiopia: digitalization, education, process standardization, performance tracking and improvement, and collaboration.

Table 2. Overview of strategies developed for improving the current state of intermodal transport in Ethiopia.

Challenge	Strategy	Effectiveness	Complexity
Missing cooperation between all stakeholders	Establishment of strong supply chain partnerships that share and align capacities	5.39	4.22
	Development of clear standard operating procedures for the different stakeholders in the supply chain	5.06	3.67
	Joint development of multi-stakeholder IT platforms	5.00	4.78
	Establishment of public and private multi-stakeholder cooperation platforms	4.94	3.89
	Clear definition of roles and responsibilities of platform members and key performance indicator (KPI) monitoring	4.67	3.72
	Development of incentive system to foster stakeholder cooperation	4.67	4.17
Missing processes to integrate transport modes at transshipment points	Policy changes to accelerate customs at the port of Djibouti	5.65	5.41
	Establishment of a more frequent train connection between Djibouti and Ethiopia to make the train a more attractive transport mode	5.53	3.71
	Tracking and tracing of goods (at truck or container level) to better estimate arrivals at transshipment points	5.35	3.88
	Simplification of processes within each stakeholder to make mode changes more efficient	5.35	4.18
	Connection of IT systems of logistics service providers to utilize available data	5.12	4.24
	End-to-end visibility of actual and planned goods within the network to enable a holistic integrated planning	4.94	4.35
	Establishment of a central continuous improvement organization to control the whole flow of goods	4.82	4.29
Lack of qualified personnel	National certification for certain job profiles to assist companies in finding qualified personnel	5.25	3.25
	Incentivization of staff to participate in further education programs	5.22	3.28
	Development and implementation of KPIs to measure performance of personnel	5.17	3.39
	Knowledge capacity building through on-job mentoring and experience sharing (from another countries and experts)	5.11	3.44
	Vocational training on specific job profiles (considering good practice examples of other countries)	5.00	3.28
	Collaboration between companies and universities to teach the necessary practice-oriented content to close gap between theory and practice	4.94	3.44
Monopolistic structures for intermodal transport	Set-up and follow-up on KPI (that track operators' performance) to lower prices	5.33	4.39
	Support of consolidation of small operators	5.00	4.44
	Anti-monopoly regulations to open up the market for freight forwarders	4.78	4.28
	Promotion of platform for transparency of small operators and their services and prices	4.36	4.17
	Promotion of sub-contracting schemes	4.33	3.94
	Conduction of quantitative study that assesses whether monopolistic structures in Ethiopia lower logistics service level and increase cost	4.28	4.33

Digitalization: Digitalization of logistics in Ethiopia is in its early stages but could have a dramatic impact on intermodal transport. Derived from the group exercise, digital approaches can assist improvements in multiple ways. Firstly, creating visibility in con-

tainer and truck locations can assist in the better planning of arrival times at transshipment points and provide end customers with better information on estimated times of arrival at their locations. Secondly, the need for digital platforms for creating visibility regarding capacities and abilities of logistics service providers and also to foster cooperation among them was stated multiple times. The absence of cooperation among involved stakeholders was one of the more important challenges, and digital platforms can support the integration of those stakeholders on multi-stakeholder platforms. This could also be beneficial for smaller logistics service providers and trucking companies that seek to better consolidate volumes and gain bargaining power.

Education: Throughout the discussions, it became clear that training and education in intermodal transport are necessary at the levels of the government, the company, and the worker to improve the current state of affairs. More precisely, the proposal was to improve the practice-orientation of university teaching through cooperation between universities and companies; the latter can provide practice problems to university students to bridge the gap between theory and practice. It was stated that university teaching currently focuses mostly on theoretical content without connection to practical problems. As a result, students coming from the university do not meet the requirements of companies and need a lot of training time before they can contribute. Additionally, the creation of national certifications for certain job profiles, as well as vocational training for those job profiles building on the experience of other countries, would assist companies in finding or training more qualified personnel. Moreover, for existing staff, incentives must be found in order to motivate them to obtain further education and training. Overall, it should be noted that the strategies from this cluster were rated as highly effective and not as complex as the other strategies investigated.

Process standardization: From the participants' point of view, stakeholders concerned with the process of intermodal transport lack an understanding of the processes involved. The joint development of simple and standardized operating procedures—for example, for planning, loading, and unloading transports, or customs clearance—would assist in improving the efficiency of the whole transport chain.

Performance tracking and improvement: According to the participants' experience, Ethiopian logistics service providers do not track their performance and consequently cannot provide key performance indicators (KPIs) to their customers. They also lack an overall understanding of continuous improvement. Therefore, multiple stakeholders agreed that the definition of KPIs and the embedding of them into a continuous improvement process is of high importance, and KPIs were discussed for multiple challenges on different levels (at the levels of the worker, the company, and the supply chain). If the performance of the actors is tracked and therefore made comparable, this will, on the one hand, lead to more competition and, on the other hand, provide ideas for improvement potential. Additionally, during the first stage of the NGT, it was noted that monopolistic structures for intermodal transport dampen the efficiency of transport chains. However, without being able to track the logistics performance via KPIs, an assessment of the efficiency of the current structures is not possible. Therefore, participants mutually agreed that further quantitative studies on the performance of the current transportation system in Ethiopia are necessary to investigate the efficiency of the currently implemented, monopolistic structures.

Collaboration: This strategy cluster includes all measures that aim at increasing cooperation and competition among the stakeholders involved in intermodal transport in Ethiopia. The assessment and discussion of challenges showed that this needs to be strengthened in order to facilitate export-led growth. More specifically, this includes closer cooperation among small operators through platforms, but also more efficiently promoted subcontracting schemes between large service providers and small operators. Additionally, certain incentives could assist in achieving closer cooperation between, for example, truck drivers and rail operators to improve and align arrival times at transshipment points.

However, when looking at the strategies and associated strategy clusters, it is noticeable that very few strategies can be implemented by one stakeholder, alone, in order to be sustainably successful and thus contribute to the improvement of intermodal transport in Ethiopia and, consequently, an increase in export-led growth. Therefore, the concrete design and configuration of the strategy cluster requires, in the majority of cases, the interplay of the stakeholders, each meeting their respective responsibilities, in the successful implementation of the strategies deployed. "Responsibilities" implies that there are initiators and drivers of the strategies on the one hand, but also moderators that contribute to the success of the initiated strategies, on the other. "Initiator and driver" here mean that these stakeholders primarily start and expedite the design and configuration of the strategy cluster by deploying initiatives. Moderators can positively or negatively influence the direct effect of the strategy cluster on the improvement of intermodal transport, thus also significantly influencing the strength of this effect.

In this particular case, the responsibilities of the stakeholders involved differ between the strategy clusters. For the majority of strategies within the four strategy clusters—digitalization, performance tracking and improvement, process standardization, and collaboration—the strategies have to be initiated and driven by the industry (i.e., local and international logistics service providers, foreign investors and manufacturers, and local manufacturers). For example, tracking and tracing of goods, development of clear standard operating procedures, setup of KPIs for performance measurement, and improvement or establishment of strong partnerships have to be started by the industry but can be highly supported by governmental institutions (e.g., through digital infrastructure or efficient regulations) as well as by non-governmental institutions (e.g., through platforms for exchange or provision of standards and norms) that serve as moderators for those strategy clusters.

However, for the strategy cluster education, this effect manifests differently. Here, governmental as well as non-governmental institutions should be the initiators and drivers of, for example, the setup of vocational training programs, national certification of job profiles, or the improvement of practice-oriented university teaching. However, the effect of those initiatives is influenced by the industry stakeholders (i.e., local and international logistics service providers, foreign investors and manufacturers, and local manufacturers) that serve as moderators for the education cluster; the industry can set the requirements, but also has to actually apply these training programs, certificates, etc., or hire the university students. Therefore, it is also clear that, for the majority of strategies, the interaction of all stakeholders is necessary to successfully design and implement the strategy clusters. Figure 5 outlines the effects explained regarding the responsibilities of stakeholders in successfully designing the strategy clusters.

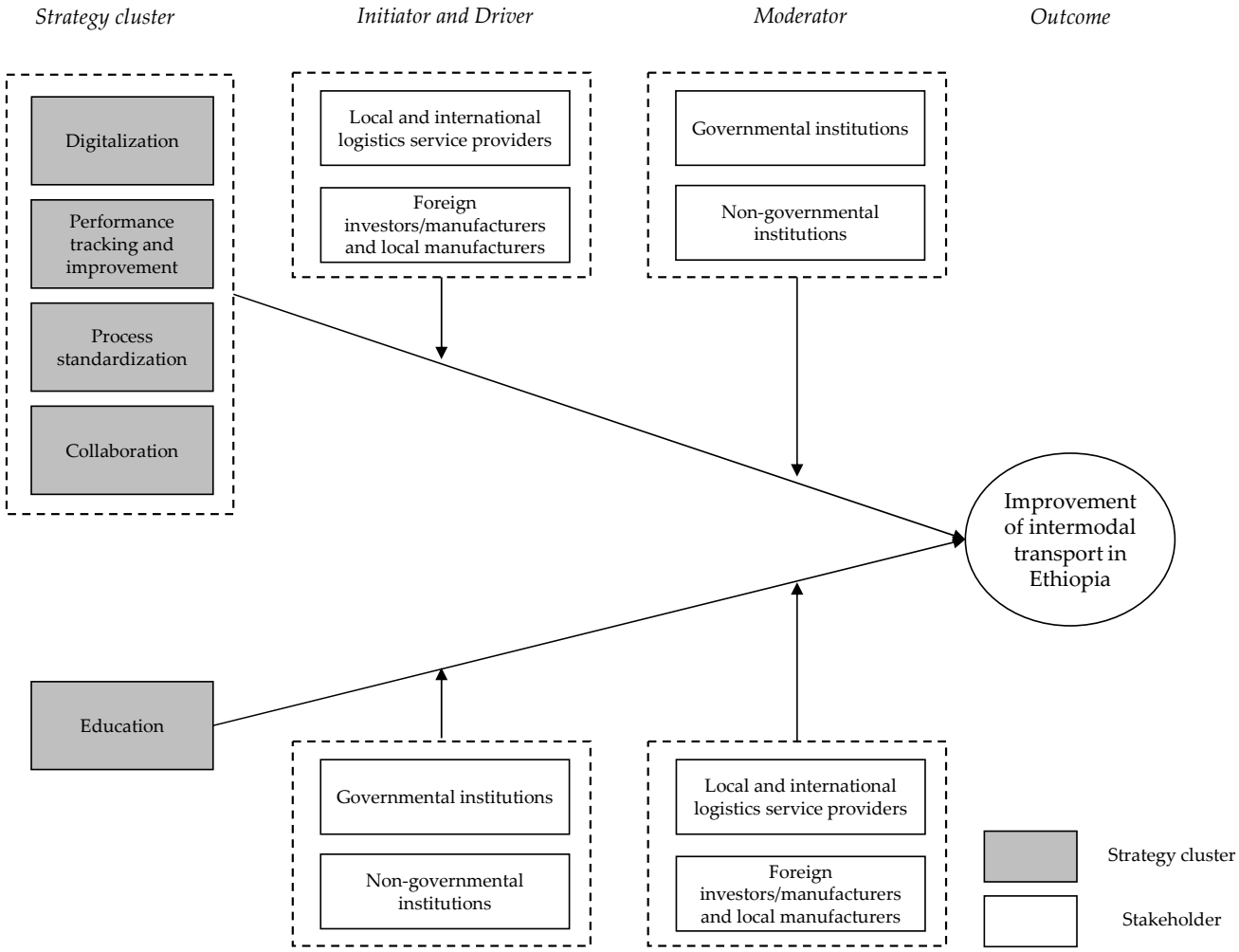

Figure 5. Responsibilities of stakeholders for the design of strategy clusters.

5. Implications

Based on a structured research process among 38 professionals that integrated the insights of multiple stakeholders, this study provides a holistic picture of the current challenges facing intermodal transport in Ethiopia and outlines potential strategies and directions for future improvements. Regarding the challenges, 19 challenges were synthesized that contribute to eight different clusters. It was shown that the challenges Ethiopia faces to improve efficiency of intermodal transport are diverse in nature and, besides more traditional transport-mode- and transshipment-related issues, they also comprise environmental as well as human-related challenges that require different approaches from those required by traditional transport-related issues. The introduction to the challenges to efficient intermodal transport systems in other countries, such as India, Brazil, Malaysia, or China (see Section 2.2), showed that some challenges are increasingly encountered in various developing and emerging, but also industrialized, countries, and these have also been confirmed in the case of Ethiopia. They include missing cooperation between all stakeholders, long customs clearance times, low freight capacities, missing processes to integrate transport modes, monopolistic structures, and others. However, the analysis also shows that some challenges are specific to, or at least particularly important in, the case of Ethiopia, including no foreign currency access, inadequate work and business ethics, lack of qualified personnel, extremely high transportation costs (even by African standards), missing transparency of locations of goods and capacities, etc., which further dampen logistical performance. This leads to the circumstance that the breadth of challenges faced by Ethiopia is very high; diverse challenges act on different levels and thus Ethiopia can

certainly be described as even more challenging compared with many other countries when it comes to implementing an efficient intermodal transport system for more export-led growth. The strategies developed and assessed by the group of practitioners were condensed into five areas of action that companies within those transport chains should tackle jointly with governmental and non-governmental institutions. The fact that this multiplicity of challenges is present in Ethiopia also means that the proposed strategy clusters are very complex in their actual design, and especially in their interaction with the stakeholders involved, and therefore cannot be implemented well without proper alignment among these stakeholders. Owing to the complexity of this, it is difficult to predict, from today's level, which path Ethiopia will take compared with those of other countries, even though it is clear that improvements to the current situation are needed. The study therefore contributes to research and practice alike.

For research, this study provides a synthesized understanding of the current challenges of intermodal transport in Ethiopia that could be a basis for further investigations in this field. To the best of the author's knowledge, no systematic approach has been undertaken so far to map a holistic picture integrating the views of multiple stakeholders on this topic. Therefore, future research in this field should focus in greater depth on particular challenges and contribute to more concrete solutions. The strategies proposed for improving the current state of intermodal transport must be understood as first impressions and need further refinement by research and practice.

For practice, this study provides valuable insights on the current state of intermodal transport in Ethiopia based on insights revealed by professionals from different industries and institutions. More precisely, the implications can be broken down into the five stakeholder groups, as mentioned at the beginning.

Firstly, for governmental institutions (including regulatory bodies), the study provides an overview of the current challenges of efficient intermodal transport. A lot of those challenges, such as customs clearance, foreign currency access, monopolistic inefficiencies, and others, can be mitigated through effective governmental measures, thus contributing to export-led growth. It has been clear throughout the discussion process among the participants that efficient transport is often highly impacted by regulations in this field. Particularly, the challenge of monopolistic structures for internodal transport is one of the more important challenges that can be controlled by governmental institutions. Although it was stated by many participants that opening up those structures would increase competition and consequently increase logistical efficiency, the flipside of losing control over domestic transport and infrastructure (e.g., railway infrastructure) should be considered.

Secondly, for non-governmental institutions, some of the outlined strategy clusters can be addressed from a neutral perspective to contribute to improvements in this field. In particular, the strategy cluster of education could be tackled by non-governmental institutions by providing assistance in developing national certifications for certain job profiles linked to logistics, as well as supporting the improvement of practice-orientated university teaching, as mentioned earlier.

Thirdly, for foreign investors and local manufacturers, this study provides valuable insights. For companies seeking to enter the Ethiopian market, the study provides insights on what to expect when importing and exporting goods. For companies already active in Ethiopia, the study provides clear directions on which challenges and strategies to focus when trying to improve logistics performance. However, upon investigation of the challenges and strategies proposed, it becomes obvious that those challenges cannot be tackled by single companies acting alone, and the efficiency of the processes involved often relies on cooperation and multi-stakeholder approaches.

Finally, for local and international logistics service providers, the study stresses their important position in achieving export-led growth for Ethiopia, because their actions need to be integrated in order to improve the state of logistics. More precisely, the study showed that numerous logistics actors (freight forwarders, transport operators, dry port operators, and operators at the Port of Djibouti) are involved in intermodal transport, but their actions

are not well aligned owing to contrasting goals and a lack of understanding of each other's processes. Missing cooperation between all stakeholders as well as missing processes to integrate transport modes have been assessed among the five most important challenges of intermodal transport in Ethiopia, which emphasizes the importance of service providers in this field. Cooperation and exchange among them seem to be necessary in order to improve the current state of affairs. This could also be fostered by government institutions, supported by non-governmental institutions and manufacturers, which again emphasizes that the cooperation of all stakeholders should come first; this starts with improving mutual understanding and must result in joint initiatives.

6. Study Limitations and Outlook

This study's intent was to provide a broad picture of the current state of intermodal transport in Ethiopia through integrating multiple stakeholders. Therefore, the study applied an NGT group exercise among 38 professionals coming from manufacturing and service-provider industries, academia, and government as well as non-governmental institutions. The intent was to limit bias through various stages of the research process. However, the study contains some limitations that need to be discussed.

Although, from a methodological perspective, the total number of 38 participants was appropriate for performing an NGT group exercise, this constitutes a relatively small sample for assessing the challenges and strategies developed. Although the assessment provides primary indications of the peculiarity of the challenges faced, more fine-tuned analyses by different stakeholder groups revealing their diverse views on those challenges were not possible. Additionally, the assessment performed was based solely on the individual perceptions and experiences of the professionals involved, thus leading to a more qualitative assessment rather than a quantitative analysis which can be supported by concrete numbers.

That being said, this study and its results provide a basis for further discussions but require further quantitative studies to draw more reliable conclusions. Nevertheless, the study seeks to open up the discussion on intermodal transport in Ethiopia, which will be among the cornerstones of economic development for one of the fastest-growing low-income countries in the world, which is increasingly becoming part of global value chains. Efficient logistics is one of the key success factors for achieving the Ethiopian government's goal of becoming the manufacturing hub of Africa by 2025. Therefore, discussions on improving intermodal transport have to be continued by research and practice alike.

Funding: The author would like to thank the Kuehne Foundation for the financial support of this research project. We acknowledge support by the German Research Foundation and the Open Access Publication Fund of TU Berlin.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data available on request due to restrictions, e.g., privacy or ethical.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Bontekoning, Y.; Priemus, H. Breakthrough innovations in intermodal freight transport. *Transp. Plan. Technol.* **2004**, *27*, 335–345. [CrossRef]
2. Bhattacharya, A.; Kumar, S.A.; Tiwari, M.; Talluri, S. An intermodal freight transport system for optimal supply chain logistics. *Transp. Res. Part C Emerg. Technol.* **2014**, *38*, 73–84. [CrossRef]
3. Mostert, M. Design and management of freight transport networks: Intermodal transport and externalities. *4OR* **2017**, *16*, 227–228. [CrossRef]
4. Mathisen, T.A.; Hanssen, T.-E.S. The academic literature on intermodal freight transport. *Transp. Res. Procedia* **2014**, *3*, 611–620. [CrossRef]
5. Shin, S.; Roh, H.-S.; Hur, S.-H. Technical trends related to intermodal Automated Freight Transport Systems (AFTS). *Asian J. Shipp. Logist.* **2018**, *34*, 161–169. [CrossRef]

6. Lin, N. CO2 emissions mitigation potential of buyer consolidation and rail-based intermodal transport in the China-Europe container supply chains. *J. Clean. Prod.* **2019**, *240*, 118121. [CrossRef]
7. Kaack, L.H.; Vaishnav, P.T.; Morgan, M.G.; Azevedo, I.L.; Rai, S. Decarbonizing intraregional freight systems with a focus on modal shift. *Environ. Res. Lett.* **2018**, *13*, 083001. [CrossRef]
8. Pedersen, P.O. Freight transport under globalisation and its impact on Africa. *J. Transp. Geogr.* **2001**, *9*, 85–99. [CrossRef]
9. Devlin, J.; Yee, P. Trade logistics in developing countries: The case of the Middle East and North Africa. *World Econ.* **2005**, *28*, 435–456. [CrossRef]
10. Naudé, W.; Matthee, M. *; World Institute for Development Economics Research the Significance of Transport Costs in Africa*; United Nations University: Helsinki, Finland, 2007; ISBN 978-92-808-3041-5.
11. Wheat, P.; Stead, A.D.; Huang, Y.; Smith, A. Lowering transport costs and prices by competition: Regulatory and institutional reforms in low income countries. *Sustainability* **2019**, *11*, 5940. [CrossRef]
12. Wiederer, C.; Straube, F. A decision tool for policymakers to foster higher-value perishable agricultural exports. *Transp. Res. Interdiscip. Perspect.* **2019**, *2*, 100035. [CrossRef]
13. Schoeman, C.B. Intermodal transportation perspectives in South Africa: A case study of its application within the Gauteng Province and lessons learned for other metropolitan areas. In *Urban Transport XX, Proceedings of the 20th International Conference on Urban Transport and the Environment, The Algarve, Portugal, 28–30 May 2014*; WIT Press: Southampton, UK, 2014; pp. 3–15.
14. Havenga, J.H.; Simpson, Z.P.; De Bod, A. South Africa's freight rail reform: A demand-driven perspective. *J. Transp. Supply Chain Manag.* **2014**, *8*, 14. [CrossRef]
15. Kalgora, B. Intermodal terminal localisation using a linear programming approach: The case study of Togo and West African landlocked Countries. *J. Transp. Technol.* **2019**, *9*, 215–231. [CrossRef]
16. Okyere, S.; Yang, J.Q.; Aning, K.S.; Zhan, B. Review of sustainable multimodal freight transportation system in African developing countries: Evidence from Ghana. *Int. J. Eng. Res. Afr.* **2019**, *41*, 155–174. [CrossRef]
17. Dettmer, P. An Optimisation Model for Intermodal Transportation in Humanitarian Logistics: Development of a Decision Support Tool for Supply Network Design in East Africa. Master's Thesis, University of Göttingen, Göttingen, Germany, 2017. [CrossRef]
18. Amentae, T.K.; Gebresenbet, G. Evaluation of performances of intermodal import-export freight transport system in Ethiopia. *J. Serv. Sci. Manag.* **2015**, *8*, 57–70. [CrossRef]
19. Coutts, K.; Laskaridis, C. Financial balances and the development of the Ethiopian economy. In *The Oxford Handbook of the Ethiopian Economy*; Cheru, F., Cramer, C., Oqubay, A., Eds.; Oxford University Press: Oxford, UK, 2019; pp. 212–229, ISBN 978-0-19-881498-6.
20. Ethiopian Maritime Affairs Authority. *Federal Democratic Republic of Ethiopia: National Logistics Strategy (2018–2028)*; Ethiopian Ministry of Transport: Addis Ababa, Ethiopia, 2019; p. 100.
21. Delbecq, A.L.; Van De Ven, A.H. A group process model for problem identification and program planning. *J. Appl. Behav. Sci.* **1971**, *7*, 466–492. [CrossRef]
22. International Trade Center. *Pulse Sector Investment Profile: Ethiopia*; International Trade Center: Geneva, Switzerland, 2019; p. 36.
23. The World Bank. *Ethiopia Economic Update—The Inescapable Manufacturing-Services Nexus: Exploring the Potential of Distribution Services*; The World Bank: Washington, DC, USA, 2018; p. 106.
24. Ethiopian Investment Commission. Overview of Industrial Parks in Ethiopia 2020. Available online: http://www.investethiopia.gov.et/index.php/investment-opportunities/other-sectors-of-opportunity/overview.html (accessed on 23 June 2020).
25. Giannecchini, P.; Taylor, I. The eastern industrial zone in Ethiopia: Catalyst for development? *Geoforum* **2018**, *88*, 28–35. [CrossRef]
26. Françoise, N. *Chinese Investors in Ethiopia: The Perfect Match?* IFRI: Paris, France, 2017.
27. Schmidt, E.; Dorosh, P.; Jemal, M.K.; Jennifer, S. *Ethiopia's Spatial and Structural Transformation: Public Policy and Drivers of Change*; IFPRI: Washington, DC, USA, 2018.
28. Zhang, X.; Tezera, D.; Zou, C.; Wang, Z.; Zhao, J.; Gebremenfas, E.A. *Industrial Park Development in Ethiopiacase Study Report, Inclusive and Sustainable Industrial Development Working Paper Series*; United Nations Industrial Development Organization: Vienna, Austria, 2018; p. 85.
29. United Nations. *The Djibouti City—Addis Ababa Transit and Transport Corridor: Turning Diagnostics into Action*; United Nations Conference on Trade and Development; United Nations: New York, NY, USA; Geneva, Switzerland, 2018; p. 39.
30. World Bank Group. *Measuring Rural Access Using New Technologies*; World Bank Group: Washington, DC, USA, 2016; p. 91.
31. UNDP Ethiopia. *National Logistics Strategy*; UNDP Ethiopia: Addis Ababa, Ethiopia, 2017.
32. Bedassa, K.W. *Assessing Freight Transport Performances in Relation to Delays in Ethiopia: The Case of Addis Ababa-Djibouti Corridor*; Addis Ababa University: Addis Ababa, Ethiopia, 2017.
33. World Bank Group. *Ethiopia Trade Logistics Project: Combined Project Information Documents/Integrated Safe-Guards Data Sheet (Pid/Isds) Appraisal Stage*; World Bank Group: Washington, DC, USA, 2017; p. 18.
34. Padilha, F.; Ng, A.K.Y. The spatial evolution of dry ports in developing economies: The Brazilian experience. *Marit. Econ. Logist.* **2012**, *14*, 99–121. [CrossRef]
35. Rodrigues, T.D.A.; Mota, C.M.D.M.; Ojiako, U.; Dweiri, F. Assessing the objectives of dry ports: Main issues, challenges and opportunities in Brazil. *Int. J. Logist. Manag.* **2020**, *32*, 237–261. [CrossRef]
36. Kumar, A.; Anbanandam, R. Evaluating the interrelationships among inhibitors to intermodal railroad freight transport in emerging economies: A multi-stakeholder perspective. *Transp. Res. Part A Policy Pract.* **2020**, *132*, 559–581. [CrossRef]

37. Ng, A.; Gujar, G.C. Government policies, efficiency and competitiveness: The case of dry ports in India. *Transp. Policy* **2009**, *16*, 232–239. [CrossRef]
38. Gu, Y.; Loh, H.S.; Yap, W.Y. Sustainable port-hinterland intermodal development: Opportunities and challenges for China and India. *J. Infrastruct. Policy Dev.* **2020**, *4*, 228–248. [CrossRef]
39. Jeevan, J.; Chen, S.-L.; Lee, E.-S. The challenges of Malaysian dry ports development. *Asian J. Shipp. Logist.* **2015**, *31*, 109–134. [CrossRef]
40. Jeevan, J.; Salleh, N.; Loke, K.; Saharuddin, A. Preparation of dry ports for a competitive environment in the container seaport system: A process benchmarking approach. *Int. J. e-Navig. Marit. Econ.* **2017**, *7*, 19–33. [CrossRef]
41. Zeng, Q.; Maloni, M.J.; Paul, J.A.; Yang, Z.; Yang, J.A.P. Dry port development in China. *Transp. J.* **2013**, *52*, 234–263. [CrossRef]
42. Nitsche, B. Decrypting the belt and road initiative: Barriers and development paths for global logistics networks. *Sustainability* **2020**, *12*, 9110. [CrossRef]
43. Schoenherr, T.; Modi, S.B.; Benton, W.; Carter, C.R.; Choi, T.Y.; Larson, P.D.; Leenders, M.R.; Mabert, V.A.; Narasimhan, R.; Wagner, S.M. Research opportunities in purchasing and supply management. *Int. J. Prod. Res.* **2012**, *50*, 4556–4579. [CrossRef]
44. Nitsche, B. Unravelling the complexity of supply chain volatility management. *Logistics* **2018**, *2*, 14. [CrossRef]
45. Nitsche, B.; Durach, C.F. Much discussed, little conceptualized: Supply chain volatility. *Int. J. Phys. Distrib. Logist. Manag.* **2018**, *48*, 866–886. [CrossRef]
46. Van De, A.; Delbecq, A.L. Nominal versus interacting group processes for committee decision-making effectiveness. *Acad. Manag. J.* **1971**, *14*, 203–212. [CrossRef]
47. Goodman, C.M. The Delphi technique: A critique. *J. Adv. Nurs.* **1987**, *12*, 729–734. [CrossRef] [PubMed]
48. Lloyd, S. Applying the nominal group technique to specify the domain of a construct. *Qual. Mark. Res. Int. J.* **2011**, *14*, 105–121. [CrossRef]
49. Green, T.B. An empirical analysis of nominal and interacting groups. *Acad. Manag. J.* **1975**, *18*, 63–73. [CrossRef]
50. Chapple, M.; Murphy, R. The Nominal Group Technique: Extending the evaluation of students' teaching and learning experiences. *Assess. Eval. High. Educ.* **1996**, *21*, 147–160. [CrossRef]
51. Ellingsen, I.; Størksen, I.; Stephens, P. Q methodology in social work research. *Int. J. Soc. Res. Methodol.* **2010**, *13*, 395–409. [CrossRef]
52. Rekiso, Z.S. Trade deficits as development deficits: Case of Ethiopia. *Struct. Chang. Econ. Dyn.* **2020**, *52*, 344–353. [CrossRef]