UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

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ETHIOPIA'S TRANSPORT SERVICE SECTOR: MEASURING ITS VALUE CHAINS AND EXPLOITING ITS POTENTIAL

ABBREVIATIONS AND ACRONYMS

AfCFTA	The African Continental Free Trade Area	**R/GVCs**	Regional and global value chains
CSA	Central Statistical Agency	**M4P**	Making Value Chains Work Better for the Poor
CRGE	Climate-Resilient Green Economy	**MoLSA**	Ministry of Labour and Social Affairs
EFY	Ethiopian Fiscal Year	**NPC**	National Planning Commission
EIC	Ethiopian Investment Commission	**PPPs**	Public–Private Partnerships
ECEA	Ethiopian Coffee Exporters Associations	**PVP**	Plant Varieties Protection
FECO	Freight Economic Output	**SSA**	Sub-Saharan African
FTA	Federal Transport Authority	**SWOT**	strengths, weaknesses, opportunities, and threats analysis
GDP	Gross domestic product		
GTP	Growth & Transformation Plan	**SAM**	Social Accounting Matrix
FDRE	Federal Democratic Republic of Ethiopia	**TIVA**	Trade in Value Added
ha.	Hectare		

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1.1. Background

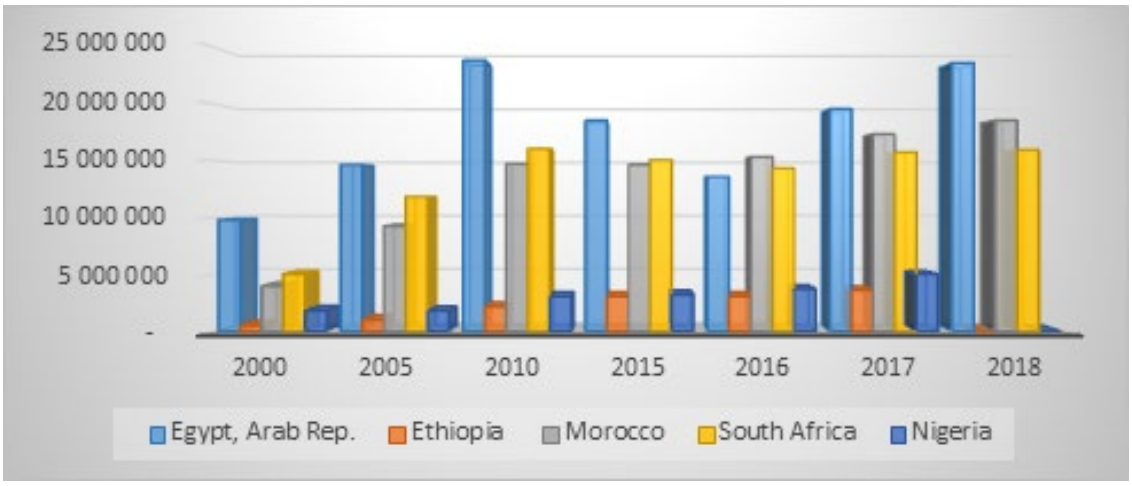
Transport systems, infrastructures and services are an integral part of the overall economic and trade development of countries and regions. They also play a key role in the performance and competitiveness of industries, firms and businesses.

From a macro-economic and policy perspective, the transport sector is viewed as an economic catalyst for the markets and regions it serves whereby the aggregation of transport infrastructure, operations and services generates direct socio-economic benefits and positive inter-sector multipliers as well as indirect spatial, agglomeration and other spill-over effects. Along with its economic, social and spatial impacts, an efficient transport system reduces a country's logistics and trade costs and fosters competitiveness, regional integration and economic growth.

Conversely, a poor or inefficient transport system is a major constraint to economic and trade development and may even offset the advantages of low-cost production and low-cost labour for developing and low-income countries. This is particularly the case for many African countries where poor transport systems and infrastructures have severely constrained economic and trade activity and limited their participation in Regional and Global Value Chains (RVCs / GVCs). This trend has started to be slowly reversed over the past two decades due to significant investments in transport infrastructure and services.

In Ethiopia, large-scale investment in transport infrastructure have certainly contributed to a strong GDP growth over the past 15 years. Nonetheless, the country's export sector remains unusually small at around 10% of GDP, which is significantly below the 24% rate expected from a country of the size and level of development of Ethiopia. Concerns about low GVC participation in Ethiopia have been highlighted in several policy and industry reports, but only a few studies have explored in depth the relationship between transport services sector and the GVC activity in the country.

Figure 1: Service Exports in Ethiopia and selected African countries (BoP, current 1000 USD)



Source : Consultant calculations based on UN Comtrade Database (2019)

From a micro-economic and firm's perspective, the quality of transport systems and services is a key enabler of firm's competitiveness, cost and price efficiency. Because they are controllable factors of trade and supply chain transactions, transport and logistics costs deserve a particular attention as they account for a significant proportion of goods' (and services') procurement, production, inventory, distribution and delivery costs. Efficient transport systems significantly lower logistics and transaction costs whereas inefficiencies in transport infrastructure and services impose excessive costs and delays on firms, businesses and supply chains.

In developing and low-income economies, the combination of the high cost and poor quality of transport infrastructure and services hampers firms'

competitiveness, growth and access to global markets, and by extension their contribution and participation in RVCs and GVCs. Traditionally, the GVC literature has focused on the broad measurement and analysis of a country's GVC trade, both for backward (upstream) and forward (downstream) GVC participation. Most recently, the emphasis has shifted towards the analysis of inter and intra-firm GVC transactions through the analysis of supply chain and contractual relationships between and within firms. This adds an interesting dimension to the analysis of the relationship between transport services and GVCs in that specific intra inter firm supply chain relationships usually require specific sets of transport services and infrastructure capabilities, the latter may not be readily available or operationally feasible in some firms or locations therefore limiting the scope of GVC participation at firm, spatial and supply chain levels.

GVCs imply fragmentation of production, international division and specialisation, and use of foreign added value, not only across countries and sectors but also between and within firms and supply chains. Global trade transactions are increasingly shaped by businesses and firms through organised production networks and long-term supply chain contracts, therefore placing those firms and their supply chain relationships at the centre stage of GVCs participation and value-added contribution. This provides an opportunity to study the GVC activity at firm and supply chain levels by putting the emphasis on firms' needs and supply chain requirements, including in transport systems and services that shape the accessibility, reliability, timeliness and predictability for a specific GVC or group of GVCs. This approach can therefore be used to further explore the specific GVC needs and challenges for some of Ethiopia's most strategic exports such as coffee and floriculture.

1.2. Objectives of the Study

The overall objective of this study is to examine the role of transport services in Ethiopia's economic and trade development through value chain participation and integration. Specifically, this study aims at investigating the interplay between transport services, trade integration and GVC participation in Ethiopia with an emphasis on two strategic agro-business exports, namely the coffee and floriculture value chains.

By leveraging national Input-Output (I-O) data and mapping product and firm's supply chain processes, it is possible to assess the level of GVC participation and estimate trade in transport services in value-added terms. Similarly, by assessing the structure and performance of Ethiopia's transport sector, it is possible to identify structural obstacles and sectoral pitfalls against GVC participation and global supply chain integration.

1.3. Policy Considerations

From a policy perspective, there is an urgent need for a greater coordination and integration between the requirements of GVC business models, on the one hand, and the tools and components of transport policy intervention, on the other hand. The choices and decisions made by GVC agents at firm and supply chain levels often have deep ramifications on transport policy formulation and implementation; and vice-versa. As discussed, and further analysed in this Study, there is a gap in Ethiopia between policy and strategy components of freight transport and logistics, on the one hand, and the needs and requirements of various sectors and agents of the economy, on the other hand.

Policy makers must have a fairly good understanding of the type and structure of GVCs that drive international and domestic freight generation, and the extent to which their supply chain needs and decisions impact mode and node choice and transport logistics network design and distribution.

Beyond the interplay between transport policy and GVC participation, measuring transport services in trade in value-added terms can provide valuable inputs to other strategy and policy areas including, but not limited to, trade reform and competitiveness, transport market access, sector liberalisation and (de)regulation, foreign and Private Sector Participation (PSP), spatial and land use, employment output and labour policies, and safety and environmental considerations including for incorporating climate change and environmental emissions criteria in GVC trade and transport policy.

1.4. Statistical and Data Quality Considerations

Another salient objective of this study is to highlight the importance of high-quality data and statistics for freight transport systems and GVC participation. Since the analysis of the interplay between transport systems and GVC activity must be evidence-based, having valid and comprehensive data alongside reliable statistical and analytical tools is a key requirement for planning, decision-making and policy directions.

In Ethiopia, freight and trade database systems are either incomplete or inexistent and there are several gaps in data collection and analysis. This study also aims at highlighting the importance of data quality and better statistics to inform the Government of Ethiopia's (GoE) understanding of the interplay between transport

and GVC and develop systems and skills towards filling the gaps in data quality and analysis.

2. Transport and Logistics Systems in Ethiopia

2.1. Scope and Dimensions of Freight Transport and Logistics

Freight systems are complex due to their multifaceted dimension and heterogeneous nature. Conceptually and analytically, a freight transport system can be studied from one or a combination of several approaches: the economic approach, the operations approach, and the logistics and supply chain approach:

- The economic approach perceives freight transport as a derived demand from trade. As such, standard economic approaches and theories on international trade and development, production output and capacity, economic geography and spatial organisation, market structures and industrial organisation, and economic and safety regulation have all been applied to various transport infrastructures and services. Key economic considerations for freight transport include the multi-input / multi-output nature of transport production, the generation of externalities, spill-over and agglomeration effects, the importance of economies of scope and scale, and the requirements for market, safety and environmental regulation.

- The operations and engineering approach perceives freight transport as a system of assets, structures, networks, and processes. Engineering applications in freight transport are mainly associated with the aspects of design and construction, planning and scheduling, operations and maintenance, performance and optimisation, and systems' safety, network reliability, and operational interoperability.

- The logistics approach is a relatively new approach that views freight transport as an integrated, rather than a secondary or after-thought, component of a logistics system that encompasses purchasing and supply, production and processing, storage and inventory management, and sales and distribution.

- Value and supply chain systems extend the logistics concept of integration to a network of firms and organisations that collaboratively trade, operate and manage the entire flow of goods, materials, information and services from raw material suppliers to final customers and end users, through production plants, processing and assembly factories, warehousing and storage sites, and distribution and retail centres. Key GVC and supply chain decisions with implications on freight transport include production fragmentation, functional offshoring, suppliers' selection, decoupling and multi-echelon inventory, and plant and warehouse location.

Practically and managerially, a freight system may be designed and analysed from either a top-down approach reflecting a country's broad policies and strategic orientations, and/or a bottom-up operational approach reflecting agents and firms' economic plans and logistics decisions:

- From a strategy and policy perspective, a freight system is the manifestation of a country or region's economic and trade policies, sectoral strategies, spatial and land use plans. Therefore, it would not be possible to develop freight strategies and sector policies, including for promoting and supporting GVC participation, without a comprehensive mapping and assessment of policies and sectoral strategies that intersect with freight transportation. These may be sector-specific strategies, which for Ethiopia includes the national trade logistics strategy, the industrial development strategy, and the agriculture and rural development strategy, or broad national plans and policies which for Ethiopia include the Growth and Transformation Plan (GTP) and the 2019 Home Grown Economic Reform Agenda.

- From an operations and management perspective, a freight system is the reflection of logistics, supply chain and trade decisions of economic agents and freight stakeholders. In essence, any goods' trade and/or production-consumption process would generate the need for freight transport. However, the manifestation of freight demand and distribution depends at least on two key aspects. The first aspect relates to GVC and supply chain strategies that underline the structure, stages and location of the production-consumption process from origin till destination. The second aspect relates to transport and logistics choices and decisions made by economic agents and freight stakeholders; shippers, receivers, carriers, and logistics service providers on aspects such as shipment size and frequency, mode and node choice, transport routing and networking, and service lead and delivery times.

A deep understanding of the above aspects and the interplay between them is required in order to examine the role of transport and logistics services in trade integration and GVC participation. There are strong analytical and practical reasons to be consistent and comprehensive about the need for this deep understanding, especially in the case of Ethiopia and in the context of GVC activity.

2.2. Freight corridors and their Transit and Supply Chain Dimensions

Over the past two decades or so, there has been a significant increase in the popularity of transport corridors and corridor management in both theory and practice. Too often though, the corridor concept and its practical implementation have both followed various pathways, leading to dissimilar (sometimes conflicting) approaches on the scope, functions, and components of corridors as well as their institutional, operational, procedural, management, and regulatory underpinnings.

The term transport corridor is often used interchangeably with economic and/or trade corridors. It can also include both freight and passenger transport, domestic and international transport, and unimodal and multimodal transport. In framing our general understanding of transport corridors, we outline below their scope and core functions and how they can apply to the objective of this Study.

From a spatial and geographical perspective, the relationship between freight flows and corridor development is better understood through the concepts of freight corridors, gateways, and distribution centres.

Freight corridors, as opposed to passenger corridors, represent transport links of freight transportation supported by an accumulation of transport nodes, infrastructures, superstructures, and activities servicing these flows. Traditionally, flows in freight corridors tended to be fragmented and segmented since each mode tried to exploit its own advantages in terms of cost, service, quality, reliability, safety, etc. Maritime corridors conventionally corresponded to geographical trade routes (regional or international), but recurrent changes in global production and logistics systems, such as in terms of hub-spoke and transhipment networks, currently reduce the capacity of freight corridors to accommodate different patterns of maritime transportation. Road and rail corridors, on the other hand, often tend to support both freight and passenger flows, hence adding an urban and agglomeration dimension to corridor development and management.

Today, most freight corridors encompass both multimodal modes and nodes as well as other supporting infrastructure and services. Two important component of freight corridors are gateways and distribution systems.

- Gateways are usually defined as locations that bring together different modes of transportation, along with warehousing, freight forwarding, customs broking and related logistics services. Many textbooks separate transport gateways as hubs for major regions, from freight gateways serving smaller regional areas and cities. In its international dimension, a gateway for an international corridor would be for instance ports, airports, and/ or land borders.

- Freight distribution centres serve as a location for cargo transfer and distribution to regional or extended markets, for example as rail/road terminals, multimodal (or intermodal) terminals, container freight stations, inland container depots, regional distribution centres, and multi-functional logistics platforms. Distribution centres are more than an interchange point since they include the consideration of terminal facilities, distribution, warehousing, and even trading centres.

While mode (i.e., maritime, road, railway, etc.) and node (gateways, distribution centres, border crossings, etc.) links are important infrastructure components of freight corridors, supporting procedural and regulatory components such as trade and transport facilitation initiatives are equally important for a successful corridor system. It is important to separate the concepts of economic corridors and transport corridors, the latter play a significant role in trade promotion, economic growth, and regional integration among the countries and regions along the corridor. As such, freight corridors tend to be categorized in terms of their economic and trade dimensions for instance in terms of import, export, domestic, and/or transit corridors.

Freight corridors tend also to be categorized according to the dominant or specialized flow of cargoes, commodities, and supply chains they serve such as for instance the grain corridor, the coal corridor, the oil corridor, the container corridor, the perishable goods corridor, the refrigerated goods corridor, etc. As such, freight transport corridors should not only be seen as a trade route, but also if not mainly as a supply chain route reflecting the decisions made by supply chain and logistics stakeholders on how to link and organize spheres of production, distribution, and supply across existing or new corridors. Furthermore, it is very important to recognize the supply chain dimension of freight corridors because it is often the supply chain organization, reflecting institutional and economic relationships between key supply chain stakeholders, that defines the scope and structure of a corridor, especially among competing trade routes. This is particularly relevant in the context of this Study and for the analysis of GVCs in general.

Of particular relevance to this Study are international transit corridors. Those are basically transportation corridors that serve the foreign trade (or supply chains)

of one or several countries by transiting through one or several neighbouring countries. A typical application are transit corridors that link landlocked countries, such as Ethiopia, with overseas trading partners through providing them with access to seaports as transit gateways to the sea. Specifically, there is a widespread recognition of the specific challenges that landlocked countries face in terms of high transport and transit costs and as a barrier to their trade competitiveness, regional integration, and economic growth.

It is therefore very important to consider all components of international transit corridors from starting to end points. Since international transit corridors consist of several national corridors, they are often characterized by their complexity and variability such as in terms of dissimilar transport infrastructure and services, competing gateways, and overlapping institutional and regulatory systems.

2.3. Overview of Freight Transport System in Ethiopia

2.3.1. Freight Infrastructure

The freight transport sector servicing GVCs in Ethiopia relies on a handful of corridors and infrastructure offerings given the country's economic and landlocked geography. The Addis Ababa-Djibouti corridor has by far the lion share of international freight movements with the port of Djibouti handling over 95% of Ethiopian foreign trade by volume. The corridor has been exclusively served by road transport until recently with the completion of Addis Ababa-Djibouti Railway in January 2018. The new standard gauge railway is part of an ambitious investment programme aimed at connecting Ethiopia with Kenya, South Sudan and Sudan as part of the Lamu Port - South Sudan

- Ethiopia - Transport (LAPSSET) corridor project. Other alternative corridors are also being considered especially with the development of the port of Berbera in Somaliland.

In terms of modal split, the new railway has already made a difference in adding transport capacity to the Ethio-Djibouti corridor. However, the system is still operating below capacity especially if flat racks and well cars are used to allow double stacking and rail-road interoperability. The system can also benefit from a programme of extension into urban and industrial freight areas, the latter remain heavily reliant on road transport.

Figure 2: Addis Ababa - Djibouti Corridor

Source: African Centre for Statistics Division of UNECA (2019)

Both road and rail services of the Djibouti corridor call at the Modjo dry port which acts as the main consolidation and distribution corridor hub to-from Djibouti. Some freight terminals are scattered around the country while others are in the planning process, particularly within and around Addis Ababa, but there is little information about the role and functions of the planned road terminals (e.g. marshalling yards, freight depots, consolidation centres, logistics platforms), their geographical scale and hinterland definition (e.g. areas of distribution, relay nodes) and their logistical and operational arrangements (e.g. cargo and delivery type, vehicle type and size, the treatment of special goods such as HAZMAT and perishables, etc.).

As for air freight, this focuses on the export of high value and sensitive goods and has been boosted recently by the opening of a new cargo terminal at Bole International Airport, but the volume of freight carried is still too small and mostly bound to European markets.

2.3.2. Freight Superstructure and Transport Services

In terms of service offerings, in 2011 the GoE has merged 3 state owned entities to establish a parastatal monopoly: the Ethiopian Shipping and Logistics Service Enterprise (ESLSE). In 2014, a public sector trucking company (Comet) was also transferred to ESLSE. This made ESLSE the largest freight and logistics service provider operating across shipping, port, trucking, freight forwarding and logistics services. Recent plans to partially privatise ESLSE, notably its shipping and port divisions, seem to have been cancelled or put on hold.

ESLSE has a monopoly over transit logistic services in the country and so does the Ethiopian Railways Corporation (ERC) over rail freight and Ethiopian Airlines over air freight. Where there is strong competition is in road freight where, besides ESLSE and a few other trucking companies, a very large number of small carriers, often owning and operating a single truck or freight vehicle, dominate the market. Even though, Ethiopia's current level of investment regulation with respect to logistics services is highly restrictive. Many areas of logistics services provision are exclusively reserved to Ethiopian nationals, including freight forwarding and ship agency, cargo handling and warehousing services[1].

Operationally, a large proportion of the trucking fleet is either too old or not fit for purpose. There is also evidence of a large informal market made up of pick-up and even passenger vehicles carrying freight in inner-urban and inter-urban areas. A similarly significant proportion of freight warehouses and stores are informal with no planning or regulatory approval. In fact, only some of aspects freight operations are adequately regulated leaving several key areas outside the scope of regulatory capture; most notably (freight) vehicle types and technical standards, vehicle scrappage and renewal schemes, HAZMAT and dangerous goods' transport, and drivers working hours and conditions of driving.

Table 1: Summary and status of road freight regulations in Ethiopia

Regulation / requirement	Status	Observations
Weight and Dimensions of road freight vehicles	Yes	▪ 2, 4 and 6 axle road classification ▪ Legal axle weight 8 tons (10 tons for rear) ▪ Permissible mass combination (56 tons)
Types of freight vehicles	No	▪ No full classification for truck type and requirements; (flatbed trailer, box trailer, two-loaders, swap body, etc.)
Load regulations	Yes	▪ load regulation signage in use at various roads and streets ▪ Regulation not enforced due to difficulty in monitoring
Technical and Mechanical Standards for vehicles	No	▪ No fully-fledged technical standards for new, imported or used vehicles in place or being enforced.
Scrappage and renewal incentives	No	▪ No renewal or scrappage scheme currently in use or being planned
Roadworthiness and testing	Partly	▪ Road worthiness programme and regulation in place; but compliance and enforcement are far from desired
Speed Regulations	Yes	▪ Applies various speed limits (from 30km to 60 km) to various axle road trucks
Transport of HAZMAT (hazardous materials)	No	▪ No classification of HAZMAT and dangerous goods materials, their movement, packing, handling requirements
Emissions regulations	No	▪ No restriction of vehicles based on their emissions
Licencing and qualifications for drivers	Partly	▪ Most drivers are professionally unqualified by international standards
Driving conditions and regulations	No	▪ No working hour restriction or monitoring measure (e.g., tachygraph) in place.

Source: Consultant

1.See Investment Regulation of 2012 and Freight Forwarding and Ship Agency License Regulation of 1998.

As far as international freight transport is considered, Table 2 shows that Ethiopia has only accessed or ratified a handful of international transport agreements. Although some domestic measures currently in place may cover certain areas of international road freight instruments; such instruments and their legal ramifications are only considered by carriers and cargo interests only when formally accessed and/or ratified. In practice, this translates into additional cost and risk premiums for Ethiopian-bound freight and cargo services.

Table 2: UN transport agreements and Ethiopia's status of ratification -shaded agreement shows accession or ratification-

Infrastructure network	1	Construction Traffic Arteries, 1950	Inland Navigation	31	Not applicable to Ethiopia
	2 -3	Not applicable to Ethiopia		32	
	4 -5			33	
	6	International Water Network (AGN)		34	
Road traffic and road safety	7	Road Traffic, 1949		35	
	8	Road Traffic, 1968		36	
	9	Protocol on Road Signs & Signals 1949		37	
	10	Road Signs & Signals, 1968	Border crossing facilitation	38	Touring Facilities, 1954
	11	Supplement Convention Road Traffic		39	Protocol Touring Facilities, 1954
	12	Supplement Convention Road Signs & Signals, 1971		40	Temporary Import of Private Road Vehicles
	13	Weights and Dimensions, 1950		41	TIR Convention, 1959
	14	Supplement 1949 Conv. and Protocol, 1950		42	Temporary Import of Aircraft & Boats, 1956
	15	Road Markings, 1957		43	TIR Convention, 1975
	16	Protocol Road Markings, 1973		44	Temporary Import of Commercial Vehicles
	17	Validity of Driving Permits (APC)		45	Cross. Frontier Passenger Baggage Rail, 1952
Vehicles	18	Vehicles Regulations, 1958		46	Cross. Front. Goods Rail, 1952
	19	Technical Inspection of Vehicles 1997		47	Spare Parts Europe Wagons, 1958
	20	Global Vehicles Regulations, 1998		48	Customs Container Convention 1956
Other legal instruments	21	Work of Crews Int. Road Tr. (AETR)		49	Customs Container Convention, 1972
	22	Taxation Priv. Road Vehicles, 1956		50	Customs Treatment Pallets, 1960
	23	Taxation Road Goods. Vehicles 1956		51	Harmonized Frontier Controls Goods
	24	Taxation Road Passenger Vehicles 1956		52	Customs Pool Containers, 1994
	25	Contract Road Goods Transport (CMR)			SMGS Transit by Rail, 2006
	26	Protocol to CMR, 1978	Dangerous Goods & Special cargo	53	Dang. Goods by Road (ADR), 1957
	27	Add. Protocol to CMR, (e-CMR) 2008		54	Protocol to ADR, 1993
	28	Pass. & Lugg. Rd. Transp. (CVR)		55	Liabilities Dang. Goods (CRTD), 1989
	29	Protocol to CVR, 1978		56	Dangerous Goods by Inland Waterways (ADN)
	30	Econ. Reg. Road Transport 1954		57	Perishable Foodstuffs (ATP), 1970

Source: Compiled and summarised by the consultant from UNECE (as of June 2021)

2.4. Assessment of Freight Transport Performance

When measuring and assessing freight transport performance, a difference exists between economic operators and policy makers in terms of what they perceive and prioritise in sector's performance and analysis. On the one hand, policy makers often reflect about the economic contribution of transport systems (direct, indirect and induced impacts) versus their societal and external costs including for congestion, accidents, noise, and pollution. On the other hand, economic operators and service providers are more concerned with the internal efficiency of the freight transport system, including aspects related to freight availability, cost, timeliness, reliability and service quality.

Currently, the analysis of Ethiopia's freight transport and logistics performance is sketchy and hardly comprehensive or inclusive of both operator's and policy maker's perspectives. One of the main obstacles is the lack of systematic, reliable and updated freight data and statistics, as evidenced by the absence of any national or regional freight (generation) model, let alone a freight transport (trip) generation model. As further discussed below, the lack of an appropriate freight planning and strategy framework in Ethiopia, including for freight data collection and analysis, is a major impediment against improving sector's performance and efficiency.

2.4.1. Firms' perspective of freight performance

From an operator's and firm's perspective, the performance of freight transport is underpinned by a number of indicators on the quality of transport infrastructure, the connectivity to freight and logistics markets, the competency of operators and service providers, and the efficiency of customs and trade facilitation procedures. Among global KPIs for international freight and logistics performance, worth mentioning the World Bank's Logistics Performance Index (LPI), the WEF's Quality of Port Infrastructure (QPI), the UNCTAD's Liner Shipping Connectivity Index, and the IFC/WB Trading Across Borders. Table 3 below shows the score rankings of Ethiopia in each of those indices compared with those of selected African countries.

2.4.1.1. Levels of Income and Logistics Performance

The LPI is the World Bank's benchmarking tool to measure a country's logistics performance. The index takes into account factors such as logistics competence and skills, the quality of trade-related infrastructure, the price of international shipments, and the frequency with which shipments reach their destination on time. LPI reflect perception evaluations of logistics professionals located outside the country, thus providing qualitative information of how a country's trading partners perceive the efficiency and quality of its logistics services.

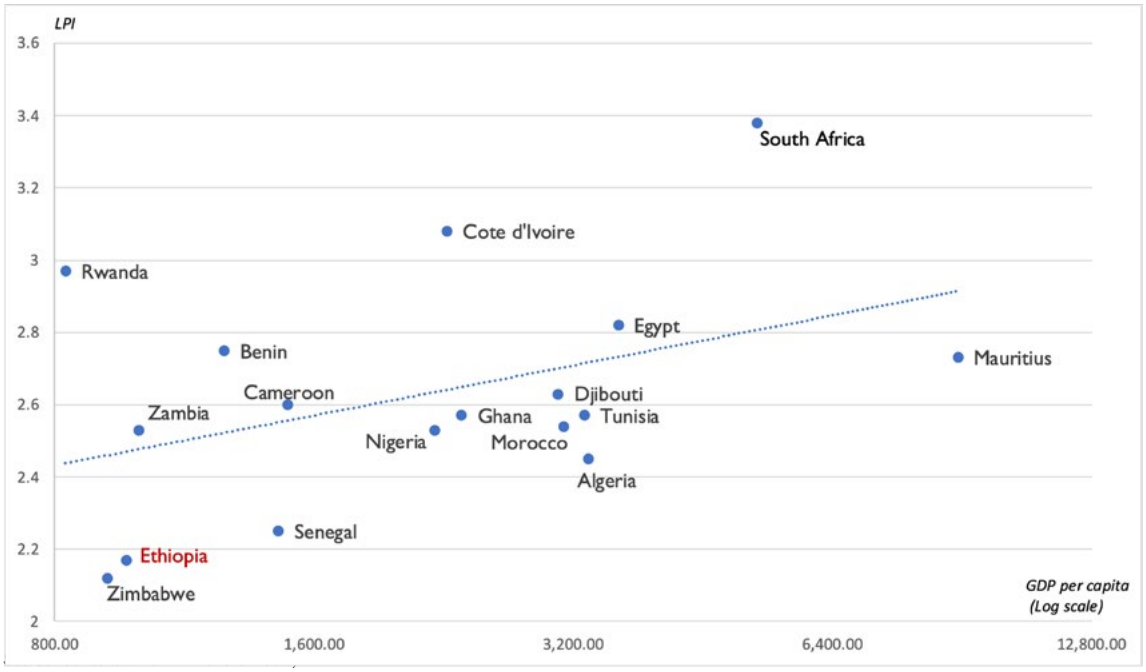
Table 3: Relevant port and logistics efficiency indicators for Ethiopia and selected African countries (Compiled by Consultant)

	LPI (WB) 2018	Burden of customs procedures 2017	Lead time		Documentary compliance		LSCI 2020 (UNCTAD)	QPI 2017 (WEP)
			to export	to import	Cost to export	Cost to import		
	1-5 (worst to	1-7 (7 is best)	days	days	$/container	$/container	Max 100	1-7 (7 is best)
Ethiopia	2.17	3.6	60	10	175	750	30	2.81
South Africa	3.38	4.2	3	3	55	676	40.11	4.8
Cote d'Ivoire	3.08	4.1	4	10	136	456	16.76	5
Rwanda	2.97	5.3	2	3	110	282	16.96	2.9
Egypt	2.82	3.9	2	3	100	554	73.28	4.7
Benin	2.75	3.5	14.0	N/A	80	599	34.49	3.9
Mauritius	2.73	4.6	1	2	128	372	37.03	4.2
Djibouti	2.63	N/A	2	3	95	1055	25.53	N/A
Cameroon	2.6	3.4	5	9	306	1407	25.5	3.1
Tunisia	2.57	3.1	4	3	200	596	6.3	3.3
Ghana	2.57	3.9	1	4	155	553	18.5	3.6
Morocco	2.54	4.5	2	5	67	228	78.5	5.3
Nigeria	2.53	2.9	3	3	250	1077	18.96	2.8
Zambia	2.53	3.7	9	6	200	380	N/A	2.3
Algeria	2.45	3.4	4.0	5	374	409	10.36	3.4
Senegal	2.25	4.6	1	3	96	702	14.45	4.4
Zimbabwe	2.12	2.9	5	10	170	562	N/A	3.1

Source: Author

In the African continent, Ethiopia along Zimbabwe are the worst performing countries for LPI but the gap with other countries has been widening since 2004. Figure 3 shows that a persistent gap exists between low middle-income and lower-income countries, but income alone is not the only determinant of a country's logistics performance.

Figure 3: Relationship between income and logistics performance in African countries



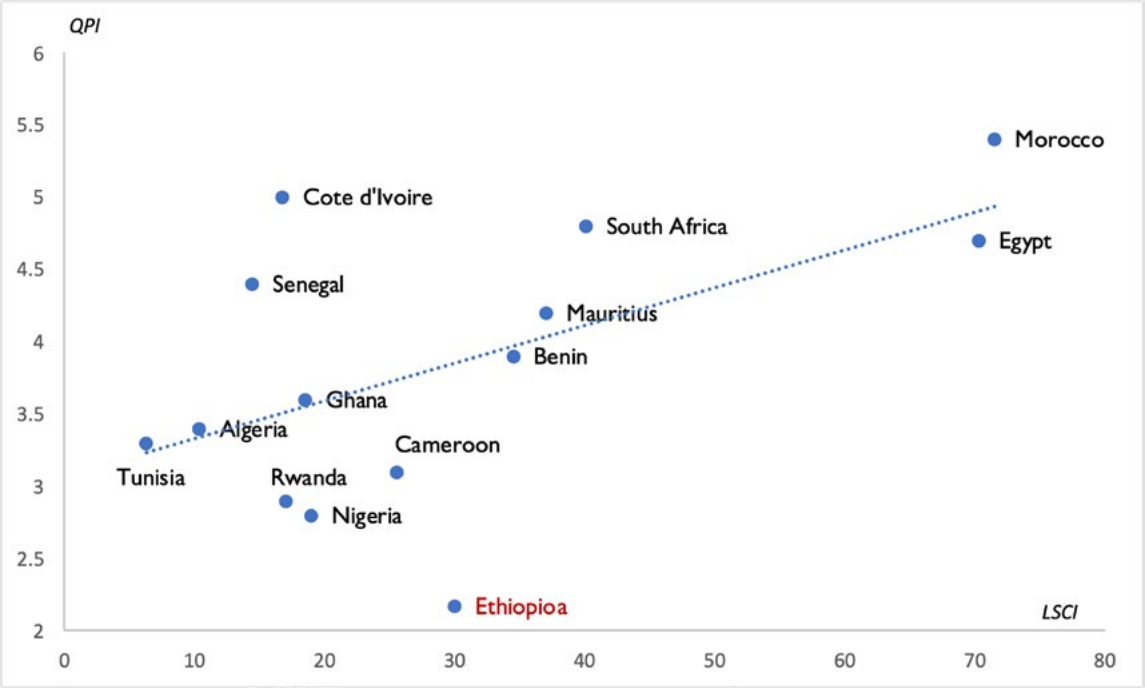
Source: Consultant from WB and UN data

2.4.1.2. Quality of Infrastructure and Logistics Connectivity

From an international perspective, a country's freight and logistics performance depends on its connectivity to international shipping and logistics networks. UNCDAT's LSCI is an index that measures a country's connectivity to the international container shipping network and by extension to global trade markets. In Africa, the countries most connected to the global shipping network are Morocco and Egypt owing to their large transhipment hubs. Given the quasi-reliance of Ethiopia on the port of Djibouti as its main gateway for international markets, Ethiopia's connectivity has been assimilated to that of Djibouti's which is still less than half of Morocco's and Egypt's. This emphasises the need for Ethiopia to link and integrate its transport infrastructure and services with more connected international corridors and shipping networks.

Figure 4 shows the relationship between LSCI and the WEF quality of port infrastructure. Among the two indices, the QPI is particularly highly correlated with the LSCI components 'number of companies' and 'largest vessel size'. Countries such as Morocco and Egypt have benefited from their large transhipment hubs and connection to a worldwide network of shipping routes and services, which in turn reduces time and cost of trade. For landlocked Ethiopia, a strategy whereby freight systems are planned and operated in ways that promote cost and time competition between transit corridors should be pursued.

Figure 4: Relationship between liner connectivity and quality of port infrastructure in African countries



Source: Consultant from WEF and UNCTAD data

2.4.1.3. Logistics Performance and Procedural Efficiency

The performance of freight logistics systems also relates to the cost, efficiency and timeliness of trade facilitation procedures. Countries which lack natural access to large seaports and transport hubs can compensate by streamlining customs and trade procedures and reducing transactions' time and cost. This is for example the case of Rwanda which impose relatively low documentary and customs' burden costs among African countries. Conversely, a country such as Cote d'Ivoire and Djibouti cancels out the benefits of connectivity by imposing long import lead times and high transaction costs. As with the overall LPI, Ethiopia scores poorly in trade costs and procedural lead times. This is particularly prohibitive for time-sensitive and high product value chains such as coffee and flower exports.

Table 4: Lead time for Export – Coffee[2]

Activities in exporting coffee cargos	Time (Days)
Obtain bank permit	2
Obtain customs export clearance and loading	1
Land transport to port of Djibouti	3
Finalize customs & port formalities and stuff a CFS	2
Waiting and loading on ship	5
Shipping to port of Hamburg (Germany)	23
Total	36

Source: Survey/Interview and Maritime Affairs Authority (2019)

2.The lead-time to export has prepared by considering coffee cargo, One TEU container, less than 20 tons' load, container stuffing at the port of Djibouti originally from Addis Ababa to destined Hamburg/Germany.

2.4.2. Policy perspective of freight performance

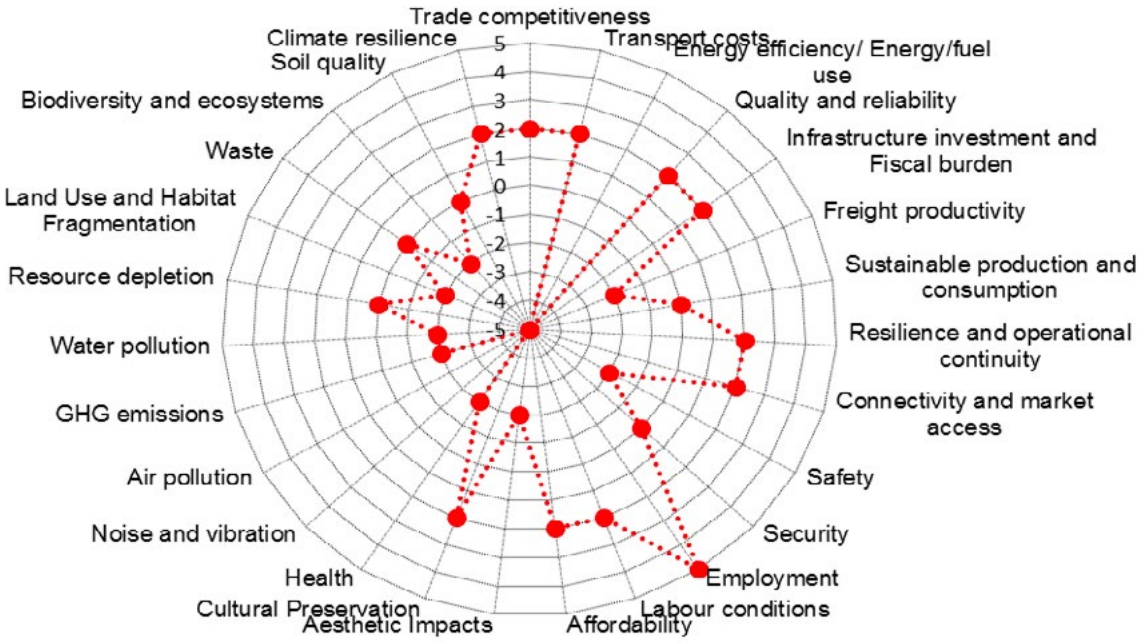
From a planning and policy perspective, the performance of freight transport in Ethiopia is best assessed in line with the framework of sustainable freight transport, the latter combines three levels of performance dimensions: economic, social and environmental; as shown in Table 5. Based on freight information sourced from secondary data sources, a five-point rating scale was used for the scoring of each objective component, the results summarised in Figure 5 shows the performance of Ethiopia's freight sector across social, economic and environmental components and dimensions of the UN framework of sustainable freight transport.

Table 5: Operational KPIs used to assess freight transport in Addis Ababa (Consultant)

Dimension	Objective	KPI
Economic	Trade competitiveness	World Bank LPI (logistics perf. Index) WB Doing Business WB Enable Trade Index
	Transport cost	$cost/ton-km of urban freight Cost of TEU transport (WB)
	Energy efficiency	Energy consumption per ton/km
	Quality and reliability	WB LPI / tracking and tracing Shippers' surveys (studies)
	Infrastructure investment	% GDP used for transport investment % of budget expenditure on transport infra
	Freight transport productivity	Ton-miles per truck per year % fill / utilisation of trucks (LTL vs. FTL) % of return empties
	Sustainable production and consumption	Freight transport intensity (% total freight moved to local GDP).
	Operational resilience	Causes and cost impacts of disruption (natural, accidents, strikes, etc.)
	Connectivity & access	Frequency of service, connectivity index
Social	Safety	Accident or Fatalities per miles of kilometre travel.
	Security	Number and cost of security accidents
	Employment	Direct and indirect jobs from freight transport
	Labour conditions	HSE indicator, driving time
	Affordability	Freight transport costs and logistics prices
	Aesthetic impact	Perception of visual pollution from urban freight and logistics
	Cultural preservation	% Preservation of natural resources and heritage
	Health	Health related costs (air pollution, allergies, contamination, etc.) resulting from freight transport
	Noise and vibration	Noise level / freight corridor length
Environmental	Air pollution	GHG per freight ton mile
	Water pollution	% HAZMAT and water pollution per freight ton mile
	Resource depletion	Mega-joules per freight ton miles
	Land use and habitat	Size of buffer zone per freight ton mile density
	Waste	volume of wastes generates by freight transport
	Biodiversity	Cost to biodiversity caused by freight transport
	Soil quality	Soil erosion / contamination due to freight transport
	Climate resilience	Cost disruption / impact of climate change on freight

Source: Survey

Figure 5: Gap chart freight performance in Ethiopia



Source: Consultant from WEF and UNCTAD data

2.5. Economic Importance and Contribution of Freight Transport in Ethiopia

Transport is an important sector of the economy in its own right: transport infrastructure provision and transport operations together account for about 10% of Ethiopia's GDP (NPC, 2019). The country has experienced the largest boost in transport infrastructure in its history since the second half of the 1990s (CSA, 2015, ERA, 2016). In its broad scope, transport and communication employ more than 65,000 people and accounts for some twenty-three percent of Ethiopian GDP (NBE and MoT, 2018), and account for approximately 13.7% of the total expenditures of Ethiopian households.

Table 6: Gross Value Adds of Transport & Communications at constant 2008 Basic prices (,000 Birr)

Description	2003 E.C	2004	2005	2006	2007	2008	2009	2010	2011
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/ 16	2016/ 17	2017/ 18	2018/ 19
Road Passenger Transport	4,383,187	4,881,012	5,723,438	6,338,424	6,847,764	11,338,731	11,749,872	11,834,486	13,633,657
Road Freight Transport	4,891,054	5,252,813	5,630,532	6,210,360	6,333,631	14,424,832	16,467,305	16,645,331	18,295,608
Railway Transport	4,282	2,942	2,100	1,931	2,805	25,721	23,484	15,804	23,594
Other Land Transport (Animal Transport)	214,843	220	225,664	231,284	236,938	516,935	529,089	541,428	553,069
Water Transport	879,367	978,665	889,977	788,123	812,532	1,688,536	2,181,761	2,387,754	2,428,083
Air Transport	2,653,359	3,221,338	3,647,379	4,200,889	4,579,959	16,159,773	19,054,091	23,392,184	25,929,250
Other Supporting & Auxiliary Transport Activities and activities of travel Agencies	1,105,901	1,430,958	1,824,808	2,106,220	2,971,177	2,103,252	2,484,186	2,624,584	2,825,775
Post & Telecommunications	5,758,527	6,403,878	8,143,974	9,518,459	11,528,042	20,052,201	24,415,536	24,428,701	36,043,111
Total	**19,890,520**	**22,391,701**	**26,087,872**	**29,395,689**	**33,312,848**	**70,453,278**	**81,097,398**	**86,310,267**	**104,436,151**

Source: National Planning Commission (2019)

The Ethiopian transport system (operation, maintenance and new/improved infrastructure) also accounts for a substantial proportion of total (national and regional) government expenditures.[3] The Financial Statements of the Government of Ethiopia (GoE) report spending on transport and communications of $1.5 billion in the year to June 2018/19, which represented just under 21 percent of total expenses.

As shown in Table 5, the ratio of total input and output of the transportation industry in Ethiopia is low. It was only between 1.86% and 2.71% for input, and 2.65% and 3.43% for output during the period of 2010-2018. Over the past 15 years, although the total output of the sector has doubly increased from Ethiopian birr 19.9 billion in 2010 to birr 104.4 billion in 2018, the ratio in the national economy has also increased from 3.34% to 5.72%. However, ironically, the ratio of the transport sector's input decreased slightly, these is mainly because of the inefficiencies in the transportation sector services (interview, 2019).[4] The government may need to take regulatory measures and invest in strategic transit and transport corridors, particularly in logistics and transport services, as well as competition and regulation in those services.

When it comes to the contribution by transport mode, air transport ranked first, followed by the road and then the water transport sub-sectors. Rail transport maintained the smallest scale of output (approximately 2.15%) compared with the other three major transportation mode. Meanwhile, air transportation sector continued to gain importance in the national economy, as its ratio of contribution increased from 13.4% to 24.8% during the same period. This indicates that the industrial structure is changing, and more international trading of cargo goods and traveling of passengers preferred more Ethiopian Airlines Group services.

2.5.1. Macro-economic contribution of transport services

The efficiency of transport services greatly determines the ability of firms to compete in foreign markets. For a small economy like Ethiopia, for which world prices of traded goods like coffee are largely given, higher costs of transportation feed into export prices. To remain competitive, exporting firms that face higher transport costs must pay lower wages to local workers/farmers, accept lower returns on capital, or be more productive. The pressure on factor prices and productivity is even higher for local industries and cooperatives with a high share of imported inputs. This is particularly important for the horticultural sector (cut-flowers) which tends to require more inputs and equipment than staple food grains.

The main stylized facts observed in the structure of Ethiopian economy within a half century are the decline of agriculture, the rise of service and the stagnation of manufacturing sector.[5] This sectoral structure of the country makes it unique when it is compared with other countries that had the same level of per capita income at various periods. Ethiopia's service sector has witnessed high growth and has contributed to the growth in output and employment during the recent growth periods. Another striking feature of the Ethiopian services sector is its significant role as an exporting branch of the economy.

Table 7: Services Sector Contributions to Ethiopia's GDP

Services Sub-Sector	% of GDP (2017)	% of GDFI (2017)	% of Formal Employment
Utilities (Water, electricity)	0.8	0.3	1.1
Construction	16.4	6.7	4.9
Trade/Distribution Services (wholesale/retails)	12.3	4.8	23.6
Business Services & ICT	4.5	N/A	1.9
Transport	10	21	6
Communication	13	N/A	1.7
Financial Services Intermediation (insurances, banks)	2.8	5.6	1.5
Hotels & restaurants	2.5	N/A	2.9
Total Service Sector	49.3%	41.7 %	43.6%

Source: Consultant from WEF and UNCTAD data

3.Note: spending on roads has been about 4 per cent of GDP every year over the last five years (MoFEC, 2017/18). Some discrepancy exists despite controls from Line ministries/ government agencies.

4.In 2016, average transport costs represented about 19% of the value of imports, compared with a world average of 15%.

5. Note: Agriculture declined by 43 percentage points and service increased by 35 percentage points from 1960 to 2010.

The expansion of Ethiopia's services exports was mainly driven by transport and travel services sub-sector. Jointly, they accounted for 90% of total services exports in 2015 up from 75%in 2002. This is attributed to Ethiopian Airlines, which is Ethiopia's largest export earner (three times as big as coffee) and accounts for 60% of Ethiopia's services sector (CSA, 2017).

Although the structure of output shifted from agriculture toward services, the corresponding employment shift was modest. Although workers moved mainly into transport services (1.8 percentage points), Ethiopia's transport services sector still absorbs only a small share of the population (FTA, 2017). It accounts 10% of services output and 6% of service jobs.

2.5.2. Contribution of Freight Transport Services

Freight transportation services enable various economic activities by connecting people, business, goods, and resources. Policy and investment decisions for the sector support and create jobs, increase household disposable income, and improve business productivity; that is, more economic development opportunities are created (BEA, 2012). Thus, the contributions of the freight industry to the economy and its historical trends must be understood and assessed before prioritizing freight transportation related investment and policy decisions.

The Input-output analysis results indicate that the (freight) transport industry has widespread economic impacts across Ethiopia's economy. The direct impacts, indirect impacts, and induced impacts were also measured in terms of employment, labour income, value added, and total output. It is important to recognize that the freight activity is not confined within Ethiopia's boundaries. Rather, its activity is affected in part by the economic activities of other countries, especially Djibouti. However, such regional impacts are not considered in this study. The freight economic output (FECO) indices were compared with other economic indicators, such as GDP. The indices change concurrently with these economic indicators, confirming the reliability of the developed indices.

The freight industry's contribution to the Ethiopia economy was estimated using the 2017/18 employment data from Ministry of Labour and Social Affairs (MoLSA) and Federal Transport Authority (FTA) by the freight industry sector and 9 regional states and 2 federal government cities. The results reveal how the freight industry affected economic activity in the country. More specifically, the results show that freight industry activities (i.e., direct impacts) generated sizable ripple effects to suppliers (indirect impacts) and local businesses that depend on the spending of the affected employees (induced impacts).

Table 8: Total Economic Impacts of the Freight Industry in Ethiopia (2017/18)

Impact Type	Jobs	Labour Income (million birr)	GDP (Value Added, million birr)	Total Output (million birr)
Direct	38,580	3,890	4,136	6,810
Indirect	7,347	654	875	946
Induced	9,290	1276	1543	2675
Total	55,217	5,820	6,554	10,431
Multiplier	1.7	1.56	1.67	1.75

Source: Calculation by author based on MoLSA and FTA Data (2018)

In 2017/18, the freight industry supported 55,217 jobs in total. Nearly 40,000 people were directly hired by the freight industry, which helped sustain an additional 16,600 workers in various sectors. The job multiplier is 1.7 meaning that for every 100 jobs created in freight transportation an additional 17 jobs are created in other sectors. The sector's GDP (total value added) is 6.5 million birr with a multiplier factor of 1.76. In particular, the direct GDP of 4.1 million produced by the freight industry is nearly 90% of the GDP generated by the entire transportation sector in Ethiopia, which is about 5.2 million (Central Statistics Authority, 2017).

Considering that roughly 70% of jobs in the transportation sector are freight-related jobs (CSA, n.d.), it is clear that the freight industry provides tremendous additional benefits to the country's economy. The total output of 10.4 million generated by freight activities in Ethiopia is nearly 60% larger than the total GDP.

Nevertheless, in general, the total GDP is considered a more meaningful measure of economic impacts than output because the total output counts all rounds of impacts at each node of the supply chain, resulting in double counting of intermediate inputs. As discussed later, in-house freight transportation was not included in the analysis since no recent data for input-output analysis are available. One study estimated that in-house freight transportation accounts for roughly 1.19% of total output of freight-dependent sectors such as construction and manufacturing (FTA, 2014). Some sectors are more freight transportation dependent in terms of the transportation cost shares. Construction and farming spent about 5% of their spending, while miscellaneous manufacturing spent about 0.74% for in-house transportation (Ibid). Assuming that the in-house freight transportation's contribution holds constant as the previous study, the freight industry's GDP contribution to Ethiopia would be over 6.8 million.

Examining by mode, the trucking industry is the largest sector in terms of absolute size and share. It supported just over 13 % of the jobs, nearly 9% of the compensation, including wages, and 8% of the GDP in the freight industry. In terms of ripple effects, both the air freight and surface freight transportation sectors have the most significant contribution to the economy. With the completion of the Addis-Djibouti railway and the Djibouti Port expansion, the rail sector and port services will become more important, reflecting increases in both of these sub-sectors and modes.

These comparisons indicate that during the study period, the freight industry's economic activity in Ethiopia and the country's political economy shared similar cycles, confirming that demand for transportation services is also affected by the current state of the economy and internal politics, especially in terms of employment and consumption expenditure.

Mapping of target Value Chain[6]

The objective of this study is to invigorate and deepen the discussion about the role of transportation (freight transport) services as tradable activities, and as intermediate inputs in Ethiopia's agro-business sector. At the government's request, emphasis was placed on transport services , with individual case studies on the role of freight transport services[7] as inputs in the coffee, and cut-flower value chains complementing the analysis.

Therefore, mapping the value chain facilitates a clear understanding of the sequence of activities and the key actors and relationships involved in the value chain. This exercise is carried out in qualitative and quantitative terms through descriptive approach, and mapping diagrams/graphs/tables presenting the various actors of the chain, their linkages and all operations of both commodities chain from pre-production (supply of inputs) to industrial processing and marketing (see part 2 of the study for detail description).

The value chain mapping was conducted using observation of chain activities, interviews with chain actors, and participatory meetings to develop and obtain feedback on the chain map. Apart from their contribution to the mapping exercise, the participation of the key chain actors including government officials helped the study to build a shared vision of the problems to be overcome, develop a collaborative upgrading strategy and to take joint decisions regarding future policy interventions.

The mapping diagrams and description are prepared through an iterative process which can be divided into two stages:

First, an initial map is drawn which depicts the structure and flow of the chain in logical clusters: the main actors and the activities carried out at the local level, their links to activities at other domestic or foreign, the supporting services and their interactions, the links to the final market, and some initial indications of size and importance.

The second stage is quantifying the value chain. This involves adding detail to the basic maps drawn initially (structure and flow). Depending on the level of detail needed for the study, this exercise focused on elements such as size and scale of main actors; production volume; number of jobs; sales and export destinations and concentration.

6.Value chain maps are a valuable tool in analysing the scope and performance potential of a agro-based business model by breaking down the various process dynamics into product/service inputs, logistics, sectors of application and embedded stakeholders. The strengths, weaknesses, costs, contribution and competition from other value chains in the production of coffee and floriculture are visualised via value chain maps, which is complemented by the flexibility and convenience of their development.

7.In the WTO Services Sectoral Classification List (MTN.GNS/W/120), largely based on the UN Provisional Central Product Classification, the transport sector is defined in nine sub-sectors.

However, it may be erroneous to speak of one final map. In general, the outcome is several maps (to avoid information overload), providing different (but interlinked) chain information. The resulting map depends on the scope and objectives of the type of study conducted and its entry point or dimension. Sample mapping questions are given below (adapted from Ben Shepherd, 2019):

• What are the main activities carried out in the value chain to export the final products (or categories of Coffee & Floriculture)?

• Who are the operators involved in these activities and what are their roles? Other factors to map out at this stage are the locations of the various actors (farmers, district, regions, primary societies, border-post, etc.) and their legal status.

• What are the flows of products, service inputs, information and knowledge in the value chain? These flows can be both tangible and intangible, for instance, products, money, information and services.

• What are the production volumes, the number of actors, the number of jobs? This information helps picture the size of the various channels within the value chain.

• Where does the product (or service inputs) originate from and where does it go? This map captures the physical flow of the product or service and illustrates regional variations, such as the transaction costs related to freight transport.

• How does value change through the value chain? This factor is useful in measuring the competitiveness of each operator within the chain (and of the chain as a whole). The simplest method of picturing this element is by computing value addition at each stage of the chain – the value of output at market price minus the value of all intermediate inputs (materials or services) purchased from other firms, including freight transport services.

• What types of relationships and linkages exist among the various chain actors? These may include a market relationship, a persistent network relationship between independent firms, a vertical integration, etc. Appendix 2 provides basic conventions for mapping these relationships and linkages.

• What types of business services are feeding into the chain, including the regulatory and policy framework in which the sector is operating? This map illustrates the external sources of competitiveness and highlight the need for potential interventions outside the value chain, i.e., interface with policy and regulation.

• What is the market share of the value chain? This variable is defined as the percentage of the sales value in the overall market.

• What are the main strengths and weaknesses of the chain? These factors are identified by carrying out a SWOT analysis which then integrated in the mapping exercise (see page # 60).

Taking into consideration the above, this section of the study provides a brief mapping of the core process for coffee and Floriculture value chain.

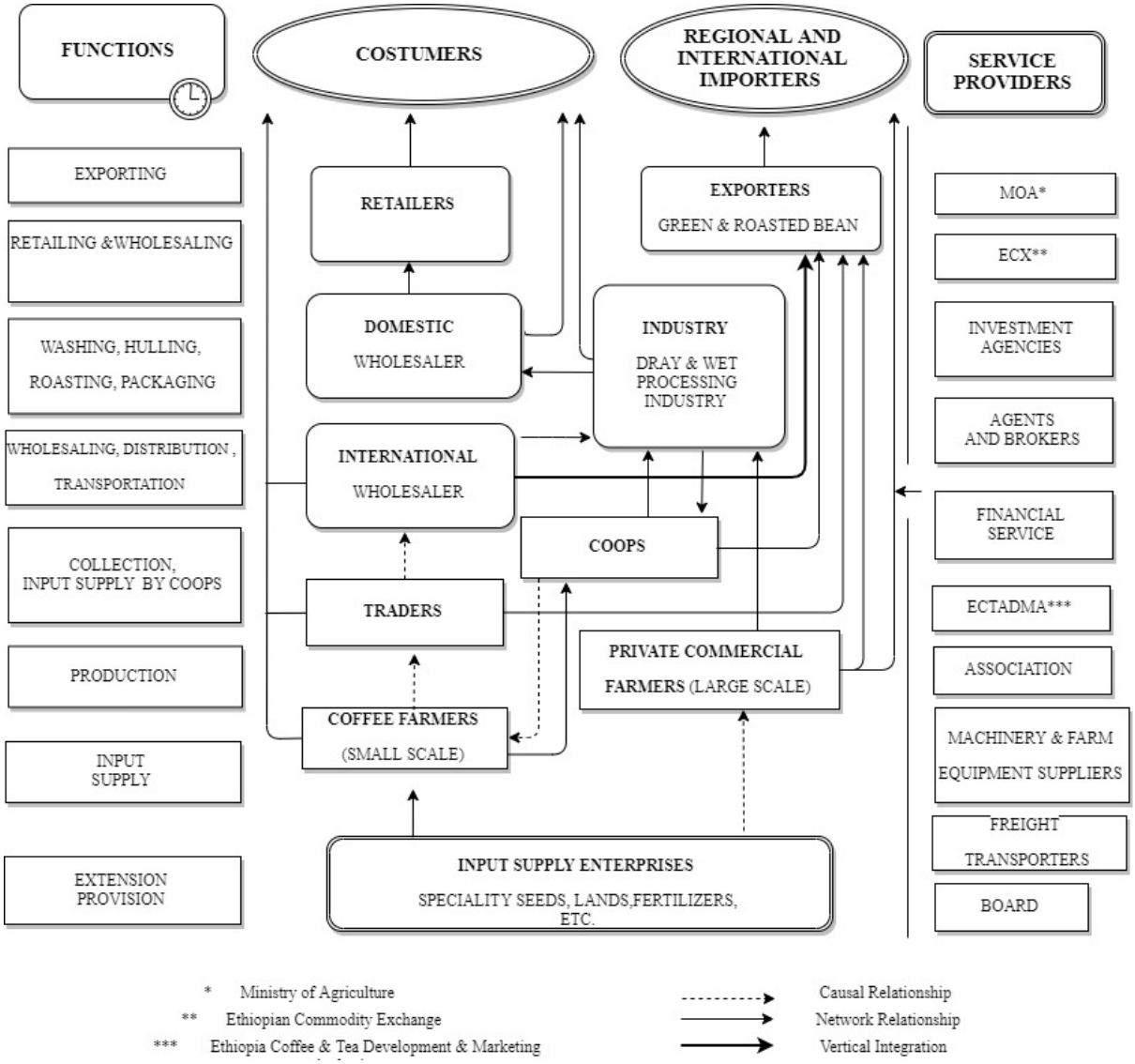
- Chain Context:

To illustrate the role of freight transport services in value chains and structural transformation, the study depicts a value chain in key export agriculture commodities such as coffee, and horticulture products, in particular cut-flower. The value chain shown in figures below are based on fieldwork and interviews conducted in Ethiopia from August - October 2019. The results of the analysis provide a snapshot of the steps through which both products move from producer to consumer, as well as the key actors and institutions involved along the way.

Current in the strategic target sector: Coffee

Coffee is the backbone of the Ethiopian economy and the leading export, with 31% of Ethiopia's foreign currency earning stemming from export of coffee. Coffee supports the livelihoods of an estimated 15-20 million Ethiopians. There are an estimated 2-5.2 million smallholder farmers in Ethiopia with an average coffee farm of 0.5 ha. Around 10% of farmers are cooperative members, while others sell to private mills, akrabis, or cooperatives. Over 60% of Ethiopia's production comes from the Jimma and Sidama regions, with other regions like Wellega, Yirgacheffee, and Harar (among others) contributing the rest. It currently sells most of its coffee to Europe and the United States and Japan.

Figure 6: Map of coffee value chain in Ethiopia



Despite its outstanding potential for qualities based on the high diversity of varieties, climates and soils, Ethiopia's average export price is low, especially compared to other African exporters. While the average export price for a pound of Ethiopian coffee in 2017 was US$ 1.3211, a pound of Kenya coffee received US$ 1.92. Ethiopian farmers receive just 61% of average export price, while Brazilian or Vietnamese achieve between 85% and 95% of FoB, see table below. This contributes to low farmer incomes and discourages farmers from improving their productivity and post-harvest practices. It is a paradox that Ethiopian coffee that is renowned internationally for its distinct flavour profiles is joining countries which derive the least benefit from coffee.

AG: Natural resource-led strategy, agriculture variant *MAN: Manufacturing-led industrialization*
MIN: Natural resource-led strategy, minerals variant *SER: Service-led development*

Table 9: Washed Arabica Coffee Supply Value Chain Costs in US$ 2017/2018 – Smallholder

Cost Lines	US$	
Variable Production Cost per Kg (green equivalent)	1.06	
Sub-total	**$1.06**	
Yield/ha/year Kg [Small Holder/Cooperatives]		
Total cost/kg of green	$1.06	
Average farm gate price/kg of green	$2.16	54%
Coffee grower 's margin/kg of green	$1.10	
Gross income/ha/year	$970.87	
Net income/ha/year	$494.40	
Collectors/Suppliers' Costs and Margin US$/Kg		
Transport	0.0107	
Other costs (income tax, local drying material, etc.)	0.0051	
Sub-total Collectors/Suppliers' Costs US$/Kg	0.0158	
Collectors/Suppliers' Margin	0.024	
Price of Red Cherry - green equivalent at washing mills	2.20	
Wet Mill Costs US$/Kg		
Labour, Salary and other operation costs	0.2578	
Fuel Costs	0.0040	
Maintenance and repairs	0.0356	
Other costs (income tax, local drying material, etc.)	0.0289	
Sub-total Wet Mill Costs US$/Kg	0.326	
Millers' Margin	0.362	
Auction Price/kg	$2.89	73%
Exporters' Costs		
Transport, Clearing, Warehouse, Milling, finance Costs, etc.]	$0.58824	
Total Exporter costs	$0.5882	
Exporters' Margin	$0.49993	
Export price US$/kg [Average export price for Washed Arabica]	$3.9733	

Source: Interviews of selected Smallholders Farmers by author (2019)

Current in the strategic target sector: Floriculture

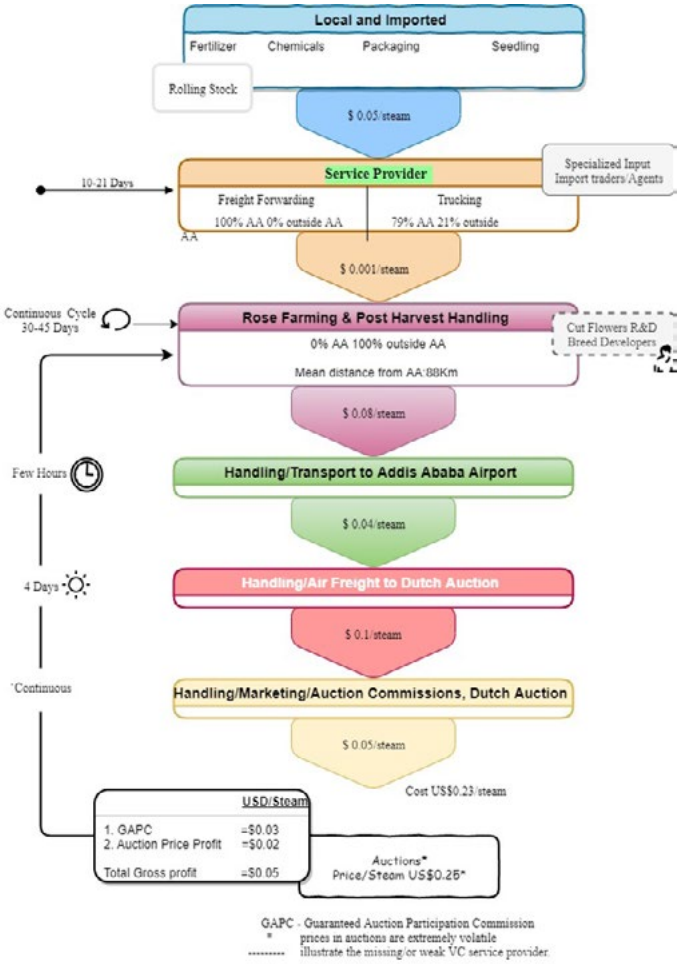
In recent decades, rapid growth in the international trade of high-value commodities has resulted in significant agricultural growth in many countries. Trade in high-value products, such as cut flowers, fruits and vegetables, are increasingly displacing exports of traditional commodities, such as coffee, tea and tobacco (FAO, 2015).

A number of developing countries have become successful exporters of high-value and high-quality agricultural commodities and achieved double-digit growth for a decade or more. Of these, Ethiopia is considered to have the potential to achieve trade gains in these sub-sectors because of agro-climatic advantages. Indeed, the country becomes an increasingly important player in the regional and global market for cut flowers. The Ethiopian flower industry represents an extraordinarily fast and successful diversification into a non-traditional export product.

Despite its late entry into the flower export industry, Ethiopia became the 5th largest non-EU exporter to the EU cut-flower market and the 2nd largest (after Kenya) flower exporter from Africa (GDS, 2017).

Given the declining export earnings from traditional exports, flori-horticulture and other non-traditional, high-value, agricultural export expansion represents an important area of potential income growth. The GTP strategy of the country envisages significant scope for achieving greater commercialization of smallholder agriculture. Moreover, about 12,797 hectares of suitable land is available for horticulture, with only 11 percent of this surface is already used for horticulture (EHDA, 2018). The sector has already created about 183,000 jobs, out of which 70 percent are women. The rapid growth of the industry fuelled hopes that flower exports might even overtake coffee as Ethiopia's main export product in the near future.

Table 10: Washed Arabica Coffee Supply Value Chain Costs in US$ 2017/2018 – Smallholder

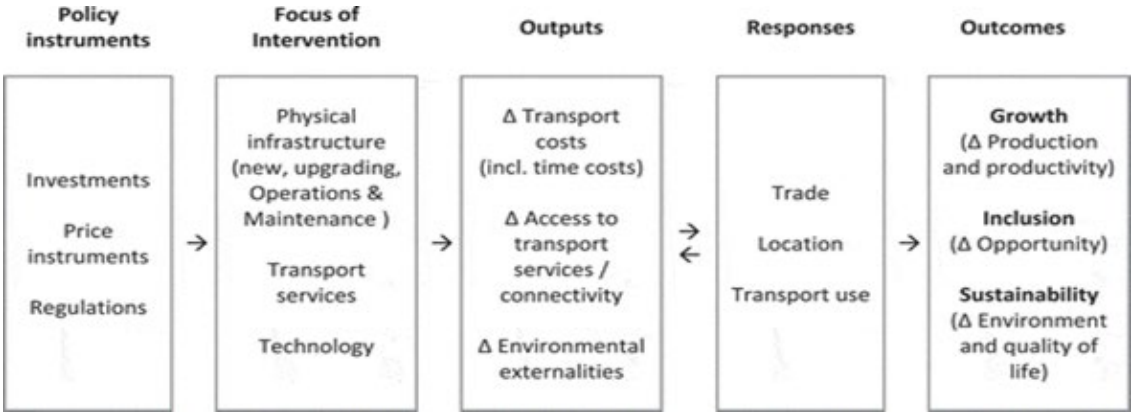


Source: Survey by Author (2019)

2.6. Ethiopia's Transportation Services Sector in GVCs

Global value chains have altered the nature of trade and offer significant opportunities for developing countries like Ethiopia to expand exports, access technology, and raise productivity. Policy makers rightly seek to understand what it takes to participate in GVCs. In practice, this means understanding what it takes to attract lead firms and upgrade to higher value-added activities (Pathikonda and Farole, 2016). However, circumstances that give rise to GVC participation vary by sector. Although fixed structural factors play a role in supporting or inhibiting regional and global value chains participation, there exists substantial scope for policy space to shape outcomes.

Ethiopia faces a number of serious policy challenges that call for detailed economy-wide analysis to support decision-makers in their work. Examples of pressing (transport) policy questions include: transport infrastructure investments, price instruments, and regulations. Investments entail building new transport infrastructure (for example roads, railways, or airports), upgrading existing links and technology, or improving transport services. Price incentives include subsidies or taxes to influence mode choice and transport behaviour more generally. Regulations include rules to directly reduce emissions (such as fuel emission standards, or driving restrictions) or to organise the transport sector (for example, freight, taxis or buses) or the construction of infrastructure. Some policy interventions may affect supply, such as infrastructure investments, whereas others target demand, as do transport subsidies.



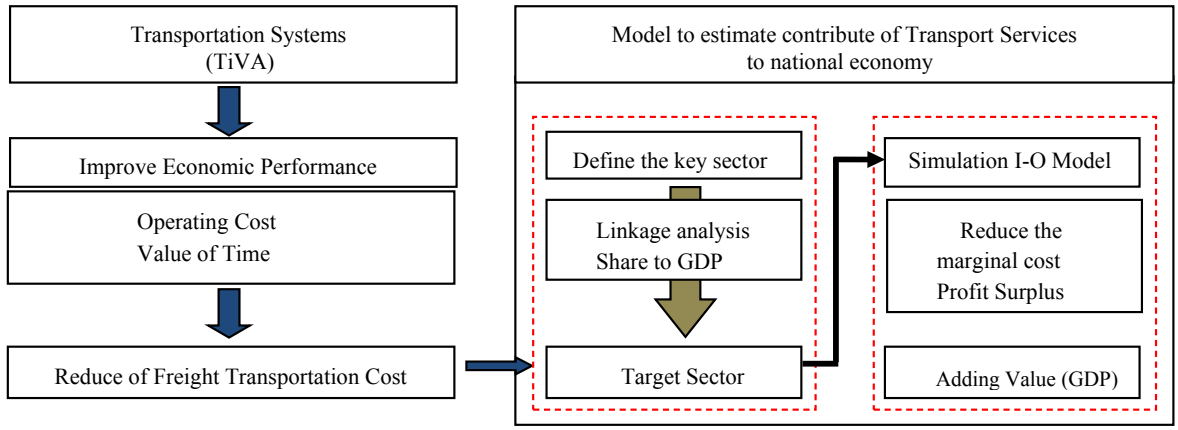
Source: Author

These issues require economy-wide analyses that trace the impacts of policy changes and shocks emanating from the transport sector of the economy on the macro-economy patterns; the sectoral structure of production, employment, trade logistics, and TiVA; and on household income and poverty...etc. Such multi-level analyses require a comprehensive approach to data generation and analytic support to policy work.

As previously mentioned, a good understanding of the nature of the relationship between transport and the economy is crucial for several reasons. In this regard, the I-O model could be a good research methodology to explore the influence of the transport industry on the other sectors of the economy. Various research results using I-O analysis have shown good performance in providing policy recommendations, especially to know the linkages between the transport sub-sector and its improvement efforts in the national economy. The use of I-O table serves as a basis for planning and macro-economic analysis, especially with regard to the production sector, the analysis of impacts, and the connections between sectors and economic projections (GDP).

In the case of Ethiopia, however, there has not been a single study that used the I-O model directly for analysing the transportation industry. There were some attempts previously to investigate on the impact of investment in road transport infrastructure on different macro-micro issues, one of these rare studies was conducted by Semen and Ferede (2015) who employed a CGE modelling approach using Social Accounting Matrix (version of 2005/06), which represents the Ethiopian economy by activities, factors, commodities, and institutions, including an aggregate savings-investment account (EDRI and ERA, 2009). The study concluded that the road transport industry in Ethiopia had a significant impact on output growth, production-inducing, and welfare effects. The current study focuses on analysing (freight) transport services; however, it provides a good framework for expanding the domain to investigate the whole transportation sector (i.e., rail, road, air, water, and related auxiliary services) from agro-value chain analysis.

Figure 8. Conceptual Framework for the Study



Source: Author

This section briefly introduces the I-O analysis used to analyse the inter sector contributions, inter sector linkages and multiplier of the transportation sector in the national economy. One of the specific contributions of this study lies in defining the connection of such variables through an extended and simplified Input-Output model derived from Social Accounting Matrix (SAM)[8] that will be explained in greater detail in the following section.

SAM and Reconstructed Input-Output Table

The Ethiopian input-output (I-O) table was derived from a Social Accounting Matrix (SAM) recently compiled by National Planning Commission in collaboration with other institutes. The time period covered by the SAM is from mid-2001 to mid-2002 and corresponds to the Ethiopian Fiscal Year (EFY) 1994 in local calendar time which starts in early July to mid-2015/16.

-Transforming the Source Data to GTAP I-O Format

The source SAM supports a 39 sector aggregation of the standard 57 GTAP sectors. In line with GTAP I-O format requirements as outlined in Huff, McDougall, and Walmsley (2000), the data for Ethiopia I-O table obey all mandatory splits and are provided in the unified format. The following steps were taken to mapping from SAM activities to GTAP I-O sectors format:

In a first step, the 57 GTAP sectors have been mapped into the 42 SAM activities using the concordances from the GTAP sectoral classification to GSC2 and ISIC Rev.3 (Ibid) in combination with the concordance between the Ethiopia SAM activities. For GTAP sectors there is a straightforward one-to-one mapping, and in these cases the GTAP codes are adopted for the Ethiopia data set in GTAP format. This count includes four GTAP sectors without domestic production in Ethiopia. For three GTAP sectors, the Ethiopia SAM activities are more disaggregated than in the GTAP classification and have been aggregated accordingly.

In a second step, the activity and commodity accounts of the original SAM are aggregated into the 39-activity and corresponding 39-commodity sector classification while the eight indirect tax accounts are aggregated into two tax accounts for indirect taxes on domestically produced commodities and on imports respectively.

The resulting new SAM is characterized by a purely diagonal make matrix. Hence at this stage the distinction between activities and commodities can be dropped and it is now straightforward to collapse the activity and commodity account blocs of the SAM into a consistent standard input-output table format, in which the entries in the intermediate input and final demand blocs represent the sums of domestic plus import purchases at purchaser prices. In the course of the extraction of this symmetric 39-sector input-output table from the SAM, the domestic trade and transport margins by commodity are moved to the intermediate input bloc by adding trade margins to intermediate purchases of trade in services and transport margins to intermediate purchases of transport and communication services.

8.Input-Output (I-O) and Social Accounting Matrices (SAM) are essential tools for sectoral and macro-to-micro policy analysis. These databases incorporate specific details on economic flows and activities. They contain detailed record of the complex activities taking place within the economy and the interaction between different economic agents. The analysis is used mainly for two purposes. First, it is employed for the descriptive analysis of the current economy. Second, the analysis is conducted for simulation of policy alternatives (Weisbrod, 1997).

Table 11: I-O table for the transport sector, extracted from the 2015/16 Ethiopian SAM

Input-output for the transport sector, extracted from the 2015/16 Ethiopian SAM

Thousand Birr

Key:
- I-O module
- Income for the transport sector from its services
- Payment by the transport sector to other sectors
- Value added module

	Forestry	Fish	Mining	Dairy	Grain mill	Grain mill services	Sugar	Other food	Beverage	Tobacco	Textiles	Apparel	Leather	Wood	Paper and Publishing	Chemicals	Pharma ceutical	Minerals	Cement	Basic metals	Metals	Machinery	Electronic equipment	Vehicle	Other manufacturing	Electricity	Water	Construction	Trade	Hotel	Transport	Communications	Financial services	Public administration	Education	Health	Real estate	Other services
Wearing apparel																															57							
Paper products publishing																															58							
Petroleum coal products																															11,665							
Chemicals, rubber and plastic products																															475							
Mineral products nec																															163							
Electricity																															36							
Water																															38							
Trade and repair services																															1,432							
Transport services	918.1	10.5	208.1	46.1	51.5	17.7	75.7	137.0	345.7	4.1	163.9	13.3	69.5	14.3	36.2	64.4	19.0	25.6	218.3	30.9	36.0	1.6	0.6	9.2	22.6	3.4	0.0	2564.5	1350.1	233.1	296	0.0	57.0	474.7	103.6	8.2	0.0	41.9
Communication																															5							
Financial services																															102							
Business Services																															47							
Recreation and other services																															141							
Real estate and renting services																															13							
Agriculture Labour(both skilled and unskilled labour)																															-							
Adminstrative workers																															76							
Professional workers																															148							
Skilled workers																															2,454							
Unskilled workers																															444							
Lowest two quantile Rural Households land and other capital endowment																															-							
Upper three quantile Rural Households land and other capital endowment																															-							
Lowest two quantile Rural Households Livestock endowment																															-							
Upper three quantile Rural Households Livestock endowment																															-							
Non Agriculture Capital																															5,424							
Enterprises																															-							
Rest of the World																															-							
Total	918.1	10.5	208.1	46.1	51.5	17.7	75.7	137.0	345.7	4.1	163.9	13.3	69.5	14.3	36.2	64.4	19.0	25.6	218.3	30.9	36.0	1.6	0.6	9.2	22.6	3.4	0.0	2564.5	1350.1	233.1	23071.6	0.0	57.0	474.7	103.6	8.2	0.0	41.9

Source: Author

- General Framework (of the I-O Model)

The I-O model is a linear, inter-sectoral model that shows the relationships among the productive sectors of a given economic system. The basic balance equations of the I-O model consisting of N industry sectors can be expressed as:

$$X_i = \sum_{j=1}^{N} x_{ij} + = F_i \sum_{j=1}^{N} a\, X_{ij\,j} + F_i \qquad (1)$$

or

$$X_j = \sum_{i=1}^{N} x_{ij} + V_j = \sum_{i=1}^{N} r\, X_{ij\,i} + V_j \qquad (2)$$

where Xi is the total gross output in sector i = 1, 2, …, N. aij(= xij/Xj) are the direct input or technical coefficients that divide xij, the inter-industry purchases of producing sector i from supply sector j, by Xj total gross output in sector j. rij(= xij/Xi) are the direct output coefficients that divide xij, the inter-industry purchases of producing sector i from supply sector j, by Xj total gross output in sector i. Fi is the final demand for products in sector i, and Vj is the final value added by sector j. Thus, Eq. (1) describes the demand-side (or demand-driven) model as viewed vertically in the I-O tables, while Eq. (2) expresses the supply-side (or supply-driven) model as viewed horizontally (Kwak, Yoo, et al., 2005).

- Inter-Industry Linkage Analysis

In the framework of an I-O model, production by a particular sector has two types of economic effects on the other sectors in the economy: (1) the backward linkage effect and the (2) forward linkage effect (Miller and Blair, 1985). The backward linkage effect is represented as the power of dispersion (POD), which is the average of n elements in column j divided by the average of all n2 elements in the Leontief inverse matrix. Similarly, the forward linkage effect is expressed as the sensitivity of dispersion (SOD), which is the average of n elements in row i divided by the average of all n2 elements in the Leontief inverse matrix. Let bij be the elements of the Leontief inverse matrix. The mathematical calculation of the forward linkage effect (Bif) and backward linkage effect (Fjb) can then be expressed:

$$\text{as } B_i f = \frac{\sum_{j=1}^{n} b_{ij}}{1/n \sum_{i=1}^{} \sum_{j=1} b_{ij}} \text{ and } F_j b = \frac{\sum_{i=1}^{n} b_{ij}}{\frac{}{i_n=1\ n}}, \text{ respectively.}$$

Comparison of the strengths of the backward and forward linkages for the sectors in a single economy provides one mechanism for identifying the leading/ key sectors in that economy and for grouping sectors into spatial clusters. Focusing on the transport sector, the backward linkage effect means that the production activities of the individual transportation sub-sector may induce greater use of other sectors as an input for transportation production. On the other hand, the forward linkage effect indicates that transportation production may be used as an input for other sectors in their own production. Therefore, forward and backward linkage effects are then useful in assessing the impact of the transportation sector on the Ethiopian national economy as a whole.

- Exogenous Considerations in I-O Analysis

In the context of transportation infrastructure impacts considered in the sample analysis, a good deal of attention should be paid to estimating the exogenous changes that they cause. The strength of the I-O model employed is that, it gives a fair assessment of sector impacts and consequences - intended or otherwise - across the economy. What I-O can do is provide a set of economic accounts that identify sub-sectors /industries as winners or losers for a wide range of policy interventions, given a properly specified change in final demand.

- Broader Economic Impact by Reducing Freight Transportation of Industry's sector

This can simply be formulated that industrial sector output multiplier is the total of production output due to a change of 1 unit of final demand from the industrial sector due to a reduction in freight transport costs. The results will describe how the effect of an exogenous change (in this study reduced freight transportation costs) to the coffee and cut flower sectors output (as direct impact) and other production sectors (as indirect impact). Conventionally, the I-O analysis is performed assuming that exogenous production restrictions are the changes in final demands or the sector being restricted is treated as exogenous sector like the final demand.

Table 12: Transportation Sector Classification

Sector	Sub-sectors*
Rail transportation	Railway passenger services Mass rapid transit passenger services Railway freight services Railway auxiliary services
Road transportation	Passenger services Freight services Private freight carriage Road transport auxiliary services
Water transportation	International freight services Domestic freight services Water transport auxiliary services (port facilitation)
Air transportation	Passenger services Freight services Other air transport services (including aerial tourism) Air transport auxiliary services
Warehousing service	General warehousing services Frozen warehousing Cargo loading or unloading operations
Other transportation services	Customs clearance services Travel services Animal Transport Transport forwarding services Pickup and delivery services Express or courier services ICT – telecommunications Other transport services (such as: parking, cargo inspection and tally, dry ports, IPs and (inland) container freight station services, etc.)

Source: MoT (2019)
**Note: Strategic target sectors, coffee and cut flower, affected by freight transport and auxiliary services.*

The demand for transportation is construed as a demand derived from economic activity, that is to say, from the location of production and consumption. There are various stages in the production of goods, so that intermediate goods have to be relocated and transported in order to produce final goods, which in turn will be shipped to markets for final consumption. The production of goods and services generates demand for transportation services at two stages: the transportation of inputs and raw materials and the transportation of intermediate and final products for consumption within and beyond national borders. That has to do with national (distribution) and international logistics and supply chains, whereby products are imported for national production and consumption and production is generated for export.

- I-O Data Used: Result

Four sets of I-O domestic tables (i.e., 2001/02, 2005/06, 2010/11, and 2015/16) available for Ethiopia were used. For the transportation sector-based analysis, as indicated in the above Table, the four original tables were aggregated into 37 sector tables including transportation industry according to the reconstructed I-O table sector classifications.[9]

9. Given the availability of this valuable statistical information, the R packages were used for simulation and exploration of the various dimensions and patterns of the transport industry through time and across economic sectors using input-output analysis. The package contains functions for basic Leontief and Goshian inverse (i.e. [I-A]^-1), backward and forward linkage, impact analysis as well as advanced (vertical specialization) analysis. In order to include the four input-output tables into the package, a two-tear approach was used. Illustration of the work frame of the study can be seen in the Figure above.

This section begins with quantitative analysis by using national I-O data to look at the ways in which the transport service sub-sectors entering different stages of regional and global value chains. The discussion mobilizes two key concepts: linkages via trade in transport service inputs, and intensity of GVC participation. The former looks at the extent to which downstream sectors like in this case coffee and floriculture sector use transport services in their production process. The latter focuses on indirect impact (exports and imports of transport services) through their embodiment in the output of other sectors. This analysis work is significant in that it unpacks national policies and regulations more comprehensively on transport and agricultural sectors in order to provide insights on their potential value and limitations from a trade policy perspective.

Table 13. Forward linkage effects (sensitivity of dispersion)

	Year	2001/02		2005/06		2010/11		2015/16	
	Sector	Value	Rank	Value	Rank	Value	Rank	Value	Rank
1	Forestry	1.0353	11	1.0764	10	0.9917	11	0.9256	13
2	Fish	0.8030	20	0.7814	21	0.7731	23	0.7396	24
3	Mining and quarrying	0.8769	17	0.8996	17	0.8313	21	0.7888	20
4	Dairy	1.0201	12	0.9472	13	0.9483	12	0.9100	14
5	Grain Mill	1.2440	8	1.0719	11	1.0353	9	0.9767	10
6	Grain Mill Services	0.7809	22	0.7777	22	0.7534	24	0.7616	22
7	Sugar	1.2750	7	1.2109	7	1.4120	6	1.4894	6
8	Other Food	2.0904	1	1.8564	2	1.9311	2	2.1101	3
9	Beverage	0.9487	14	0.9300	15	0.8374	20	0.8178	18
10	Tobacco	1.9283	2	1.7801	4	1.6447	4	1.9060	4
11	Textiles	0.9917	13	0.9461	14	0.9374	13	0.8696	15
12	Apparel	0.7904	21	0.7562	24	0.7811	22	0.7822	21
13	Leather	1.0428	10	1.1375	8	1.0944	8	1.0548	8
14	Wood	0.6271	31	0.6305	32	0.6252	31	0.5943	31
15	Paper & publishing	1.0712	9	1.0780	9	1.0291	10	0.9542	11
16	Chemicals	0.6679	26	0.6679	27	0.6393	27	0.6144	27
17	Pharmaceutical	1.3828	6	1.3591	6	1.3203	7	1.2089	7
18	Minerals	0.9417	15	0.9747	12	0.8852	16	0.8414	16
19	Cement	1.5574	4	1.8558	3	1.5034	5	1.4936	5
20	Basic Metals	0.6423	29	0.6515	30	0.6276	30	0.6001	30
21	Machinery	0.7634	23	0.7978	20	0.8865	15	0.9409	12
22	Electronic Equipment	0.8248	33	0.1261	31	2.3083	1	0.2539	35
23	Vehicle	0.4505	25	0.8210	15	1.8699	3	2.2202	2

24	Other manufacturing	0.5977	13	0.6088	23	0.5948	13	0.5662	13
25	Electricity	0.7074	25	0.7211	25	0.8465	19	0.7607	23
26	Water	0.8496	19	0.9075	16	0.8661	17	1.0499	9
27	Construction	1.8248	3	1.9261	1	2.3083	1	2.2539	1
28	Trade	1.9283	2	1.7801	4	1.6447	4	1.9060	4
29	Hotel	1.4314	5	1.6001	5	1.5662	5	1.4022	5
30	Dummy sectors	0.9102	16	0.8572	19	0.8868	14	0.8193	17
31	Communications	0.6248	23	1.9261	1	2.3083	1	2.2539	1
32	Financial Services	0.9102	16	0.8572	19	0.8868	14	0.8193	17
33	Public Administration	0.6239	32	0.6343	31	0.6160	32	0.5833	32
34	Education	0.8714	18	0.8792	18	0.8577	18	0.8121	19
35	Health	0.6472	28	0.6778	26	0.6388	28	0.6307	26
36	Real Estate	0.6355	30	0.6532	29	0.6406	26	0.6016	29
37	Other Services	0.6584	27	0.6600	28	0.6344	29	0.6022	28
38	Rail transportation	0.6239	32	0.6343	31	0.6160	32	0.5833	32
39	Road transportation	0.8714	18	0.8792	18	0.8577	18	0.8121	19
40	Water transportation	0.6472	28	0.6778	26	0.6388	28	0.6307	26
41	Air transportation	0.6355	30	0.6532	29	0.6406	26	0.6016	29
42	Warehouse service	0.6584	27	0.6600	28	0.6344	29	0.6022	28
43	Other transportation services	0.7421	24	0.7671	23	0.7524	25	0.7204	25

Source: Author

As indicated in Table 8, the forward linkage effects of the transportation sectors are relatively lower than those of other sectors, which means that the transportation sectors are less stimulated by the overall industrial growth than other sectors during an economic boom. For the transportation sectors, a big changes occurred in the forward linkage (i.e., supply-driven for supporting others) effects from 2001/02 to 2015/16. This also implies that, in general, the transportation sector is significantly influenced by business fluctuations, simultaneously it is a vital input to national economy. However, on the evidence of ranking elevated from the 18th in 2001 to the 6th in 2016, the road transportation was getting more importance to support the other sectors in national economy.

Based on table below, it can be seen that backward linkage (i.e., demand-driven for boosting other sector) effects of all sectors. Road, rail and air transportation are with higher ranking of backward linkage effects since 2001/02; in particular, both road and air transportation sharply increase their backward linkage effects over recent years.

Inter-industry linkage effect analysis can provide implications on the structure of an industry in the national economy.

Table 14. Backward linkage effects (Power of Dispersion)

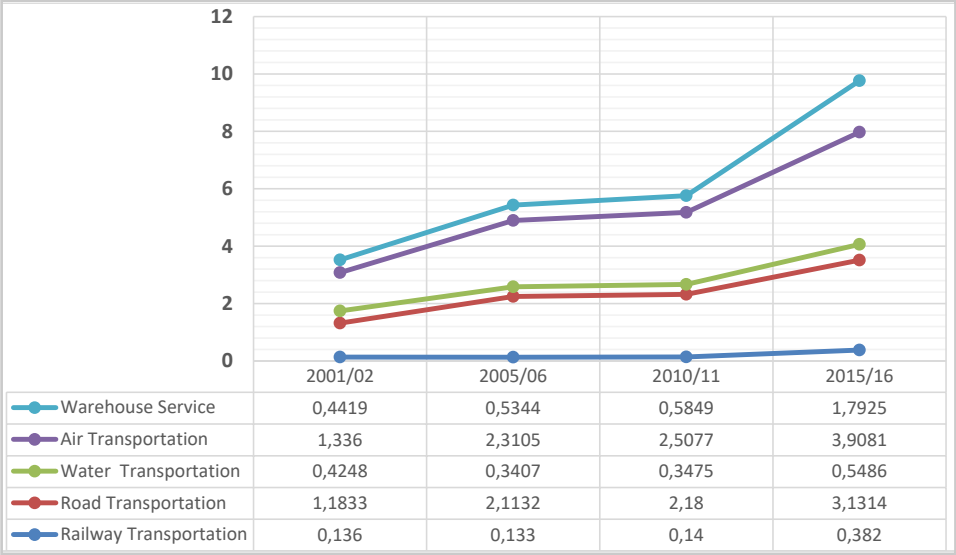
	Year	2001/02		2005/06		2010/11		2015/16	
	Sector	Value	Rank	Value	Rank	Value	Rank	Value	Rank
1	Forestry	1.0994	11	1.1675	10	1.1157	12	1.0173	4
2	Fish	0.8727	21	0.8323	27	0.8077	30	0.7916	30
3	Mining and quarrying	1.2398	13	1.2805	12	1.2298	15	1.1969	17
4	Dairy	1.2810	2	1.2662	3	1.3059	1	1.3177	3
5	Grain Mill	1.0857	12	1.0647	14	1.0998	13	1.1357	10
6	Grain Mill Services	1.0640	13	1.0292	16	1.0113	16	0.9981	16
7	Sugar	0.7056	33	0.7001	33	0.7048	33	0.6777	33
8	Other Food	1.1533	9	1.1097	12	1.1628	7	1.1471	29
9	Beverage	1.0629	14	1.0745	13	1.0878	14	1.0157	25
10	Tobacco	1.2094	6	1.2268	4	1.2572	3	1.2445	35
11	Textiles	1.2134	5	1.1843	9	1.2356	4	1.2625	4
12	Apparel	1.2020	7	1.1876	8	1.1539	9	1.1618	8
13	Leather	1.0240	15	1.0009	17	0.9809	17	0.9385	18
14	Wood	0.9973	17	1.0526	15	1.0287	15	0.9924	17
15	Paper & publishing	1.1384	10	1.1673	11	1.1452	10	1.1136	12
16	Chemicals	1.2002	8	1.1919	6	1.1417	11	1.1034	13
17	Pharmaceutical	0.9033	18	0.9309	18	0.8762	22	0.8248	27
18	Minerals	1.2312	4	1.1982	5	1.1838	6	1.2202	15
19	Cement	0.8638	14	0.8573	13	0.8344	7	0.8298	5
20	Basic Metals	0.8901	19	0.8891	19	0.8677	23	0.8504	22
21	Machinery	0.7634	23	0.7978	20	0.8865	15	0.9409	12
22	Electronic Equipment	0.7120	32	0.7062	1	2.3083	1	0.8373	28
23	Vehicle	1.4505	5	1.5210	5	1.8699	3	2.2202	32
24	Other manufacturing	0.5977	33	0.6088	33	0.5948	33	0.5662	33
25	Electricity	0.7074	25	0.7211	25	0.8465	19	0.7607	23
26	Water	0.8496	19	0.9075	16	0.8661	17	1.0499	19
27	Construction	1.8248	1	1.9261	2	0.8486	4	2.2539	1
28	Trade	1.8399	2	1.8069	3	1.8765	2	1.9067	2
29	Hotel	0.8561	26	0.8541	24	0.8309	8	0.8285	6

Source: Author

	Year	2001/02		2005/06		2010/11		2015/16	
	Sector	Value	Rank	Value	Rank	Value	Rank	Value	Rank
30	Dummy sectors	0.8529	28	0.8246	28	0.7298	32	0.6791	32
31	Communications	0.8118	31	0.7732	31	0.7688	31	0.7421	31
32	Financial Services	0.8676	23	0.8585	22	0.8382	26	1.1170	11
33	Public Administration	0.7120	32	0.7062	32	0.8486	24	0.8373	24
34	Education	0.8399	29	0.8069	30	0.8765	21	0.9067	20
35	Health	0.8561	26	0.8541	24	0.8309	28	0.8285	26
36	Real Estate	0.8529	38	0.8246	38	0.7298	32	0.6791	32
37	Other Services	0.8118	31	0.7732	31	0.7688	31	1.7421	31
38	Rail transportation	0.3069	30	1.2883	35	1.2977	2	1.2087	36
39	Road transportation	0.8553	2	0.8874	20	0.9152	20	0.9231	19
40	Water transportation	0.8813	20	0.8524	25	0.8176	29	0.8150	9
41	Air transportation	0.8321	3	0.8193	1	0.9237	18	0.8419	23
42	Warehouse service	0.8719	22	0.8744	21	0.9187	19	0.9021	21
43	Other transportation services	0.8571	25	0.8519	26	0.8419	25	0.8168	28

According to Chang and Lin (1997), if industries have both power and sensitivity of dispersion values greater than one for both forward and backward linkage effects, these industries play crucial roles in the economic development and in supporting other industries/economic sectors (forward linkage effect), as well as in boosting other industries (backward linkage effect). On the other hand, if industries have both power and sensitivity of dispersion values smaller than one for both forward and backward linkage effects, these industries have difficulty in supporting and boosting other industries. If we examine the impact factor of the freight transportation industry, the standard point of the average is higher than 1, and road and air freight was found to be influential. This means that both transport service sub-sector influences all the other industries through purchase. Moreover, among the six transportation services, the road, rail and air transportation sectors (with higher backward linkage effect) have a relatively strong capacity for pulling in other industries; especially, the road and air modes swiftly getting higher backward linkage effect since 2005/06 seemingly indicate that these two sectors become more important over recent years. Besides, the road transportation (with higher forward and backward linkage effects) has comparatively more strength to support and promote the other industries and sectors, like, trade (distribution of agriculture commodities) and construction. In general, the results of this study indicate that the industry generally have more strength in absorbing products of related industries rather than in being used as an input by other industries.

Figure 9: Production-Inducing Effect

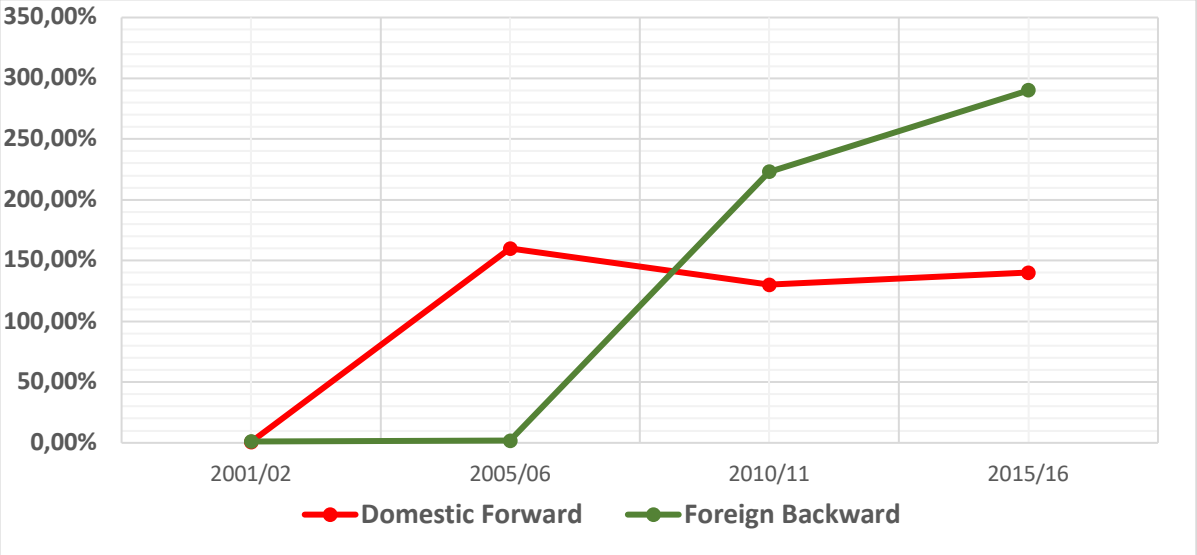


Source: National Account's and author's calculation (2019)

As previously mentioned, the modified Leontief price model, can also be used to assess the price change on the economic system caused by the cost change of the transport sector. The results of this may provide valuable policy insight on the economic effects. For instance, reduction of freight transportation cost due to the operation of the newly built Addis-Djibouti railway, assumed 10% of the existing transportation costs. Due to changes in the total transport mode demand, the total output of Ethiopia (GDP) will overall increase of 647.4 million birr (8x iteration change in output) which is around 1% elasticity from the existing total output. This means direct changes felt by the sector output is as big as the value of goods (coffee cargo) transportation cost savings.

On the other hand, the sectors that use transport sectors most intensively are the same ones that are likely to see the largest proportional effects from improvements in transport sector competitiveness and governance, including quality as well as price. Ethiopia's most intensive user of transportation services are its construction industry, and wholesale/retail trade sector. This means that both sectors absorb high value-added from the transportation sectors within the country. Thus, these sectors are highly dependent on an efficient functioning of transportation system. The least intensive sectors using transportation services are some of Ethiopia's domestically oriented services sectors such as real estate and health. From the Export Intensity (EI) perfective, the result shows that more than 35 percent of the transport service output is sold abroad, while 12.8 percent of the primary agricultural products' outputs are exported. Although it may come as a surprise, the estimated EI for Ethiopian Fiscal Year 1998 EFY (2005/06) shows that the service sector in general, and the transport sector in particular is the most export intensive sector in the economy. Overall, only 49 percent of the total output is exported abroad, from this the aviation sub-sector takes the lion share, particularly Ethiopian Airlines.

Figure 10: Exported forward and backward GVC linkages over time (2001/02-2015/16)



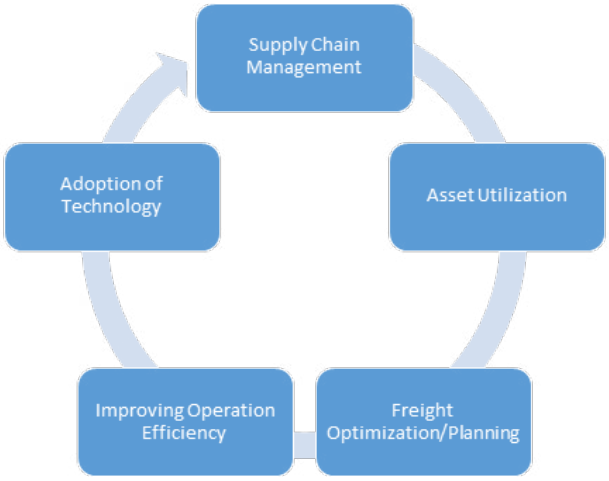
Source: National Account's and author's calculation (2019)

Overall for country's transport services sector is more important as a forward driver of value-added, but in terms of exporting, this value-added happens mainly through backward linkages. This is confirmed by the fact that domestic linkages of exported value-added for the country has been relatively low compared to the foreign backward linkages. Although domestic forward linkages grew somewhat until 2010, after this period they fell so that the gap between the two linkages has been increasing in recent years.

Bringing these results together, the conclusion is that transport services are indeed important in sectors where RVCs/GVCs operate in Ethiopia, such as agribusiness and forestry products, as well as other sectors. However, there is evidence that despite improvements in transport infrastructure and logistics service over recent years, domestic value added in the sector has not been rising in the way that would typically be expected as these downstream sectors themselves expand. In accordance with the analysis results above, it can be argued that if there is an additional development/investment and restructuring in the transport service sector, it will increase economic efficiency and equity.

- The implications from those analyses are as follows:

First, it proves that I-O tables combined with transport sector datasets at the macro-level is a useful tool for examining the effect/importance of transport sector in the national economy of the country. Second, it allows us to obtain interesting conclusions for policy-makers by using top-down approaches; the transport sector, freight service industry in particular, is classified as sub-sector of the transportation industry has a strong effect on other economic areas. As shown in the forward-backward linkages effects and the intensity of participation are relatively high, and thus continuing development can be expected. In addition, the transport sector is an industry that greatly influences the pivotal industries of the country, such as construction industry, agriculture, forestry, manufacturing and service industry. Therefore, it is significant for the government to prioritize more in streamlining the sector to improve transport service efficiency. Lastly, this study confirms that, economic policy-reform/ benefits is not the only driver determining the transport sector. Other non-economic variables, such as logistical, technology and modal aspects, influence the transport service sector intensities, play also an essential role in explaining the current and future trends of the sector, align with the case studies findings (see Part II). In summary, the biggest challenges in the industry today are:



Source: Survey Result (2019)

Challenges while conducting the analysis: Limitations and future works

This study could be further improved by addressing a few limitations. First, the lack of detailed historical data by all mode of transport. Hence, due to the problem of data sources, the most recent data used is the 2015/16 I-O datasets, which is from approximately four years ago - this poses limits. However, a more precise measurement, which underpins the analytical frameworks of the study, was attempted by simultaneously applying different methods. Additionally, by analysing the previous years, the trend of the transport service industry was examined, and thus, development and pervasive effects trends were also examined. This country-level impact study doesn't consider leakage to surrounding countries and/or among regional states. It is difficult to postulate that the I-O analysis used in this study, can perfectly replace all the other methods. But, it is evident that this type of analysis is very useful for policy-makers and researchers for analysing the status and role of the transport services sector in the economy as a whole. The methodology of this study can also be used in a future studies, because of its flexibility and precision.

Policy considerations:

The prioritization of services is especially important because it has grown clear that without a competitive services economy that facilitates industrialization, Ethiopia's dream of structural transformation will remain unachievable. This is particularly relevant with the increasing automation and digitization of industrial and economic processes (GVCs). In this regard, accurate measures will help decision makers understand the role that each transport freight mode plays in Ethiopia national economy to make more informed investment decisions and reform measures.

The analysis reveals that services matter for Ethiopia's economic growth and development, but performance needs to improve for the transport sector to become truly transformational. Many modern services remain underdeveloped in Ethiopia. Although the strategic services are excessively controlled (for example, services that are considered to be of strategic importance are allowed to operate only as strict

public monopolies—for example, telecom, power, and air transport—or through limited domestic private ownership—for example, the transport and financial sectors), other so-believed wasteful services, such as professional services or health services, are neglected, resulting in almost no policy discourse on the role of the services sector in determining the national competitiveness and limited reform. Traditional services such as freight (distribution, logistics) services also witness high regulations and prohibit the presence of foreign services suppliers and investment.

The study results and methodology can also adapted, and could be used to review the performance of the sector as a whole and each modal transport sector services separately. A close examination of the trends and/or the results will help forecast the future direction of the transport sector policy of the country. The methodology can be even more refined with additional and latest data collection like a survey of industry. A wide use of statistics would help promote public policy initiatives and dialogue. Moreover, the economic indicators used in this study – employment, income, output (GDP) – can be important information for public outreach efforts to mitigate the negative externalities and perceptions, and thereby increase the awareness and leveraging the transport (freight) services sector for inclusive value chains in Ethiopia. Sound polices have often failed due to the lack of understanding of public needs and issues in communicating such polices. Therefore, a more proactive strategy in communicating the importance of the transport services sector is suggested. Although transportation services contribute to economic productivity, it also imposes significant economic costs. As this study founds out, the spillover of the government spending and interventions are significant, in terms soft and hard infrastructure development.

Lastly, as implied in the sample analysis, I-O works best when it is joined with econometric or other models, and often the analyst must work with old and national level data, relaying on non-survey techniques. If I-O is to become more useful in target industry modelling and structural analysis overtime, the Federal government should simply have to make I-O data available on a more frequent, timely, and regional administrative regions basis.

An Enterprise Map of Ethiopia: Coffee and Floriculture

Industry Overview: Coffee Sector Profile

An Enterprise Map of Ethiopia: Coffee and Floriculture Industry Overview: Coffee Sector Profile

The birthplace of coffee,[10] Ethiopia is home to some of the finest coffees in the world. It is home to some two thousand indigenous strains or cultivars of coffee and research has found 24 formal varieties of Arabica coffee. This is unique relative to other coffee producer countries where the coffee plant was introduced much later with much less genetic variety. Ethiopia's coffee production for MY19/20 (Oct-Sep) is forecast at 7.35 million 60-kilogram bags (441,000 metric tons). Exports are forecasted to reach a record 4 million bags (240,000 metric tons) (USDA, 2019).

All coffee production is rain fed; thus, precipitation is the most important production factor. Small land holder farmers produce 95 percent of Ethiopia's coffee in varied environments, including forest, semi-forest, garden, and plantation coffee. Under the government's second Growth & Transformation Plan (GTP II), MY19/20 production is predicted to come in at 1.1 million metric tons. Coffee productivity is also projected to increase from 0.75 tons/ hectare in 2014/15 to 1.1 tons per hectare by 2019/20.

According to the Ministry of Agriculture (2017), coffee generates 34 percent of Ethiopia 's foreign exchange earnings and provides livelihoods for 15 million Ethiopian smallholder farmers. Government institutions are responsible for the state coffee plantations with approximately 8000 permanent employees and an estimated 50,000 casual jobs annually. Coffee generates a considerable number of jobs on-farm, in the processing plants and in the transport sector. Coffee processing is a very human-intensive process. It requires a lot of expertise to make the right cup of coffee. Thus, one should not dismiss branded coffee. Coffee cherry collecting and transporting activities in most regions of Ethiopia in which except loading and unloading, mostly performed by women groups of farmers. See Figure 11 Coffee growing areas of Ethiopia.

Coffee is the most important foreign currency earner for Ethiopia. In addition to ensuring the volume and quality of coffee exports, exporters must properly manage the contracts. While most exporters assist the economy by supplying quality coffee to the international market, the government is also taking strict actions against those who fail to comply with their contracts. Ethiopia has more than 400 coffee exporters, 395 coffee farmers who directly export coffee, and over 30 import-export companies who export coffee. Ethiopia exports coffee to over 60 countries. Based on the coffee export data in 2017/18, the principal export markets for Ethiopian coffee were: Germany (22 %), Saudi Arabia (16 %), United States of America (11%), Belgium (7 %), Sudan (6 %) and Italy (5 %).

Figure 11: Coffe Growing Aeas of Ethiopia

hence the similarity in name Kaffa - Coffee. Coffee is called 'Bunna' (boo-na) in Ethiopia, but as the plant spread out in the area as far as the Arabian Peninsula across the Red Sea people referred to it as Kaffa or Coffee for the region it came from. The reason for its early spread

Table 15: Values of Coffee Exports as a Share of Total Exports (billion)

Item	2014/15	2015/16	2016/17	2017/18
Total export value	$2.75	$2.65	$2.76	$2.74
Total value of Agriculture export	$2.35	$ 2.27	$2.32	$2.13
Agricultural exports share out of total exports	86	86	84	78
Coffee exports	$0.812	$0.722	$0.897	$0.917
Coffee exports share of total agricultural exports (%)	35	32	39	43
Coffee exports share of total exports (%)	30	27	33	34

Source: Calculations by author based on Ethiopian Revenue Custom Authority

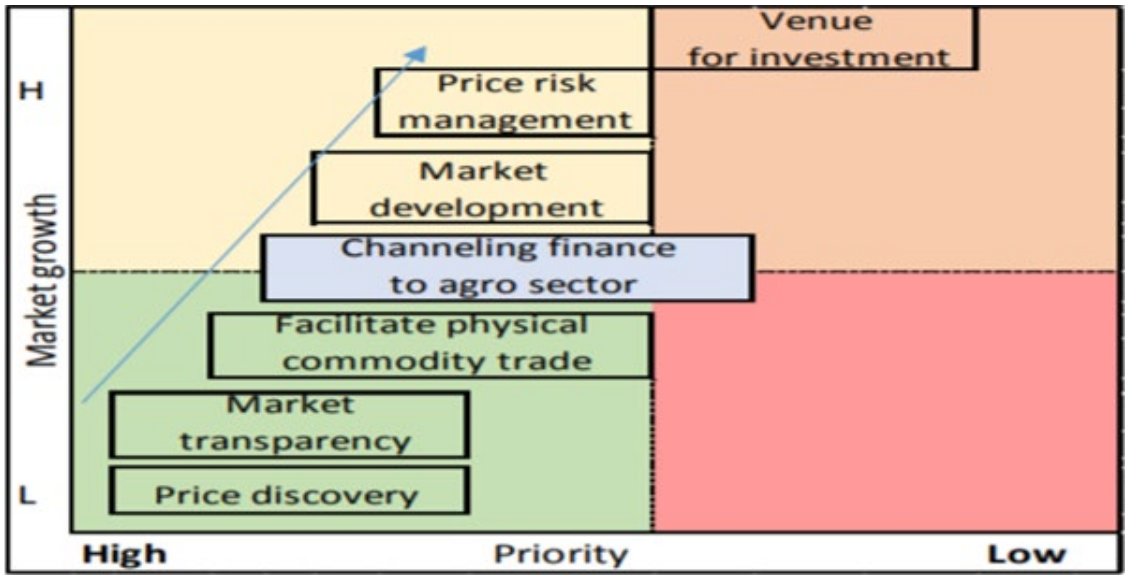
Coffee, the backbone of Ethiopia's economy, is the most important export commodity item. During the 2017/18 marketing year alone Ethiopia registered a record almost 917 million U.S. dollars from coffee exports. Recent market trends mean that certification and traceability have become significant new requirements to increase marketability and prices of Ethiopian coffee. The government has responded to market demand by creating certifying bodies and new marketing systems.

The Ethiopia Commodity Exchange Market

Ethiopia's exchange was formed to overhaul the country's agriculture sector and create a dynamic, forward-looking, and efficient agricultural market system. The first modern commodity exchange in Sub-Saharan Africa (SSA) outside South Africa and a pioneer for Rwanda's East Africa Exchange, it now connects 3.5 million Ethiopian smallholder farmers to markets. Similar to those in most emerging markets, Ethiopia's exchange was launched with an open outcry system which deployed spot contracts for three staple foods—maize, wheat, and haricot beans—with one satellite delivery center and two partner commercial banks. Before its launch, Ethiopia's agriculture sector was fragmented and suffered from high transaction costs, equally high contract default rates, a lack of quality standards, and an unreliable commodity supply (ECX, 2016).

Weak infrastructure in terms of electricity, roads, telecommunications, financial services, and warehouses, along with an absence of necessary market infrastructures, including reliable and timely market information, standards, and reliable ways to connect buyers and sellers, all hampered the exchange's initial progress. In the eleven years since its inception, the exchange has evolved to handle larger trade volumes. The ECX disclosed that it had traded a total of 101,948 tons of products worth 5.12 billion birr (≈ 160 million dollar) in December 2019. The commodity market was able to trade the stated amount of products, including sesame, coffee, white and red nuts.

Figure 12: Benefits of Commodity Exchanges to Emerging Markets



Source: UNCTAD, IFC (2017)

Ethiopia's exchange was positioned to function as an end-to-end service for commodity warehousing, quality control, trading, clearing, and market data dissemination. Its indigenous all-in-one model gave it the functions of an exchange, quality certifier, warehouse operator, and clearinghouse. A lack of awareness about structured markets was a daunting hurdle in the initial stage of the exchange's implementation. The exchange has successfully marketed itself through intensive campaigns and the training of farmers (Ibid).

Figure 13: ECX Traceability Process Flow

Source: ECX (2016)

Methodology

Stratified random sampling method was used to collect primary data collected from the 32 coffee farmers', exporters, government officials, retailers and wholesalers of different coffee growing regions of the country. Interactions with the chain actors were primarily aimed at understanding the market structure, GVCs level of participation, the services in coffee trade, demand scenario, supply chain bottlenecks and its linkages etc. It provided the insights into the actors' choices, value addition (TiVA), business aspects, local market structures, value-added, and emerging trends in the industry. The different modules/sections of the questionnaires allow one to zoom in on a variety of topics that are relevant to RVCs/GVC integration. An important advantage of this data source is that the necessary questions have been posed identically and in the exact same situation in all the different countries. An additional advantage is that the data represent a random sample of firms using three levels of stratification—sector, firm size, and region— and in some surveys weights are provided to calculate a nationally (administrative region) representative average.

The following four steps of value chain analysis, summarized by M4P approach (2008), are applied to the coffee sectors:

1. Mapping the value chain to understand the characteristics of the chain actors and the relationships among them, including the study of all actors in the chain, of the flow of goods and services through the chain, of employment features, and of the destination and volumes of domestic and foreign sales. This information obtained by conducting surveys, interviews and participatory meetings as well as by collecting secondary data from various sources;

2. Identifying the distribution of actors' benefits in the chain and the services embedded within them. This involves analysing the margins and profits within the chain and therefore determining who benefits from participating in the chain and who would need support to improve performance and gains. In the prevailing context of market liberalization, this step is particularly important, since the farmers involved in value chain are the most vulnerable;

3. Defining upgrading needs within the chain. By assessing bottlenecks within the chain and identifying chain constraints, upgrading solutions are defined. These include interventions to: (i) improve the quality and move into more sophisticated lines to gain higher value and/or diversify production; (ii) reorganize the production system or invest in new technology to upgrade the process and enhance chain efficiencies; (iii) introduce new functions in the value chain to increase the overall skill content of activities, and (iv) adapt the knowledge gained in particular value chain functions in order to redeploy it in other economic sectors;

4. Emphasizing the governance role. The concept of 'governance' is central to the global value chain approach. Within the concept of value chain, governance defines the structure of relationships and coordination mechanisms that exist among chain actors. By focusing on governance, the analysis identifies institutional actors that may require support to improve capabilities in the value chain, increase value added in the sector and correct distributional/ logistics distortions. Thus, governance constitutes a key factor in defining how the upgrading objectives can be achieved.

Background Information

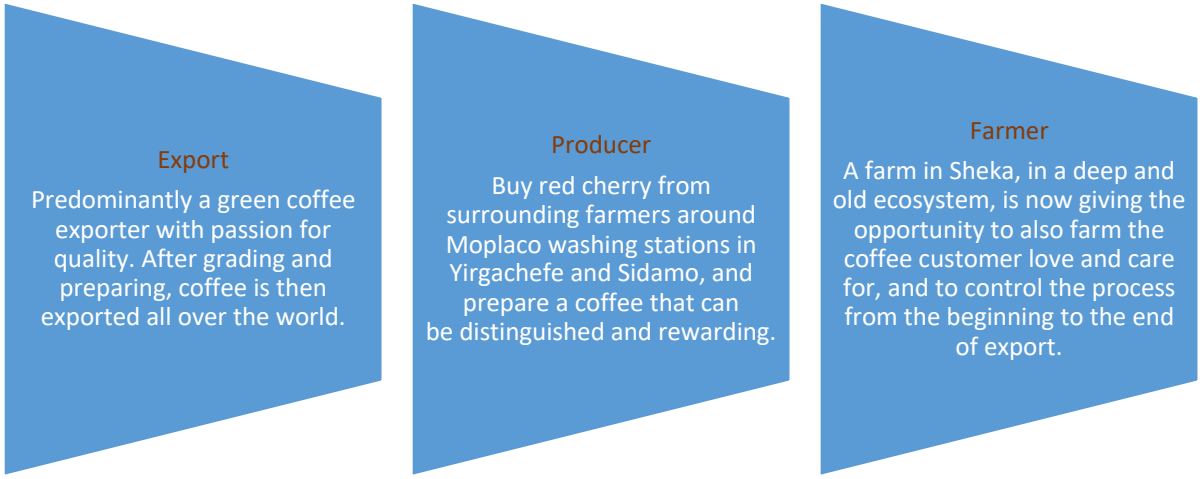
Profiles of Major Coffee Firms

Moplaco

Basic details. Moplaco Trading PLC was established in 1971 by Yanni Georgalis and other family members, all Ethiopian nationals with Greek and French origins.

Currently, there are five shareholders, two children of the founder of the company, Heleanna Georgalis and Irene Georgalis, and three other shareholders, who are all Ethiopian nationals. The firm is engaged in coffee preparation and export. It has 130 permanent employees and hires up to 1,000 seasonal employees. Moplaco annually exports an average of 8,000–10,000 tonnes of coffee. The average asset value and capital of the firm are estimated at $3 million and $2 million, respectively.

Figure 14: Mocca Plantation Coffee – Moplaco Core Business



Source : Moplaco (2019)[11]

History. The Georgalis family have been involved in the industry for generations. The coffee processing and export business began with the current owners' grandfather, who was a traditional coffee trader more than one hundred years ago. Yanni Georgalis transformed the business by modernizing its operations and moving into the export of coffee. He expanded the business by developing new lines of activity, manufacturing plastic bags and shading nets for coffee and vegetable producers. For his achievements in the sector, he has received several awards both from the local and international community. When Yanni Georgalis passed away, his daughter Heleanna Georgalis took over the management of the company. She decided to limit the firm's operation to coffee and coffee-related products, concentrating on maximizing the quality, depth and volume of coffee processing.

Current activities and products. Moplaco Trading PLC processes and exports premium coffee, speciality coffee, conventional coffee and in small-scale, roasted coffee.

Organization and management. Heleanna Georgalis is the ultimate decision maker; a general manager advises, and makes decisions in her absence.

Firm capabilities. The firm's headquarters is located in Dire Dawa. It has coffee preparation and processing facilities at two sites in Addis Ababa. Additionally, it has similar facilities in Dire Dawa and Cheleklektu. The firm uses a traditional internal control system and the use of ICT is minimal. Moplaco's products have been positioned as premium quality and are mostly sold at a premium price. The company's facilities are rated among the top five in Africa. Most employees have been with the firm for more than 20 years. The company is now introducing new administrative systems to exercise control and credibility. The firm holds equity investments in different institutions to protect itself from inflation and from adverse trends in the coffee sector. Moplaco, in partnership with other coffee exporters, has acquired a jute bag manufacturing company from the government to ensure timely and quality supply of the bags for its coffee export.

Supply and marketing chain. The main input of the firm, raw coffee, is purchased through the ECX. Moplaco uses a very large and well-established customer database that has been built up by the family over 56 years. They enrich and update this list by participating in trade fairs, and by adding new private contacts made by the owners. The firm tries to differentiate its products through packaging design and branding. Some of the internationally registered coffee brands of the company include Stag, Cafe Tgreto, Tana-Ko, Park Mountain, Red Wolf, Gebena and Anfilo. It outsources its transport and customs clearing (transit) service needs. The outsourcing logistics function[12] was an ideal solution that helps the company to focus on its core activities, reduce its operation cost, to efficiently utilize company's asset and saving in capital investment.

11. http://moplaco.com/

12. Three dimensions of logistics outsourcing practices are common in the firms: Transportation Services (domestic transportation, international transportation, reverse logistics, and freight forwarding), Information processing (order processing, invoicing, logistics IT-systems), and Materials management and value-added services (warehousing, inventory management and product customization).

Export. Over 95% of the company's exports are to Japan, Germany, the United Kingdom and the United States.

Recent developments. In addition to the export of washed coffee to the international market, the firm has recently started roasting and supplying coffee to local cafeterias and restaurants using in-house transport services.

Development agenda. Moplaco Trading used to own an organic coffee farm before it was nationalized by the previous government. It plans to continue its effort to procure a coffee plantation, in order to ensure its quality and maintain a continuous supply of coffee.

Robera

Basic details. Robera was established in 1994 by Abraham Teressa, an Ethiopian national, and his family in the form of a PLC. It is located in the capital. The firm was established with an initial capital of about $370,000 and is engaged in processing and export of coffee. It currently employs 43 on a permanent and about 350 on a temporary contractual basis, with demand for labour peaking during the harvesting / exporting season (Oct. - January). The main type of work undertaken is coffee-picking, sorting and pulping. Only the ripe cherries are harvested and they are picked individually by hand. Pickers rotate among the trees every eight to ten days, choosing only the cherries which are at the peak of ripeness. Both male and female labourers are hired and there are rules restricting the hiring of children of less than 14 years of age. Robera has an annual turnover of about $5.7 million, with estimated assets and equity of $1million.

Background. The shareholders have been engaged in the coffee business for more than 35 years, previously as a small-scale coffee collectors selling to coffee exporters, and eventually became a coffee exporter. As an exporter, the firm was at first involved in the export of green coffee. The firm also has a licence to export other commodities.

Current activities and products. Robera is engaged in the processing and export of nine varieties of sun-dried green coffee, washed green coffee, roasted coffee and grounded coffee. The firm has an annual production capacity of processing 6,000 tonnes of green coffee and 12,000 tonnes of washed coffee. Its roasting machinery has an annual production capacity of about 120 tonnes in a single shift.

Organization and management. The firm is led by the owner, who is the general manager and is assisted by the deputy general manager. Department managers and section managers are responsible for their departments and sections: administration & finance, business development & marketing and the promotion & value-added section.

Firm capabilities. Some 35 years of involvement in the sector has enabled the firm to create trust among coffee buyers in the international market. Robera is currently trying to create a link between coffee and tourism based on sales of traditional coffee in its own outlets. The owner's extensive experience in handling to processing coffee has enabled the firm to focus on building up its niche market quality roasted coffee. However, most of its exports are currently of green coffee.

Supply and marketing chain. Coffee is purchased through the ECX. Packaging materials mainly imported from China. The firm has developed its clientele over the years and mostly trades with trade houses based on sales contracts. The firm uses its own vehicles for distribution so far. However, for future, the company is considering outsourcing its logistics function which is considered to be a critical area where the company with good strategies can beat its competitors and improve their performance.

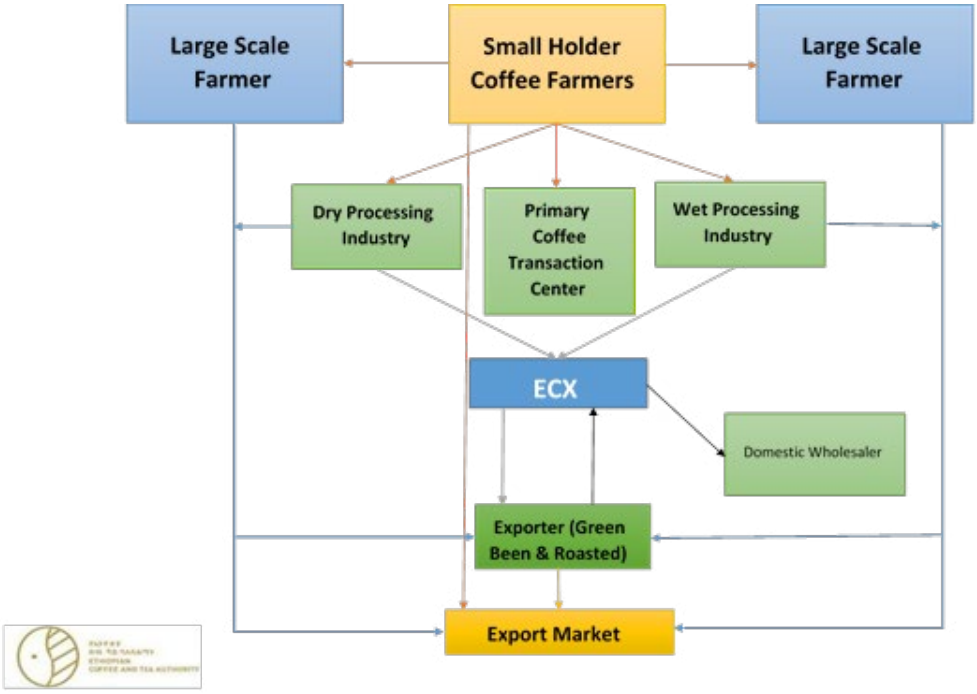
Export. The firm exports all of its products. Its main export markets are Germany (50%), Japan (30%) and the United States (10%).

Development agenda. The firm is discussing ways of extending its roasting and export business as a joint venture with investors in Turkey, Germany and Israel.

Description of the Value Chain

The figure below illustrates the domestic coffee value chain from farm gate to export. Market participants are numerous and include smallholder coffee farmers or state farms, primary collectors (= sebsabies '), suppliers (= akrabies '), processors, service cooperatives, unions, exporters and various government institutions. Many participants are required to have specific licenses for their respective functions. For example, sebsabies have to sell to akrabies and akrabies are required to deliver their coffee to the auction and are not permitted to export it. Finally, exporters are permitted to buy coffee exclusively from the auction. For the purposes of this case study, five main stages of the coffee global value chain are discussed: input supplier, and coffee producers (Pre-Production activities); coffee farming (Production activities); and distribution, marketing, and sales (Post-production).

Figure 15 Schematic Coffee Marketing System Value Chain Structure



Source: Author and ECTDMA (2019)

Input suppliers: Agro-input dealers; agricultural chemicals, seedlings from research centers. Large scale producers directly buy from international suppliers whereas the rest get from local agro-dealers.

Coffee producers: The sector segmented as small-scale coffee farmers and coffee farmers' service cooperatives (90%), medium-sized producers (5%), and large scale commercial private enterprises (5%) produce for local and global market depending on the graded standard of coffee quality inspection body. Picking and drying are often the only operations undertaken by the grower drying are often the only operations undertaken by the grower.

Collectors: Buy coffee from smallholder farmers at their locality and supply to processors and have a crucial role in the coffee assembly and transfer the collected coffee to the processers.

Primary cooperative: Members' collect coffee together as well as purchase others coffee in village town as a group and supply to a cooperative union.

Processors: Both dry and wet processing are carried out at processing station by processors. It includes hulling and pulping of coffee and sorting, grading packing and weighing is carried out herein large scale producers & cooperatives all processing work is accomplished by the producers by their own processing plants.

Cooperative Union: Collect coffee from primary cooperative members in bulk, makes value addition practice such as hulling/processing, clearing, sorting and packaging and export directly to international buyers. In addition, Cooperative Union plays a significant role in the area of market linkages with international traders, collateral for cooperatives, and technical support to other cooperative and representing other cooperative members in the marketing process as well.

Wholesalers: There are private enterprises and individual that has got legal license to participate in a coffee transaction according to the regulation set by the country coffee transaction undertaken at ECX, and they buy processed coffee from collectors and sell the best quality to exporters and the rejected one

for domestic retailer buyers that obtained from large any sources.

Exporters: Involved in the international transaction marketing operations buying the coffee from wholesalers at ECX and export the finished clean and standardized coffee bean.

Retailers: The retailers purchase coffee from the large-scale producers, exporters and cooperative for the international market and the rejected and lower graded coffee supplied to the domestic market.

Consumers: Ultimate users of coffee that can be international or domestic users.

Table 16: Supporters and their functions matrix within the Chain

Supporter sectors	Functions/roles
Agricultural & natural resource offices	Provide selected variety seedlings support for producers; Extension & technical advisory services; Provides production, sustainability, and market info
University & agricultural research institute	Provision of selected high quality, high yield and disease resistant variety seedling to producers; Give scientific & innovative training techniques;
Non-governmental Organizations	Provide training/facilitation and aid on market linkages; Train business development and capacity buildings;
Ethiopian Commodity Exchange (ECX)	Market Place that facilitate bot export and domestic coffee trading by different actors;
Financial Institutions	Provide loans or micro-credit to farmers, cooperatives union, wholesalers
Ethiopian Coffee Exporters Associations (ECEA)	Private support on promoting exports as one of the primary contacts with the world market; Provides coffee trade info, lobby on polices, & supplies technical support to its members.
Logistics/Transporters (Trucks/Vans/motorcycles/donkey carts)	Provides transportation services to bring coffee beans from fields to market; Supply input to farmers.
Coffee Quality Certification & checking agent	Performs quality checks on arrival at the export market and also grants export clearance (grading);
Ethiopian Agriculture Commodities Warehousing Service Enterprise (EACWSE)	Established with the mandate of the two primary functions – warehousing services and quality certification.

Source: Survey (2019)

Services along the Value Chain

A total of 28 services, which are composed of at least 51 services (if classified by UN Central Product Classification, Ver.2) are identified in the value chain and they are categorized according to the various stages within the chain: i) pre-production services, ii) services during production, iii) post-production services, and sales services, and v) back-office services. Of the 51 services, the firm supplies 18 services and utilizes 33 services. One service, tracing coffee services, particularly for classification /tracing the origin at all stages - is both provided and utilized.

Breakdown of Services by Stage

Pre-production of coffee beans: Farm and Planting

The seeds are normally planted in large shaded beds. After sprouting, the young seedlings are left to grow for a few days before moving them to individual pots with carefully formulated soils for optimal growth. The potted seedlings are shaded from the scorching sun and watered frequently until they're vigorous enough to be moved to their permanent growing place. Planting is best done during the rainy season to ensure the soil will remain moist as the roots get firmly established.

Cherry

Coffee plants are perennial evergreens grown at high altitudes in the tropics, blossoming with sweet-scented flowers that give way to bright cherries. The coffee beans are the two seeds inside the fruit. Once matured, the deep red or maroon cherries are usually hand-picked ready for processing. In Ethiopia, coffee is grown by smallholder farmers who are part of a fair-trade co-operative in the western Oromia region. Coffee from Sidama is typically grown near to the farmers' homes under native shade trees, allowing the cherries to slowly develop their sweetness and character.

Harvesting

Depending on the specific variety, it takes approximately 3-4 years for newly planted coffee bushes to bear fruit. The fruit, commonly termed cherries, depending on the degree of ripeness, turn from green to bright or dark red – the unripe ones being green in colour. Cherries ripen faster under lower altitudes and higher temperatures. Coffee can be hand-harvested by people to ensure that only the ripe cherries are picked. Hand-picking is a hard and labour intensive process where people need to carefully check cherries for ripeness and, naturally, it involves paid labour. Cherries mature at different periods and up to three pickings are needed to clear a farm depending on the landscape. Whether by machines or humans, coffee is always harvested by strip picking, and/or selective picking. In most regions there is one major harvest season in a year.

Production

Cherry processing: The drying method

This is the ancient method of processing cherries and is still popular in regions where water is scarce. This method is also known as 'unwashed' or 'natural' processing. The harvested cherries are dried using one of three methods. The natural, flavour-enhancing process used in some parts of the country, involves drying the whole cherries in the sunshine over several weeks. This develops the complex flavour profile and tropical fruit, fragrant nectar and natural sweetness that comes out of the cup. For some regions, the skin and outer flesh is removed from the cherries before they are fermented in water for up to two days; this is known as the (wet) washed method. It breaks down the fruit surrounding the bean and gives the coffee a

bright, lively flavour. And for the honey process, used in Harrar region, cherries are sun-dried with a touch of the sticky fruit remaining on the bean.

Coffee milling process

Before being taken to the market, the dried coffee beans are processed as follows: Hulling: Hulling parchment coffee involves removing the dried husk. Polishing: Coffee polishing is an optional step that is skipped by some millers. It involves getting rid of any sliver skin that may have found its way through hulling. Polished beans are considered to be of a higher quality than unpolished ones.

However, in terms of content, there is little difference. Grading: The beans are then sorted and graded based on size and weight. The polished beans are also checked for colour inconsistencies and other flaws with human hands being used to remove any flawed beans. The process is painstaking and can take several hours. The beans are sized by putting them through a series of screens with holes that only allow a certain size of beans to pass through. The sizing takes place on a scale of one to ten. At the end of the milling process, only the finest beans are packaged for sale to the high-end markets. In Ethiopia, the lower quality beans are not discarded; instead they are taken for processing and sold at local markets. For the reason that higher quality beans are exported where they command higher prices, whereas lower quality cherry are sold locally to price sensitive customers. This practice maximising foreign earnings and local demand while insuring the long-term viability of the sector.

Post-production

Coffee tasting process

The packed coffee is repeatedly tasted to additionally check and define its taste and quality. The process is called capping and it takes place in a special room designed to enhance it. Tasting helps people to tell where the coffee is from. The process shouldn't intimidate you; anyone can take part in it. It involves gurgling coffee to the back of your mouth and identifying which flavour it is. The process is quite similar to a wine tasting event. Some of the terms tasters use are:

• Acidity: Acidity describes the level of acidity of coffee. High acidity coffee is thought to be of a higher quality. Low acidity coffee is usually called soar;

• The body and after taste are other terms used to describe the coffee. The 'body' refers to how the coffee feels in the mouth – for instance, it may feel heavy or extremely light. This quality is, to some extent, constant and does not depend on individual tastes.

Coffee roasting

Unroasted coffee is also known as green coffee and such beans have all the flavours locked in them. Roasting seeks to transform the green coffee into the aromatic brown beans you buy in your favourite stores. Roasting is carried out at temperatures of approximately 550F during which time the green coffee beans are turned continuously to avoid burning. Green beans are first dried until they become yellow and develop roasting smell. Once the beans register an internal temperature of 400F, the step called 'first crack' happens during which the beans double in size and start to turn light brown. After that, as the temperature continues to rise, the colour changes to medium brown and a fragrant oil (caffeol) starts to emerge.

This roasting stage is called pyrolysis and is the heart of roasting. It gives coffee the aroma and flavour that we witness every time we drink this drink. At this stage, coffee is light or medium roasted and roasting process can be stopped or continued to obtain a darker roast.

Coffee grinding

The primary goal of a grind is to produce the most flavour in a cup of coffee. The type of coffee brewer used determines how fine or coarse the coffee should be ground. The type of grinding determines how fast the coffee can release its flavours. This is the reason espresso coffee is so finely ground. On the other hand, coffee prepared with filter coffee makers is coarse-grained (coarsely ground).

Coffee packing

Coffee packaging is very important, as any exposure to air can turn the coffee into a lump. This is especially the case for ground coffee, which can quickly lose its flavour if exposed to air. This is the reason why coffee is usually packed in airtight containers and should be resealed carefully when not in use.

Coffee Fair Trade: marketing and freight transport

Fair trade is a trading initiative based on equity that claims to contribute to development by increasing farmers' profits and empowerment in communities. Often, coffee is collected from the individual farmers, processed and shipped to the auction in Addis Ababa or Dire Dawa, and exported through the port in Djibouti. However, fair trade coffee has received permission from the Ethiopian Coffee and Tea Authority to bypass the auction and be directly exported through Djibouti, with the benefit of avoiding middlemen to get a higher FOB-price. Coffee traders usually prefer the traditional 60 kg jute bags because the bags help to maintain the identity of Ethiopian coffee. In addition, coffee traders also lack both material and financial capacity to export coffee in bulk containers.

Table 17: Logistics cost to export a container under unimodal[13]

Cost List	Cost per 20 feet container (USD)	Percentage of total cost	Cost per 40 feet container (USD)	Percentage of total cost
Land transport cost (Addis to Djibouti)	510	26 %	1020	32 %
Port handling charges at Djibouti	450	23 %	660	21 %
Shipping cost	950	49 %	1400	44 %
Commission and other expenses	40	2 %	80	3 %
Total	$1950	100%	$3100	100%

Source: Survey (2019) and Maritime Affairs Authority-Internal Diagnosis (2018)

- Exporters

After the all the coffee production and processing activities are finished, it exported to the international market by exporters. Exporters found in Addis Ababa central market who received coffee from private producers, private traders and cooperative unions to sell it to the international market. These exporters bought the coffee from the central auction market through ECX. These coffee exporters do not get any coffee from the state producers, because state farm producers export coffee to foreign market by themselves. They play a significant role by searching foreign market through the linkage they have with the importers outside the country. They add a place utility to the commodity coffee. Here, the unions, the private

13. The above analysis has been carried out based on the current type and amount of export cargo.

traders and the state owned producers could also act as exporters of coffee, since they can directly sell it to the foreign importers (interview, 2019).

- Importers

Imports are those actors outside the country who buy coffee from different exporters in the country Ethiopia. The Ethiopian coffee importing countries are notably German coffee importer, Japan, the Netherlands, and America. These foreign importers after adding some value to the coffee they received, they directly sell to wholesalers and then to supermarket.

- Domestic wholesalers and retailers

The other important actors in coffee value chain in Ethiopia are wholesalers who directly buy coffee from the household farmer's or small-scale farmers. The small-scale farmers, who harvest, dry and hull the coffee and transport to market across Ethiopia. By doing so, it the small-scale farmers play a significant role in adding a value to coffee. Here the function of hulling will go to retailers in that they add more value to the coffee and finally sell to consumers after hulling it (survey, 2019).

In conclusion, apart from the main coffee-production related value chain, the service provider in coffee value chain actors in the country are the Ethiopian Commodity Exchange (ECX) main and its branches, input supplying government organizations, Woreda level administration bodies, development agents, freight transporters, credit and other financial service providers (Commercial Bank of Ethiopia, Saving and Credit Association and other Non-Governmental Organizations).

Back office Services and workers

In addition to coffee production-specific processes, the case study firms also require services inputs to keep the business operating properly, and to ensure compliance with relevant reporting requirements and financial obligations. Again, it uses a mix of in-house provision wherever possible, and third party provision when the cost and efficiency benefits are significant.

An example of the ways in which these two strategies work together is in relation to finance and accounting. Day to day accounting reporting are produced in-house. However, year-end auditing, including tax compliance, is outsourced to external auditor. Similarly, a mix of in-house and third party provision is used for freight transportation of cherries for most firms.

Outsourcing, Bundling and Other aspects of Services Supply

There are several reasons why the firms choose to outsource their services. In general they can be grouped into the following categories: i) the services lie outside the firms' core operations, such as advertising and utilities supply; ii) as the firms continuous to expand internationally, it outsources some of the marketing services for its overseas counterpart, such as sales representatives; iii) some of the government mandated testing was outsourced; iv) most firms lacks expertise in providing specialised professional services such as market research and coffee tester; v) to gain economies of scale in area such as freight transportation.

Besides its core services in areas such as traceability and sustainability of coffee marketing/ quality assurance, maintenance and repair services, the firms also supply a considerable amount of supporting services in-house such as packaging, retail trade and human resources. This is partly due to economies of scale given the firms sizeable presence in Addis Ababa.

Policies Affecting the Value Chain

The following section identifies policies that affect the coffee firms' value chain. Although Ethiopia boasts Africa's largest coffee industry and is the source of some of the world's finest coffee, the country's smallholder farmers often can't access financing to grow their businesses and increase production. Banks are often unwilling to lend to coffee farmers because they lack collateral; the complexity of the loan appraising process and weather-related risks also limits the appetite of local banks to lend. In addition, as Ethiopian coffee continues to dominate

world markets, the government is now putting in place a new reformed policy to create more opportunities for farmers, suppliers and exporters in the industry, so they can benefit from direct market chain.

The new policy intends to improve quality control and marketing elements of the value chain system. For instance, when interviewed which challenges are keeping Ethiopia from being the top coffee producer in the world, head of the ECTA mentioned that what he called "bottlenecks" to the country's coffee producing potential. One, he noted, is the extended value chain system which does not add any significant value neither to the market nor the product. The farmer receives no more than 50 to 60 percent of the true price. Another reason, he mentioned, is the fact that since most coffee trees are old, production quality and quantity per unit of land is lower, compared to other coffee producing countries. In the previous policy, the farmers were allowed only to sell coffee to the primary buyers. Not to the exporters, not to the suppliers, they did not get the chance to directly export. But in this new policy, if they have the capacity, the farmers themselves can now be directly involved in exporting the coffee they produced. Or they can opt to sell to exporters, or to local industries that roast and pack coffee. Hence, the new policy offers Ethiopian coffee farmers a number of options.

In addition, for coffee producers to get a good price for their wild coffee, their beans need to be branded and licensed to certify they meet quality standards. However, local subsistence farmers have struggled to reach the standards required because they lack training in effective coffee production practices, business and marketing skills. As a result, they have no option but to sell their coffee locally for a much lower price than they would fetch if their processes were upgraded. A high-quality grade means that coffee can be exported to countries like the UK and USA, whereas lower grades are only traded locally.

Table 18: SWOT analysis coffee value chain in Ethiopia

Internal Analysis of Coffee value chain in Ethiopia	
Strengths	**Weaknesses**
Existence of Ethiopian Commodity Exchange Authority for modern marketing information;	Less value addition to maintaining the quality of the product by processing.
The existence of Ethiopian coffee export association for the support of the subsector in marketing, production etc.	Reduced production, quality and processing infrastructures and facilities across the chain;
Liquored test practice and experienced staffs'	Inconsistency of the quality of the production in coffee value chain sector;
Good experience in natural/forest coffee production;	Limited large scale farming practices;
Large number of smallholder of coffee producers;	Underdeveloped market, market information and forecast;
Attention of Government due to export and foreign exchange purpose;	Inadequate improved seedlings of coffee to overcome drought, disease and pest constraints;
Well, experienced producer farmers, Strong social communication skills at producer levels;	Limited organized producer's groups, Inadequate supporting institutions for cooperative work;
Beneficial for environmental biodiversity conservation /sustainability;	Lack of active quality controlling strategy;
Cheap Labour and soil/environment;	Delay in unloading coffee at Ethiopian Commodity Exchange (inefficient freight transport system); Lack of affordable Credit.

External Analysis of Coffee value chain in Ethiopia	
Opportunities	**Threats**
Having Suitable agroecology and soil conditions of coffee production area, High demand for natural Ethiopian coffee in importing countries; Existence of coffee genetic diversities to resist different risks (Drought, disease, pest etc.); Unexploited land and water resources with potential to produce more coffee; Use of by-products as husks and mulching trees.	Climate problem, deforestation, and land Erosion; Unpredictable weather; Fluctuation of international quality standards requirement; Pests and diseases outbreak; Fluctuating world coffee prices; Increased supply from large-volume/new emerging countries; Substitution coffee with other crops; Technological innovations in other countries could drastically affect local growing conditions or relative advantage over production costs.

Source: Survey (2019)

National policy variables in context – issues and trends

Quality: Ethiopia is the only producing country with more than 10,000 accessions of potential high-quality coffee Arabica (still 10% is wild forest coffee). Its high-quality potential is recognized by international buyers, who describe the cup profile as "complex" and "unique." World specialty and differentiated markets grow at more than 20% a year, but only 27% of total Ethiopian production reach specialty grade G1 to G3, but not necessarily premium prices. In fact, they are sold at less per kg compared to Kenyan, Colombian or Guatemalan equivalents grades. Ethiopia's specialty coffees Harar, Sidamo, and Yirgacheffee are sold from US$ 5-9 per kg FoB whereas the retail market price of these coffees reaches about above US$ 50 per kg on the international markets.

In real life the international coffee trade is conducted by a variety of private agents and futures contracts: dealers, brokers, specialized traders/exporters, and importers, large importing roasters and retailers of consuming countries.

Box 1: Coffee Grading

Grade 1: Specialty Grade Coffee Beans: no primary defects, 0-3 full defects, sorted with a maximum of 5% above and 5% below specified screen size or range of screen size, and exhibiting a distinct attribute in one or more of the following areas: taste, acidity, body, or aroma. Also must be free of cup faults and taints. Zero Quakers allowed. Moisture content between 9-13%.

Grade 2: Premium Grade Coffee Beans: Same as Grade 1 except maximum of 3 Quakers. 0-8 full defects.

Grade 3: Exchange Grade Coffee Beans: 50% above screen 15 and less than 5% below screen 15. Max of 5 Quakers. Must be free from faults. 9-23 full defects.

Grade 4: Standard Grade Coffee Beans: 24-86 full defects.

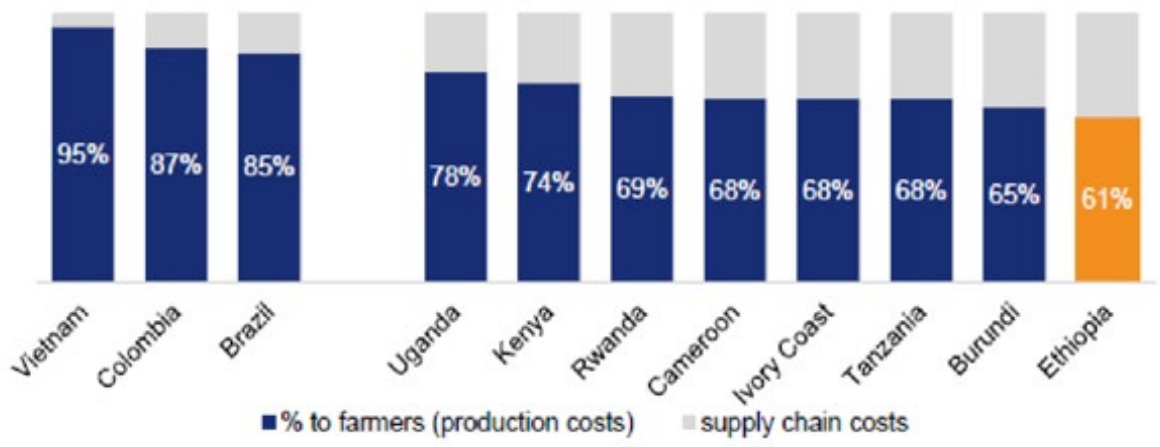
Grade 5: Off Grade Coffee Beans: More than 86 full defects.

Source: Ethiopian Coffee and Tea Authority and Ethiopian Coffee Growers Association (2016)

Production costs: Ethiopia's other comparative advantage is that its farm production costs are low: US$ 1.9/ha as compared to e.g. US$ 31 in Brazil and Vietnam respectively – though with much lower yields in Ethiopia. However, climate change, environmental degradation and technological innovations in other countries could drastically affect Ethiopia's growing conditions or relative advantage over production costs.

Price: Despite its outstanding potential for qualities based on the high diversity of varieties, climates and soils, Ethiopia's average export price is low, especially compared to other African exporters. While the average export price for a kilogram of Ethiopian coffee in 2017 was US$ 1.3211, whereas a kilogram of Kenya coffee received US$ 1.92. Ethiopian farmers receive just 61% of average export price, while Brazilian or Vietnamese achieve between 85% and 95% of FoB, see figure below. This contributes to low farmer incomes and discourages farmers from improving their productivity and post-harvest practices. It is a paradox that Ethiopian coffee that is renowned internationally for its distinct flavour profiles is joining countries which derive the least benefit from coffee.

Figure 16: Percentage of Export Price that Farmers Receive



Source: Global Coffee Platform, 2017)

Marketing system: The government of Ethiopia took control of the coffee marketing system to try and keep exporters from hoarding exportable coffee and to give the growers direct access to international markets. The government has banned certain exporters from the coffee market because of hoarding coffee. The Ethiopian Coffee and Tea Development and Marketing Authority revoked their licenses, closed their warehouses, seized their coffee stocks, and sold them on their behalf. A policy was put in place to limit the amount of coffee an exporter can store. An exporter, for example, selling and buying coffee on the ECX will have his or her right to trade revoked if found to be storing more than 500 metric tons of coffee without a signed contract.

Certification: Only 5%-8% of total coffee area gets some sort of certification (mainly organic and fair trade). In countries like Peru around 20% of exports are already certified organic (not counting other certification schemes). However, the market dictates how much of Ethiopian's production should be organic or certified under a different regime, such as Fair Trade, Rainforest Alliance or UTZ. Therefore, the first specific objective of these programme, "increased volumes of high quality traceable organic coffee", must be relativized regarding international demand, which is unpredictable. There will not be enough demand to justify 100% organic production, except it is a political goal of the country. Second, payments for certified coffee must outweigh the costs of certification, and this is not always the case, depending again on market trends.

Trade: smallholders are selling green coffee beans either to around 2,000 traders, or to some cooperatives or unions. These are exporting themselves or via one of the 400 exporters in the country. Coffee trading within the Ethiopian Commodity Exchange (ECX) is mandatory since 2008. In 2016, ECTA was re-

established, followed by 2017 coffee reforms which made changes to how coffee was sold via ECX, and expanded the direct-export, out growers, and vertical integration channels. For example, now any farmer with >2 ha of land can obtain an export license and export directly. Specialty buyers admit to already seeing an increase of new exporters linked directly to farms and receiving samples from these new export farmers. The reforms also allow for direct traceability, a requirement of many specialty buyers, which will enable to separate forest coffee, identify new origins, and develop forest coffee as specialty grade.

Institutional set-up: To address the institutional drawbacks the government has established in 2015 the Ethiopian Coffee and Tea Development and Marketing Authority (ECTDMA). The Authority is mandated to lead the entire coffee value chain and is considered to represent a significant development over the earlier fragmented institutional set-up in the coffee sector. It bundles all coffee related development aspects with strong tights to research and decentralized structures, see above value chain.

Transport Policy: The government policy can inadvertently inflate transport costs. Most developing countries enact rules that detract from using existing transport resources efficiently. These rules drive up transport-related transaction costs and often preserve monopolies in service markets.

Transport /logistics services performance assessment and findings:

- Excessive and cumbersome Transit and Customs Procedures

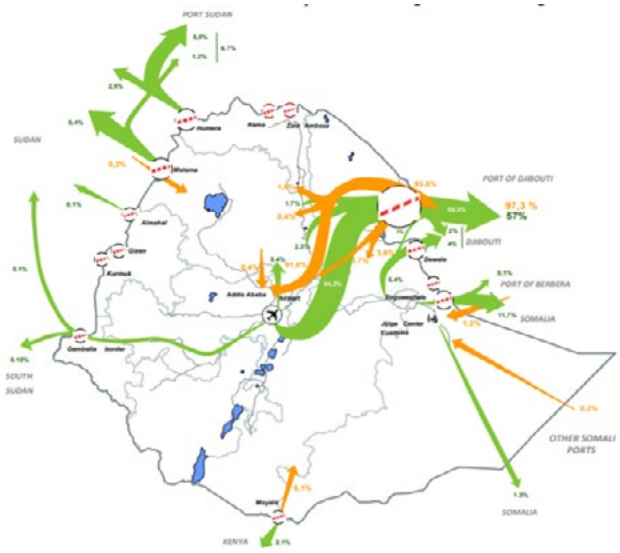
High costs of transit/transport-related transactions, such as frequent reloading of goods, customs clearance, fulfilment of documentation requirements, and others—add to the overall logistical costs of international shipments. Uncertainty about the enforceability of legal documents (such as bills of lading or letters of credit) increases the risks faced by coffee exporters as well as transport operators. For instance, from the study on Djibouti port reports the average costs per container related to administration and customs clearance at $1,727, which could be reduced to $320 according to international best-practice estimates. In many cases, transport-related transaction costs do not even show up in the final freight bill, but take up a firm's resources that could be used more productively.

Regarding to port dwell time, the cargo dwell time is 10 times higher than the average global standards (= 3 days). This figure is a major commercial instrument used to attract cargo and thus generate revenues. Therefore, the incentives for Djiboutian port authorities and container terminal operators are increasingly strong to lower number of days that a tonne of cargo remains on port to attract more freight. Djibouti's port subsector is of strategic importance beyond its borders, in particular as a gateway for Ethiopian cargo, which accounts for around 90 percent of Djibouti's throughput. However, the port's full potential has not been achieved due to inadequate capacity of the port's container terminal facilities. The main challenges to be addressed by Djibouti port authority are: (i) low availability of rail wagons and locomotives, (ii) delays in cargo deliveries, (iii) congestion in the port terminal, and (iv) high costs to exporters. In particular, when cargo dwell time is broken into operational, transactional, and storage dwell time factors, they differ in their impact on dwell time and cargo delays. For instance, one peculiarity in Djibouti port is the frequent occurrence of very long dwell times because of truck congestions, which adversely affect the efficiency of port operations and increase congestion in container terminals at a high cost to the coffee exporters. Cargo dwell times is also show an abnormal dispersion, with evidence that discretionary behaviors increase system inefficiencies and raise total logistics costs, see the below responsibility of coffee exporters.

Source: Survey

Capacity and productivity constraints in Djibouti port also add to transport cost, by increasing both the port charges and the time in port (which could be considered as a deadweight loss). Long container dwell times increase the congestion factor and generate additional idle time in the physical handling of operations. At the same time, high occupancy rates hamper re/handling productivity because they lead to higher storage density and stacking heights and thus longer delays in coffee shipment. The findings from firm surveys and field visit indicate that most measures, starting with building more storage capacity, often might not have the expected positive impact on dwell time in the long-term. A public awareness campaign is needed to disseminate findings on the main causes of long dwell times, at least for relevant authorities. In most cases, the perceived causes, such as lack of terminal capacity, do not hold, and structural issues need to be addressed. Even if investments were made, without structural changes, dwell time would probably remain the same. The private sector (terminal operator, customs broker, owner of container depots, and even shippers) does not seem to have an interest in reducing dwell time. In most instances, the interests of controlling agencies, port authorities, private terminal operators, and logistics operators (freight forwarders), collude at the expense of exporters. In fact, there are strong incentives to use the port as a storage area.

Figure 17: Ethiopian Exports and Imports and the Dominance of the Ethio-Djibouti Corridor



Source: MoT, CSA, WBG 2017
Note: The size of the arrow reflects the share of Ethiopia's trade along each of the designated corridors.

On a related matter, weeks-long cargo dwell times in the port have become a serious obstacle to the successful integration of both economies into regional and global trade networks (GVCs), because it makes lean, demand-driven manufacturing and commodity trading activities virtually impossible. Improvements in port management, often implying reform leading to the introduction of public–private partnerships (PPPs), may be needed to provide the necessary funding to carry out major rehabilitation and expansion in operational dwell time (refers to performance of physical operations), transactional dwell time (refers to performance of clearance formalities), and storage dwell time, (which refers to the voluntary storage of coffee cargo in the container yard as part of a wider inventory management strategy).

Monopolistic Practice in the Freight and Logistics Services

There are several services provided by monopoly and exclusive service providers in the freight and logistics service sector. This include container terminal management, bulk cargo operation terminal at the port of Djibouti, and dry port services on Ethiopian side. These services are not open the private sector and also lack efficient procedures for delivery of quality service. These have caused for inefficient operations and a higher increase in service charges. Thus, lacks of proper controlling on the logistics services areas and absence of a competitive environment in the service sector. Moreover, multiple changes of transport modes during the transport journey create costs in the form of frequent reloading of goods, coordination problems that result in shipment delays, and the need to contract several transport operators instead of a single door-to-door service provider, often exacerbated by legal provisions preventing foreign multimodal operators from undertaking door-to-door contracts (Interview, 2019).

Containerization has substantially reduced the reloading costs of multimodal journeys, as goods are packed once at the factory's door and unpacked at the importer's site. Indeed, containerization has fostered the integration of transport service providers toward multimodal operations, which internalizes transaction costs resulting from modal switches. Even though containerization of general cargo has taken hold in Djibouti Ports, containers are less frequently used for inland transport (especially in some coffee export regions of Ethiopia), obviating one of the main cost-saving characteristics of container shipping. The main reasons for this are long inland turnaround times for containers, and inadequate/poor road infrastructure unsuited to container loads. Limitations on the cross-border provision of trucking services create bottlenecks at the border, because coffee has to be reloaded onto different carriers.

Although official customs fees are typically only a small portion of overall transportation costs, inefficiency in customs procedures can result in congestion and long queues at the Ethio-Djibouti border. For example, at the key border crossing-point, as many as 1,500 trucks queue up on both sides of the border, and waiting times vary between one and five days. Inefficiencies often are the result of understaffing, burdensome documentation requirements, poorly defined procedures, and the need to obtain approval from many officials (field visit, 2019).

- Freight/Logistics Infrastructure deficit and Management Problem

An effective and efficient freight and logistics services system requires development of adequate infrastructure. In this regard, the field trip gave an opportunity showing several gaps and shortcomings related to:

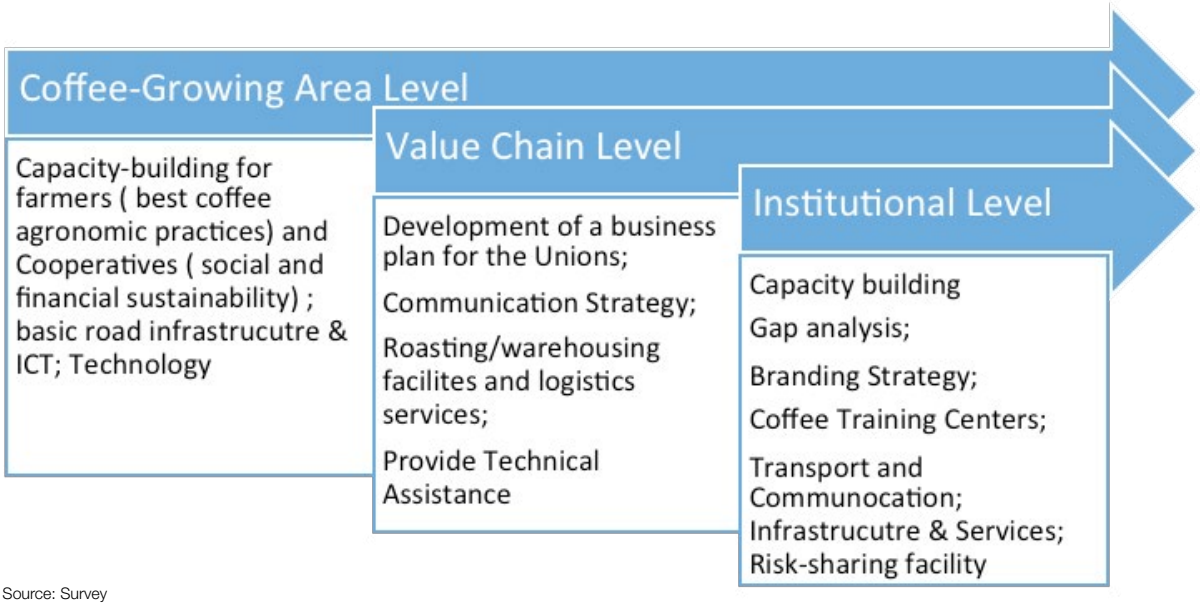
- Transport supply and management problem;
- Poor road condition and old fleets;
- Port facilities, stuffing materials, port handling equipment;
- The use of modern information technology and related digital infrastructure.

- Regulators gaps on Institutionalization and Capacity

Freight and logistics service providers and various government agencies engaged in regulation and controlling have institutional organization and capacity shortcomings in leading the sector with relevant knowledge and skills. The result from the interview showed that there is also no legal basis for horizontal coordination among freight and logistics institutions. The problem is compounded by the shortage of qualified professionals in the sector. There is much that both governments can do to reduce transport-related transaction costs, usually under the umbrella of so-called trade facilitation initiatives. Such programs can result in significant reductions in direct and indirect trading/shipping costs in relatively short time periods. They are most effective if implemented in partnership with the private sector. Another role for government is to create an appropriate legal and regulatory framework for multimodal transport, which often represents one of the most pressing constraints to the provision of efficient door-to-door services. Cooperation on standard-setting and the conclusion of mutual-recognition agreements with neighbouring countries can facilitate the cross-border movement of coffee beans by trucks.

Private entry and competitive market structures have proved to be feasible for virtually all transport services and, to a large extent, have led to efficiency gains and lower prices for consumers. Moreover, the principle of comparative advantage fully applies to the provision of transport services, as it does to other traded commodities. By opening up domestic markets to foreign competition, coffee exporters can choose among a broader spectrum of freight services and opt for service operators with superior technologies or lower operating costs.

Conclusion: Three Levels of Intervention



Source: Survey

Industry Overview: Floriculture Sector Profile

Floriculture industry is a new agro-industry activity in Ethiopia. The industry represents an extraordinarily fast and successful diversification into a non-traditional export product. The Ethiopian flower industry emerged in the late 1990s, and despite being a late comer, the country has become the second largest flower exporter in Africa (after Kenya). Climate conditions have made Ethiopia a favourable cultivation site for such products as it is situated in the tropics, with its diverse range of altitudes.

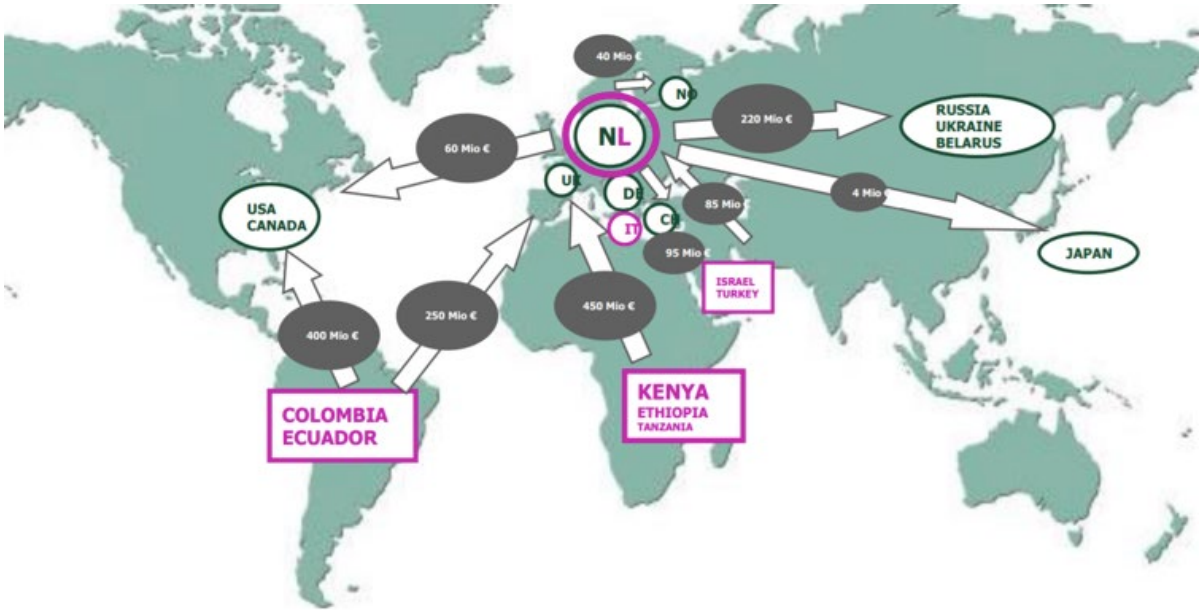
Ethiopia has managed to greatly transform its horticulture sector with a span of 15 years. Moreover, about 12,797 hectares of suitable land is available for horticulture, with only 11 percent of this surface is already used for horticulture. Finally, a large

workforce is available. The sector has already created about 183,000 jobs, out of which 70 percent are for women. The global market demand for Ethiopian

horticulture products is growing from time to time and Ethiopian products have been exported to Europe, North America, Middle East and Far East countries (EHAI, 2018). The flower types produced in Ethiopia comprise roses, field flowers and flower cuttings. Roses are the major flower type, and a reproduced by more than 80% of the firms, accounting for 60% of the total cultivated land. Field flowers account for 26% of the cultivated land, while cuttings are the smallest category.

There are about a hundred flower producers and exporters cultivating a total of about 1850ha of land, mostly located within a radius of 200km from Addis Ababa International Airport, the only cargo outlet to export markets. Most of the firms are either fully foreign owned or are joint ventures with foreigners. The industry now employs more than 50,000 people, on a permanent or temporary basis. The main market for Ethiopian flowers is the Netherlands, but also re-exported to Germany, UK and France. The Dutch flower auction of Royal Flora Holland is the central marketplace where imported cut flowers are sold and redistributed to other destinations. Today, more than half of the world's cut flowers are bought and sold at this auction, which has been the hub of the global flower trade since the early 20th century. Two main market segments for cut flowers in Europe are specialized flower shops and unspecialized retail (e.g., supermarkets). New developments in ICT are changing the way of doing business in the flower industry. Distance buying, pre-auction sales, and online shops are becoming more prominent. In recent years, an increasing number of growers from developing countries export directly to other regions market, bypassing the auction clock. Export earnings from the sector reached $550 million in FY2017/18.

Figure 18: World Cut-Flowers Trade Flows



Source: International Flower Trade Association[14]

14. https://unionfleurs.org/

Profiles of large and mid-size firms. All large and mid-size firms in the floriculture industry are engaged in the production of flowers for export. Local demand for flowers is very small.

Small-scale, informal and peripheral activities. Peripheral activities include the production and local sales of ornamental plants and flowers. The business is dominated by small-scale and informal businesses, located mostly in the capital and nearby towns.

Background Information

Primary data was collected through semi structured interviews with flower farmers using a structured survey questionnaire which was filled up by the interviewers. The questionnaire was tested before final survey was made with 5 growers for appropriate amendments to improve it. A stratified random survey method was used to collect data from 12 farmers from the Oromia regional states and 21 traders from different areas of the SNNPA. Thus, the total sample size was 33 which include flower farmers, retailers, wholesalers and retailer cum wholesalers. The present study covered six-month period from July 2019 to December 2019. Data were collected during the period from August 2019 to October 2019 through direct interviews with the interviewers at their work site or homestead (farm).

In addition to primary data secondary data were also collected from various sources. Some information was collected from the relevant government line-ministries. Besides, various books, journals, newspaper, documents of Bureau of Statistics (CSA), National Planning Commission, Department of Agricultural Economics of Addis Ababa University and related websites were consulted for appropriate secondary data.

Profiles of Major Firms

AQ Roses

Basic details. AQ Roses PLC was established in January 2006 in the Zeway region, 160 km from the capital. AQ Roses is a family-owned company formed by Vim Ammerlaan and his two sons, all Dutch nationals. The firm is actively managed by the two sons

AQ Roses is engaged in the production and export of various varieties of roses. It has about 1,100 permanent employees. AQ Roses is highly profitable, making a return on its assets of 20%. It has an average annual turnover of $10–12 million with an average total asset value of $10million and a net profit margin of 15–20%.

Background. Vim Ammerlaan has been in the rose production and trading business for more than 30 years in the Netherlands. The family owns a flower farm in the Netherlands, and decided to expand their capacity by building an additional flower farm, AQ Roses, on 40 ha of land in Ethiopia, taking advantage of the opportunities and incentives put in place by the government. According to Ethiopian Investment Code 2001, flower growers are offered a five-year tax holiday, duty free imports, access to bank loans and farm lands as well as a 100 percent exemption from payment of export customs duties .

Current activities and products. AQ Roses is solely engaged in production and export of 12 varieties of roses with a production capacity of 1.6million stems per week or 80–90million stems per annum.

Organization and management. The firm has a simple organizational structure where at least one of the three shareholders is always available on the farm, making all the necessary decisions instantly. There is no formal and bureaucratic decision-making structure. Most production and logistics decisions are taken by local farm managers and one of the shareholders. All sales and marketing decisions are taken by Vim Ammerlaan, who has an in-depth knowledge of the Dutch market.

Firm capabilities. AQ Roses has managed to maintain a high degree of product quality and charges a premium price by focusing on roses as a business. This strategy has allowed the firm to operate profitably in the industry even though price has recently been declining due to oversupply. The extensive experience of the owners in the flower industry has enabled the firm to easily find export markets. There is a strong management mix between the shareholders who

have international experience and the local managers who have an in-depth knowledge of the domestic production environment.

Supply and marketing chain. The major inputs of the company are fertilizers, chemicals and packaging boxes, which are fully imported from abroad. However, fertilizer and chemical costs depended on the quality of land (new land or old land), the current price of cut flowers, and the anticipated quality of the harvest. The firm makes use of its well-established relationships with suppliers to purchase the major production inputs and mostly procures these inputs on accredit basis (which is not permitted for domestic companies). AQ Roses has its own sales and distribution company in the Netherlands. It sells its products on a retail basis using its network, allowing the firm to obtain the best possible price for its export. The firm also uses the auction market.

Export. The firm exports all of its production to the Netherlands, where its affiliated distribution company is located.

Development agenda. AQ Roses plans to make additional investments to improve its post-harvest technology and produce better products with a view to be coming more competitive within the global floriculture industry. Furthermore, the two sons are planning to invest/expansion in different areas in Ethiopia and are evaluating various business opportunities.

Red Fox PLC

Basic details. Red Fox Ethiopia was established in 2003 by Günther Dümmen, a German entrepreneur who has long experience in the flower business, and his son, Tobias Dümmen. The family also owns production sites in Costa Rica and El Salvador. The firm is engaged in the breeding and export of unrooted young plants. It has 1,300 employees, 450 of whom are seasonal workers employed on a contract basis for three to four months at a time. The firm was initially established with a capital of $2.79million.

History. The Dümmen family joined the young-plant business in 1963. The decision to invest in Ethiopia came about after considering the cheaper labour costs, the incentive packages offered by the government, the lower crime rates compared with other flower-growing African countries and the good climate. Red Fox Ethiopia started operation on eight hectares of land in Koka, a town 95 km from the capital. The firm was initially engaged in exporting ornamental products and unrooted cuttings in its early years of operation. The factory's acreage has increased in a series of steps to reach to 35 ha in 2009.

Current activities and products. Red Fox Ethiopia produces unrooted cuttings for export. It exports more than 150 varieties of unrooted young plants.

Organization and management. Günther Dümmen serves as the chairman of the group and his son as a CEO overseeing the operation of the family's investments in Costa Rica, El Salvador and Ethiopia. There are four professionals from abroad with long-established, international experience in the industry who manage the production department. The information systems department is also managed by a foreigner. The owners plan to slowly and smoothly replace them with local professionals

Firm capabilities. The owners' experience in the international market is the firm's greatest asset. This has helped the firm to have a competitive advantage both in input procurement and marketing. In addition, the firm holds intellectual rights on breeds of various varieties. Red Fox controls the end-to-end and supply chain by having its own importing company, and transportation services and distribution networks in the international market. The presence of a well-established customer network enables the firm to book orders in advance and to produce accordingly, resulting in minimal wastage and price fluctuation risk. An international production quality expert from head office visits the firm at least once a month to oversee production flow and ensure that quality is maintained.

Supply and marketing chain. Chemicals and fertilizers are fully imported from abroad, while packaging

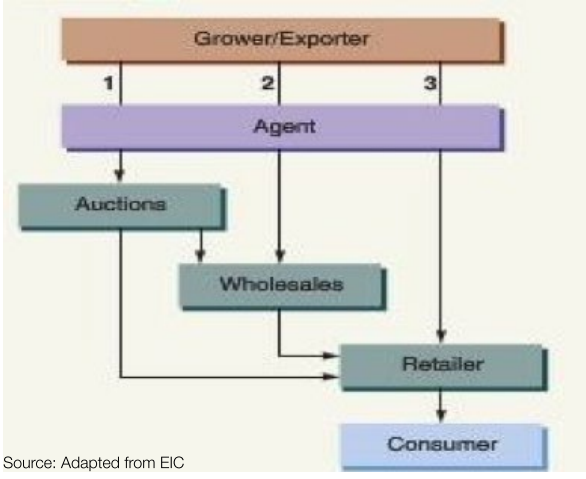
materials and plastic bags are procured from local manufacturers. The major portion of the firm's output is sold to customers who book in advance. It has sales offices in the United States, France, Italy and Germany. It sells through wholesale, direct retail and auctions. To transport its products to the airport cargo terminal, the firm uses its own delivery trucks. For air shipment, Red Fox uses Lufthansa Airways.

Export. All of the firm's products are destined to the export market, mainly to the United States, France, Italy and Germany. In 2009, it has exported 127million cuttings, generating export revenue of $10million.

Development agenda. Red Fox plans to strengthen its market leadership and consolidate its special expertise in producing unrooted young plants. The firm is in the process of acquiring additional land so as to increase its total acreage to 65 ha. In addition, it plans to diversify by engaging in the production of fruit, in partnership with another firm that has adequate knowledge and experience of the sector.

Description of the Value Chain

The value chain under study here is depicted in a simple, stylized form in figure below. The Ethiopian floriculture value chain, from farm (grower/exporter) to market (consumer), can be divided into farming (pre-harvest), harvest, post-harvest, transport and marketing. Pre-harvesting includes activities like selecting the appropriate variety, planting, irrigation and applying the necessary inputs to grow at required quality and to control diseases.



Source: Adapted from EIC

Pre-harvest:

The quality of cut rose flowers at the postharvest stage is affected by pre-harvest conditions. Moreover, the vase life of cut-flowers is not only determined by differences between cultivated varieties, but also by growing conditions. For example, the vase life of roses that are grown hydroponically during Ethiopian rainy season often ends at an early stage of maturation due to petal wilting (neck bending). Therefore, planting the right variety is vital for success in the industry, in this regard, breeders are key actors in the cut flower value chain. In fact, they are those who have exclusive right on cultivars; hence, breeders sell propagation or license certain domestic growers on material of the protected variety (PVP).

Harvest

Systems for harvesting cut flowers vary according to individual crops/varieties, growers, production areas, and marketing systems. It is important to know the optimum stage of harvesting for each species to ensure the quality of cut-flowers after harvest. Consequently, every species has a minimum maturity stage to which cut flowers could be picked during at the bud stage without losing the quality and vase life. For some other varieties, disorders such as bent neck, improper pigmentation, or abnormal opening of the buds could result when cut flowers are harvested too immature. Often, if the cut-flowers are to be shipped longer distances, then they are harvested at an earlier stage.

In practice cut flowers should have harvested in the morning (after precipitation has dried) or in the evening, not during the heat of the day. Often ideally, it will be harvested in the morning when temperatures are lowest and the cut-flower water content is high. Immediately, they are graded and bunched after harvest and before placing them in buckets of clean warm water (Proflora bulletin, 2009).

Post-harvest

Appropriate post-harvest practices is an important subject to maintain the life of cut flowers for the promotion of the sub-sector in Ethiopia. Floriculture

industry analysts stress the importance of quality and reliability in the increasingly competitive global market for cut flowers. The most important aspect of quality is freshness and vase life, and these aspects depend on optimum post-harvest handling. Indeed, the horticultural product marketability is strongly affected by quality loss during the post-harvest chain. For instance, after harvest, growers/exporters undertake post-harvest activities namely, sorting, cutting to appropriate the stem length, bunching and packing. Almost all growers have their own cooled chain processing (equipment, warehouse and trucks). Hence, these are indispensable chain activities to regulate the prolonged life supply of cut flowers, which costs less than two percent of total production costs (EHPEA, 2017, and GDS, 2006).

Because of their global production system nature and marketplace, and the high perishability of cut flowers, air transport has been the transport system of choice. For instance, the export cut flowers from the farms are inspected at the entry of Addis Ababa airport by customs authority and agriculture officers. The major cargo transport service provider in this regard is the national flag carrier, Ethiopian Airlines, whom transported 87 percent of the cut flowers market share to EU. While other airline carriers like Lufthansa, and Emirates transport the remaining amount. Perhaps the weakest link in the flower postharvest chain is at the airport.

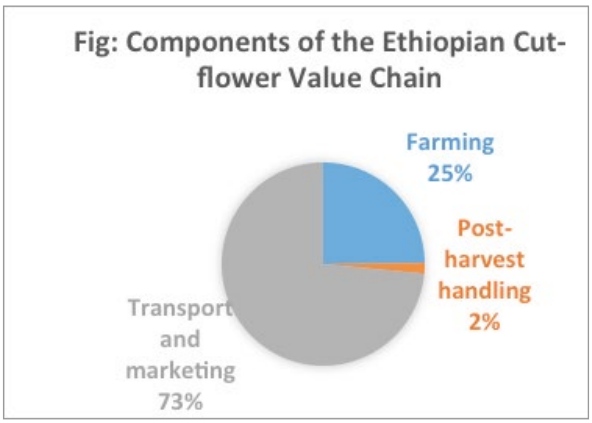
Transport and Marketing

Maintaining quality in export cut flowers depends on an understanding the factors that lead to deterioration. Understanding these factors allows the grower and exporters/agent to develop and implement optimum post-harvest handling technologies, transportation modes, and marketing techniques. For instances, because of the dramatic effects of transport temperatures on subsequent vase life and the propensity for overheating of packed flowers, they should be transported at close to the optimal temperature (0°C for most species or varieties). Ethiopian airlines have cooling systems already exist for aircraft transportation of flowers under controlled temperatures.

At present floriculture marketing agents in Ethiopia includes growers/producers, exporters and facilitative organizations such as transporters (logistics operators), EHDA, EHPEA, relevant government agencies, financial institutions and insurance companies.

The largest running cost component for the cut flower industry is airfreight charge. To accommodate the increasing flower export, Ethiopian Airlines Group leased cargo planes for exporting cut-flowers and since 2008 ET relocated its cargo activities from Amsterdam to Belgium (Liege). This necessitate the local growers/exporters to arrange their own logistic services to transport their cut flowers from Belgium to the Netherlands (Flower Auction Aalsmeer) through contracted agent. In the subsequent value chain stage, the agent will unpack and refresh the flowers (within 3 days), and then make them presentable for a global floral marketplace. As stated above, more than 70 percent of Ethiopian cut flowers are sold at Dutch Flower Auction through Royal Flora Holland or VBA, both of which have their own sales representatives in Addis Ababa. It offers global growers, wholesalers and exporters a central marketplace in which to trade flowers. It gives them access to a range of marketing channels, and financial information, storage and logistic facilities.

Within the floriculture value chain, local growers are the initial suppliers. Demand comes from exporters/agents, importers, wholesalers, cash & carry stores, and retailers. Within this chain, auctions play a mediation role, by bringing together suppliers and buyers, and so determine the prices in transparent manner. Occasionally, these are global price in which many parties throughout the world use them as price setters index (Kennedy, 2008). Moreover, the auction run large amounts of transactions swiftly with the 'Clock System', and project display detail information on the type of cut flowers, company profile, its origin, and its quality standards. Another role is to increase efficiency by breaking large consignments from growers into smaller amounts for cut flower buyers.



In practice, as regards market knowledge, the actual supply and the quality level, the auctioneer announces the highest price to start the auction; then the clock keeps dropping until any buyer stops it to buy at a certain price level (Wijnands, 2005, Melese and Helmsing (2010) et al.). In this regard, auctioning serve as a classic case of arm's-length trading. In actual fact, Ethiopian supplier and the auction buyer do not meet physically, and have hardly any further trade relationship, as was confirmed during interview. Other than presenting the flowers in the auction, the intermediary agents also play an important role as a source of market information for Ethiopian producers, and create opportunities to upgrade flower quality by giving remarks on the shipment. With respect to local growers, flowers variety, quality and the consistency of the supplier are the major factors required for success in the industry. For this, domestic growers rely often on expatriate (floriculture expert's consultancy). Additionally, they get feedback from their agents (traders) to improve product quality.

Services along the Value Chain

As has been emphasized in the coffee mapping study, services fulfil a range of functions along value chains. A total of 21 services can be identified in this value chain; 15 of which are more directly related to the flower production/harvest phase while 6 relate to the agriculture phase; an additional 4 services are transversal operations which support all stages of the value chain. These can be categorized according to the various stages within the chain (see Figure above): i) Floriculture preparation, ii) services before flower production, iii) services during flower production, iv) transport, distribution and marketing services, and v) back-office services.

Breakdown of Services by Stage

Pre-harvest

Pre-production services include activities in the land preparation, buying inputs and flower production. These services are carried out by in-house personnel as well as contractual daily wagers.

Land requirement is tested. Land Examination (i.e. Soil and Water testing) consists of Ph. testing (for both soil and water; it should be strictly in the range of 6.5 – 7.5), electrical Conductivity testing (which should be below 1) and other normal tests to plan the nutrients requirement. In case the mentioned Ph. & electrical conductivity levels are not met, the only option left is the transplantation of new soil bed. It increases the project cost substantially.

Selection of flowers appropriates for the regional climate. Cut-flowers production is generally done in greenhouse structures because of associated high risks and the high margin. In present scenario of increasing demand for cut flowers protected cultivation in green houses is the best alternative for using land and other resources more efficiently. Hence, assessing the climate conduciveness is important for the selection of a particular crop.

Next step in floriculture pre-harvest planning is the market study and potential linkages of supply. In floriculture, it is considered that nearer the supply destination, better the value realization as the shelf-life of flowers are very limited. Hence, it is better to target the different markets for supply and therefore the production planning should incorporate the varieties accordingly. Basic flower parameters to study are: flowers, their varieties, colours in demand, disc-size of flowers and stem-length.

Production: Harvesting and Handling Cut Flowers

Maximizing the vase life of cut flowers is dependent on pre-harvest procedures too. Long before harvest, plant cultivar selection should be considered for

postharvest longevity to provide the best possible cultivars for cutting.

It is important to know the optimum stage of harvesting for each plant species to ensure the quality of flowers after harvest. For maximum vase life of cut flowers, harvest flowers daily at their proper stage of development. Harvesting too early or too late significantly reduces the vase life of the flowers. If harvested after the optimum stage, the developing flowers use the carbohydrates that will be used for the development of smaller flower buds, thus, slowing down the growth of other flowers.

Each plant species has a minimum harvest maturity stage in which flowers can be harvested without affecting their postharvest quality. Flowers of some plant species can be harvested at the bud stage with no reduction in quality and vase life. For other plant species, disorders such as bent neck, improper development of pigmentation, or abnormal opening of the buds can result when flowers are harvested when they are too immature. If flowers are to be stored or shipped long distances, then they are usually harvested at an earlier stage.

Prior to harvesting, plants should be healthy and turgid. White plastic buckets and cutting tools (knives or shears) should be cleaned and sanitized. Avoid stacking buckets if the outside is not as clean as the inside. Cutting tools should be sharp. Dull cutting tools can result in crushed stems that reduces water uptake. Buckets should be cleaned and disinfected regularly. All buckets for harvesting should contain clean water.

Flowers should be harvested in the morning (after dew has dried) or evening, not during the heat of the day. Ideally, flowers should be harvested in the morning when temperatures are low and plant water content is high. Flowers are graded and bunched immediately after harvest and before placing them in water. This practice reduces handling steps and minimizes mechanical damages that often occur on the flowers and leaves. If grading and bunching cannot be done immediately, then flowers should be placed in clean buckets containing clean warm water (acidified) and a biocide. Warm, acidic water reduces air bubbles.

After Harvest Care. After harvesting, flowers are then moved to a cool area where stems can be recut and placed in solutions depending on the specific need of the flowers. Once harvested, flowers continue to transpire and will wilt rapidly. Most flowers will fully recover from wilting if recut and placed in a warm, rehydration solution. Stems are recut by removing about an inch of the end of stems under water prior to placing them in their solution. This helps prevent air bubbles in the water conducting tissue. Air bubbles reduce the uptake of solutions.

Supply Foods. Once harvested, cut flowers are typically placed in a low light or dark environment where photosynthesis is at a minimum. Much of the carbohydrates needed come from starch and sugars stored in the stem, leaves, and petals but the levels may not be adequate. In addition to clean, acidified water with a biocide, a continuous supply of food (sugars) is needed by some flowers for maximum postharvest life of the cut flowers. Water and the addition of preservatives to the solution will result in the best performance of many flowers. This all done by in-house experts.

Packing. There are many shapes of packing containers for cut flowers, but most are long and flat and a full telescoping design (top completely overlaps the bottom). This design restricts the depth of the flowers in the box, which may in turn reduce physical damage of the flowers. In addition, flower heads can be placed at both ends of the container for better use of space. With this kind of flower placement, whole layers of newspaper have often been used to prevent the layers of flowers from injuring each other. The use of small pieces of newspaper to protect only the flower heads, however, is a better practice, since it allows for more efficient cooling of flowers after packing. It is critically important that containers be packed in such a way that transport damage is minimized.

Care must be taken to pack in such a way that air can flow through the box and not be blocked by the packing material. In general, packers use less paper

when packing flowers for pre-cooling. The half-cooling time for forced-air cooling ranges from 10 to 40 minutes, depending on product and packaging. Flowers should be cooled for three half-cooling times (by which time they are 7/8 cool). Much can be achieved in improving box design and construction. There are literally hundreds of box sizes used in the flower trade, and the quality of card used in the boxes is quite variable.

Cooling. By far the most important part of maintaining the quality of harvested flowers is ensuring that they are cooled as soon as possible after harvest and that optimum temperatures are maintained during distribution. Most flowers should be held at 0-2oC. Chilling-sensitive flowers (anthurium, bird-of-paradise, ginger, tropical orchids) should be held at temperatures above 10oC. Individually, flowers cool (and warm) rather rapidly (half-cooling times of a few minutes). So, while individual flowers can be cooled quickly, it is also true that individual flowers brought out of cool storage into a warmer packing area will warm quickly and develop condensation prior to packing.

Quality Control. There are few official grade standards for cut flowers. Some marketing channels, for example the British mass market chains and the Dutch auctions, have internal quality control systems that provide a check on quality of flowers. The most important quality parameter is «freshness» or vase life. This parameter is difficult to assess visually, but because of its importance, producers and receivers set up a «quality control» program that would involve evaluation of the vase life of representative flowers on a continuing basis.

Logistics: Transport and Marketing

In this stage of the value chain, because of the dramatic effects of transport temperatures on subsequent vase life and the propensity for overheating of packed flowers, they should be transported at close to the optimal temperature (0°C for most species). Flowers should be properly cooled at the grower's operation, and transported to the airport in refrigerated (or at least well insulated) trucks. Some systems already exist for aircraft transportation of flowers under controlled temperatures. In Ethiopian Airlines, cargo vacuum coolers have been installed to reduce temperature of flowers before they are air-freighted. This expensive equipment certainly provides a means of rescuing product that is warm on arrival at the airport, but this is not an optimal procedure. Prior heat exposure and the additional water loss from the flowers during the vacuum cooling process undoubtedly compromise flower quality and vase life.

Perhaps the weakest link in the flower postharvest chain is at the airport. Freight forwarders may be inundated with late arrivals just prior to aircraft leaving. Pallets are assembled hastily, there is no time for pre-cooling of warm flowers, and boxes are handled roughly (interview, 2019). Pallets may be at ambient temperature for up to 4 hours while the aircraft is being loaded. The producing and transportation industries need to work together to set standards for temperature management, pallet construction, and temperature maintenance during loading.

Pallet construction. Flowers are delicate, and box strength is compromised if corners don't line up. It's important that the pallet be constructed so that the corners are square and line up above each other. One of the most vexing problems of the flower industry is the wide array of box sizes, which may make construction of a square and well aligned papallet difficult (interview, 2019).

Contract Farming is the agreement between growers/local farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices. The arrangement also invariably involves the purchaser in providing a degree of production support through, for example, the supply of inputs and the provision of technical advice.

Finally, the marketing functions can be seen as essential link between growers and consumers in

two different and yet simultaneous and connected ways. First, the marketing agents link producers and consumers physically, by actually buying, storing, transporting processing and selling. Simultaneously, however, because exchange of commodities is taking place, open or implicit price signals are being generated and transmitted to the active economic agents in the system, influencing their production and consumption decisions.

Table 19: Airfreight Cargo Fees: Addis Ababa – Europe

Type of Service	Cargo/Vehicle Type	USD $/Kg
Chartered Airplane	B-747	$ 1.78
Chartered Airplane	MD	$ 1.86
Chartered Airplane	Air Bus	$ 1.70
Inland Transport	Refrigerated Truck	$ 0.02

Source: Survey (2019)

In Ethiopia, the main market of flower production is export, which accounts for about 97% of total sales revenue of the sector. The domestic market is more or less residual market for the exporters. Cut-flower exports to the EU market are made in two ways: auction and direct sales to supermarkets and other retailers. The relative ease of accessing the auction market means that new entrants tend to begin exporting through this channel.

Back office Services and workers

The back-office services are transversal to the chain activities, and they support all firm operations. These activities include finance and accounting, human resources, soil test, flower selection (breeding), IT, legal services, and security. The companies carry out some of these services in-house, including, finance and accounting and human resources, security occasionally drawing on the support of external expert/ consultants. The remaining activities, including legal services, and soil-test are outsourced to specialized firms.

Outsourcing, Bundling and Other aspects of Services Supply

Among the 21 different services identified in this value chain, my analysis estimates 12 are supplied in house, 5 are partially outsourced, while 4 are fully outsourced. This shows imbalance between in-house and outsourced provision of services; however, in the analysis of services provision by segment of the value chain certain trends can be observed. For example, the floriculture supplies more services in-house in the beginning stages of the chain, while it follows a more aggressive outsourcing strategy at the later-stage of the chain. Most firms' provision of services is concentrated in their core competencies.

The main reasons for outsourcing services mentioned during the interviews are: (1) cost efficiencies and economies of scales (e.g. hiring floriculture expert, freight cargo, cool-chain trucks); (2) access to specialized equipment and skills (e.g., agents, breeders; refrigerators; green-house); (3) government support services (e.g. registrations, tax...etc.).

Policies Affecting the Value Chain

Policy context. Floriculture is one of the areas identified by the government as apriority sector. Current targets include utilizing a total of 3,000ha of land for flower production and creating 70,000 jobs. Several schemes have been initiated by the government for promotion and development of the floriculture sector including integrated development of commercial floriculture, which aims at improvement in production and productivity of traditional as well as cut flowers through availability of quality planting material, production of off season and quality flowers through protected cultivation, improvement in post-harvest handling of flowers and training persons for a scientific floriculture. A large number of promising varieties of cut flowers have been developed. All these efforts indicate the government's commitment for improving the sector and creating a positive environment for entrepreneurship development in the field.

Exporter incentives, such as an export credit guarantee scheme that offers credit (with collateral requirements ranging from 0–50%) and foreign exchange retention schemes, have aided the growth of the industry.

Flower export is highly time and process dependent. It requires improved infrastructure and logistical capabilities including air transport, post-harvest cold chain facilities, forwarding and handling services, packaging materials, information and communication technology (ICT) and quality control and certification services. Some of these capabilities are national or sectorial in nature and cannot be built or possessed by each firm or bought from the market and thus require coordination.

Many Ethiopian environmental activists still argue that environmental policies or standards, labor regulations are not implemented by many companies within the industry as per the standards provided by the regional government. These concerns are related to labor right like working condition.

One of the issues for the floriculture industry in Ethiopia is the weakness of the international and the domestic transportation system although it shows significant improvement. In addition, the refrigeration system at the airport is not sufficient enough and so the flowers cannot remain long at the airport. Therefore, each farm has to adjust the time when they cut flowers to the departure time of flights as well as the amount to be exported to the available space. Most of the farms are, as a consequence, located within 50-200km from the airport. The proximity of farms to each other, however, causes shortage of water, drainage facilities and labor. Lack of a comprehensive transportation system, that is absence of a freight transportation company for the cut flowers from the farm to the destination, pushes up the transportation costs in Ethiopia as compared to other countries.

The expansion and growth of the industry magnified the economic significance of the sector, but the social and environmental implication of the sector was not given due attention even though the sector was still blamed for some of its social and environmental shortcoming in the region.

The challenges in this exercise are two-fold. Relating a firm's performance to its own perceptions of, or even its own measurable experiences with, access to services would create concerns about endogeneity. Perceptions are likely to be influenced by success, and a more efficient firm may be more efficient because of particular characteristics that also affect the treatment it receives from services providers, like size and the resourcefulness of the manager. These issues make a one-to-one juxtaposition at the level of the firm an unattractive strategy. At the other extreme, aggregating all the information to the country level would make it impossible to control for other administrative regions within Ethiopia, i.e., specific differences in governance, institutions, business climate or geography in a cross-section. And it would leave the unique variation at the sub-national and administrative regions level unexploited.

My empirical strategy is thus to go the middle way by exploiting the regional variation within the country. Rather than using the individual firm's responses to the services-related questions on the right hand side, I aggregate these responses up to regional

averages (most mentioned challenges). This reduces considerably the influence that an individual firm's performance can have on the value of a right hand side variable. At the same time, regions within a country share all the possible unobservable influences that are determined at the country level, and introducing country fixed effects allows me to capture these unobserved differences.

Looking forward

As is the case in many developing countries, the major export items of Ethiopia are dominated by few agricultural products that earn very small amounts in the international market. Moreover, most of the exports are destined to only few countries. This fact calls for export diversification in an effort to increase the kinds of export items and searching new markets for both the existing and new items. Ethiopia has been operating in the floriculture industry for over 20 years. To this effect, so as to promote economic growth through diversifying high-value agricultural production and broaden foreign exchange earnings, the government of Ethiopia, which now pursues a market-led economic policy, needs to place proper emphasis on the potential of the floriculture industry. The exporter goes through a lengthy custom, inefficient logistics and bank clearing procedures as identified in the interview (2019). Given the perishable nature of the cut flowers, these bureaucratic customs, and bank formalities are hindering the quality and competitiveness of Ethiopian cut-flowers in the international market. In addition, a substantial portion of the value of horticultural products is lost due to a lack of storage facilities, poor Agri-logistics due to inadequate packing and handling practices, soaring freight cost, and by insecurity and uncertainty associated with domestic and international transportation.

The floriculture value chain in Ethiopia is process intensive in both the pre-and post-harvest phases, including strict requirements on chemical application and timing, temperature and humidity control, irrigation, cooling temperature and length, packing materials and quality differentiation and sorting. It is interesting to note that what clearly differentiates this sector from the traditional agriculture model is that, not only is production year-round and highly industrialized, but also the post-harvest processing is tightly coordinated with a three-day period from harvest to arrival in destination market abroad. Therefore, optimized routes should be used to decrease transport services and logistic cost.

The case studies draw conclusions on the critical role of services in coffee and flora value-addition of broader relevance and implications:

First, the services sectors suffer from being treated in isolation and not as part of an interconnected chain of value addition, from production to final consumption. Yet, the case studies presented in this report show that since value chains are a series of linked international markets for goods and services, with policies in one market having spillover effects in other markets along the whole value chain, services should be considered at par with manufacturing, to achieve the desired export performance. Policy formulation needs to deal with the goods and services markets together, as there are significant links between the two sectors. Moreover, such links call for modal neutrality—trade and regulatory policies that enable services firms to provide services.

Second, that many services are now tradable and can be a source of export-led growth and export diversification has not sufficiently captured the attention of Ethiopian policy makers. This may reflect that the development of modern services is a relatively recent phenomenon, and also the assumption that the comparative advantage of a low-income country like Ethiopia lies in agriculture and labour-intensive manufacturing. Although Ethiopia's services exports are currently dominated by traditional services such as transport or tourism, exports of modern services, such as communication or business services, are beginning to emerge.

Third, there is a genuine concern among policy makers that the state of regulation and the regulatory capacity of the administration are too weak to allow for the further liberalization of services. And finally, there is a worry that opening services sectors that operate under a monopoly would lead to declines in government revenue.

Concluding remarks and policy implications: Coffee and Floriculture

For a while, transport services have been seen as primarily a cost center for business firms. The goal has been to minimize cost, which in terms of sectoral dynamics means lowering prices and improving productivity. However, Ethiopia's involvement in agribusiness value chains makes it clear that transport can also be a source of real value addition in the RVC/GVC context. Effective and efficient transport services, including in areas such as refrigerated trucks for transport (cold chain for cut flowers), and containerized coffee beans can be vital sources of value for domestic firms looking to export in agribusiness sectors, where it is the backbone of the Ethiopian economy. This prospect makes clear that the transport sector's development is not just a question of cost minimization, but also includes issues of quality, technology, and productivity. Thus, the optimal development of transportation services requires effective and coherent policies. Investment in basic infrastructure and services is needed to ensure the quality of the transportation services network to work.

From the Ethiopian national statistics, it was already emphasised that in value-added terms, services account for half of trade. A new stylised fact is that when adding the in-house provision of services in these firms, the share of services in exports increases from one third to 50%. We can also be more specific about what can be described as the servicification of RVCs/GVCs. On the one hand, there is a higher use of foreign services as inputs in some exports in some sectors, replacing domestic services inputs. Services value chains are becoming more and more regional and international. On the other hand, there is a more qualitative shift with services redefining the way these companies produce values.

Some evidence on this shift can be found when looking at bundles of agricultural products and freight transport services inputs they use, suggesting that firms increasingly provide solutions to customers that combine goods and services. In addition, an analysis of value creation through the I-O model proposed by this study also highlights the raise of value shops in the value-added in exports of these goods, confirming this trend towards activities that consist in solving problems and in co-creating value and productivity with in the Ethiopian economy.

In this digital era, services are not only the enablers of RVCs/GVCs, i.e. the activities that are deployed for regional/international production networks to operate but also the drivers of value creation. Services are part of a business ecosystem where collaboration with

customers, government, development partners and contractors is the key to innovation and productivity.

The policy implications of this study have been well identified in the case of value chains where what matters the most is to remove tariffs and non-tariff measures affecting imports of intermediate goods, streamline customs procedures and administrative requirements and carry out domestic service reforms that can improve the provision of efficient services inputs towards the improvement of the Sector.

These traditional trade barriers are still relevant in a world of services value chain, particularly when taking into account the fact that many services are traded embodied in the agricultural commodities and therefore impacted by trade rules on these goods. Through a cascading effect in the value chain, trade policy instruments such as tariffs but also non-tariff measures have an impact on the embodied services. The prevalence of bundles of goods and services also suggests reinforcing the consistency of trade rules on these goods and on services.

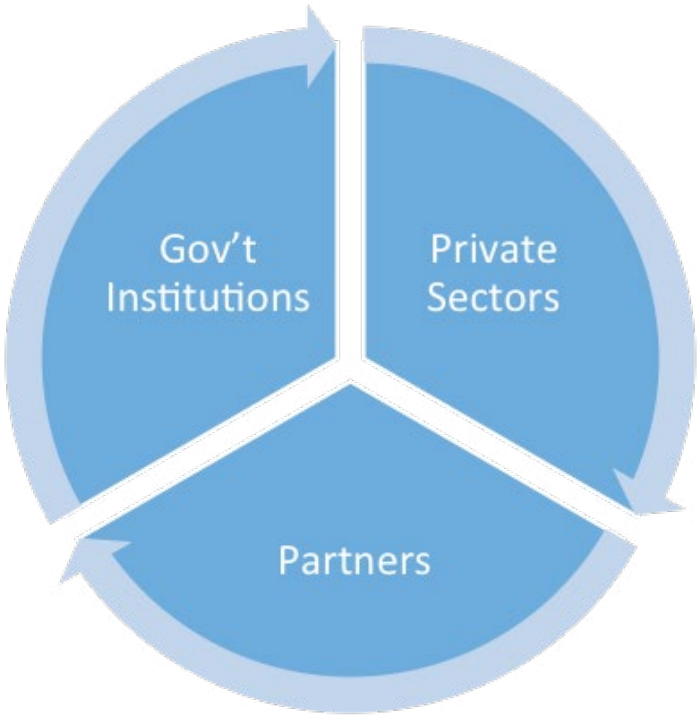
The study suggests that addressing the bottlenecks in infrastructure is also a necessary condition to provide a window of opportunity for the economy to develop following its comparative advantage. With the right conditions, good infrastructure can support the agribusiness economy, particularly the coffee and cut-flower sector, to reap the benefits of participation in regional and global value chains to upgrade the economic structure. But the shift towards value networks and value shops also points to additional reforms that could facilitate the expansion of services RVCs/GVCs. In the case of value networks, the main trade barriers are generally sector specific regulations and the lack of enforcement of quality standards and certification activities along the VCs. Therefore, the government should promote active quality controlling system along these value chain. Rules related to data localisation or commercial presence requirements can also prevent companies from creating a network of users across borders. In the case of value shops, the main barriers are related to soft and hard infrastructures. Beyond trade, skills and innovation policies play an important role in the development of value shops for coffee and cut-flower.

These case studies show that although transport services have an important role to play in each value chain, they are only one part of the story. Although eliminating obstacles to transport services can help link producers (farmers/growers) to international markets for inputs and the sale of agriculture commodities, or reduce post-harvest and storage losses, binding constraints such as limited access to finance or lack of skills would need to complement reforms in the sector to reduce the prices paid by consumers for these products, facilitate the movement into higher value-added activities, and increase exports.

Ethiopia may be structurally disadvantaged by being land-locked and far from global markets, but other policy-related variables may matter just as much. Therefore, if Ethiopia wants to increase its participation in GVCs, it needs to focus on addressing existing policy gaps that restrict global value chain participation. Other studies have described what specific policies might be beneficial, consistent with the findings of this study. These include, among others: addressing gaps in regional trade facilitation and trade policy to improve access to markets, and lower the cost of access to inputs; improving access to and quality of key services inputs; and, raising skills to improve productivity in order to exploit regional wage competitiveness (World Bank, 2016). Initially, the investments can contribute to participation in lower value-added segments in RVCs/GVCs, and over the long-term can lead to greater participation in more technology-intensive and higher value-added activities and sectors.

Finally, the prevalence of services activities within these firms also suggests looking at whether services outsourcing, in-house or offshoring should be facilitated and is not blocked by restrictive policies. There is an economic rationale in keeping some services activities in-house, particularly when they are complementary with the core activities of these firms. What regulators and policymakers should ensure is that the choice between outsourcing and insourcing is based on economic reasons and not distorted by policies.

Proposed activities: the role of Stakeholders



Triple Helix Approach – An evolving concept

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