A review on the socio-economic impacts of informal transportation and its complementarity to address equity and achieve sustainable development goals

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Abstract
Sub-Saharan suffers from a poor transport system failing to address equity and sustainability. The system can be affected by several factors; however, this study explores how African historical transport infrastructure development and socio-economic changes affect institutional changes and preferences of available transport modes. We used recently published systematic reviews, case studies, analytical cross-sectional studies, policy review papers, and available relevant studies reports and some grey literature to understand the impacts of these factors. Our analysis shows that the transport demand is affected by local socio-economic contexts shaped by historical pretexts, socio-technical changes, economic transitions, and related value systems. These is essential to understand the operational characteristics of the formal and informal transport modalities, their roles and contribution to meet the mobility needs of the people and designing of an effective management system. This paper can provide insights to policy-makers, urban transport planners and researchers in the field on the complementary modalities involving formal and informal transportation.

Keywords: Informal transport, Livelihood, Job creation, Complementary services, New ways

Introduction
Access to modern transportation is vital to socio-economic development and societal wellbeing. A sustainable Development Goal 11 (SDG11) aims to provide safe, affordable, accessible, and sustainable transport systems for all by 2030 [91]. Governments in developing countries are taking many initiatives to expand transport infrastructure in rural and urban areas to achieve the goal [43, 47]. Improving transport infrastructure increases the movement of people from place to place for business, paid jobs, and other activities, helping improve their livelihood. An efficient transportation system facilitates these activities by reducing travel time, increasing job opportunities, and enhancing productivity [77, 78]. However, these benefits are often limited by low-quality transport systems, traffic congestion, inaccessibility to suitable transport facilities,
and costs. Transport-related challenges are a growing concern in developing countries, accompanied by varying transport needs, limited and unsuitable infrastructure, and scarcity of resources [55]. These challenges are significant to create considerable inequity among the majority with low income and few with economically better-off. Most people walk 3–4 h a day to work to save transportation costs at the expense of their productive time for additional income [64]. Such a long journey enforces women to work closer to home and at a disadvantage of traveling long distances for paid jobs. The inequity can be worsened by growing rural to urban migration looking for better jobs and unplanned settlements with limited infrastructure. Hence, sustainable mobility is needed to facilitate these activities, foster economic growth, improve livelihood, and provide equitable services [60, 64].

Sustainable transportation facilitates economic growth and poverty reduction by addressing complex issues requiring the collaboration of all development sectors and focusing on equity, societal welfare, and environmental protection [60, 91]. Road transport is the dominant contributor to the economy accounting for 80% of goods and 90% of passenger transport in Africa [76, 90], and major drive for achieving economic development at all levels [74]. Informal passenger transport mode in cities in Sub-Saharan cover the largest share of the road transportation services and ranks the second following walking [6]. However, most urban road infrastructure is designed to accommodate conventional public transportation; it is not suitable for intermediate transport facilities (informal transport), thus relatively remaining a weak contributor to poverty reduction [19]. An appropriate transport mode is needed to respond to the majority’s transport needs and livelihood. Transport planning should prioritize people and their livelihoods by improving mobility and access to goods and services [92]. This kind of transportation demand requires transport modes simultaneously addressing both people and goods. Addressing this demand relies on local resource availability, transport facilities and suitability, institutional setting, and enabling policies. Sustainable mobility is attained by traveling safely and traveling better with limited resources. Several policy options promote low-carbon and low-cost transport solutions. These policy options can be shifting transport demand from cars to public transport and fuel-efficient intermediate transportation options. An informal transport mode is an alternative approach to providing transport services where conventional transport means fail to meet specific transport needs [32]. This study uses “informal transport system” interchangeably with “intermediate transport mode” in the rest of the document.

Intermediate (informal) public transport mode refers to road vehicles used for flexible passenger transportation, which do not follow a fixed schedule and a fixed route [75]. They include bicycle rickshaws, auto-rickshaws, taxis, mini-busses, carpools, vanpools, and other transportation providing transport services for people and goods. Intermediate transportation modes are cost-effective and time-efficient to provide convenient transport services to most low-income people traveling with their goods [32, 80]. The intermediate transport mode can significantly contribute to socio-economic development since they are comfortable and convenient, consume low fuel, are less affected by congested streets, are easy to provide door-to-door service at low costs and help create income generation [32]. The intermediate transport
modes are vital for developing countries where the population is alarmingly growing with increasing rural-urban migration and informal jobs and businesses.

Several studies have presented the sustainability of different intermediate transport modes in low- and middle-income countries [32, 36, 44, 75, 80]. India is a pioneering country with an intermediate transportation system design and fulfilling its growing population’s diversified transportation needs [32, 57]. The emergence of bicycle and motorcycle taxi services in East Africa can be considered a spontaneous entrepreneurial response to the increasing transport demand [82]. Mini-busses make up the bulk of public transport in the urban and three-wheel Indian-made motor vehicles are popular in small towns in Africa [11, 49, 52]. These transport modes provide on-demand transport services while creating job opportunities for the majority of the youth without jobs.

In transport planning, travel time usually changes due to infrastructure investment and attached economic values to these changes through time. The mobility benefits of increasing transportation efficiency save a lot of time used for other productive activities. Translating accessibility to transportation for gained economic and social benefits facilitates the available transport’s acceptability. A significant improvement needs to consider specific locational choices and a more comprehensive range of activities and social services such as access to education, health care, farming, and other social services [61]. A transport mode matching people’s demands requires a decentralized and contextualized approach. People can choose their suitable means of transport according to their needs and income capacity to afford. One transport mode may not fit all; diversified transport facilities are needed to meet the demand. Meeting these demands in societies with diversified socio-economic status and interests requires a better system that complements formal and informal transport systems. Managing this combined system needs significant policy reform and institutional changes that effectively fit the growing and diversified demand.

Many people are interested in informal transportation involving intermediate mode due to their accessibility and efficiency, while others prefer conventional transportation involving buses and light railways. Both the formal public transport and informal transport modes provide a complimentary transport service based on the people’s transport needs. Informal transport modes provide the services without official permission despite its on-demand mobility services and jobs creation for low-skilled workers [13, 22]. The absence of a robust management system for informal transport systems may involve many safety issues and unnecessary costs to both service providers and customers. Studies have reported perceptions related to safety, risks of accidents, and insecurity of informal transportation modes [5, 46, 83]. Legalizing informal transportation and policies fostering a competitive environment for informal and formal services has many cost and distributional benefits across income classes [37]. Indonesia has introduced a smartphone app to control informal transport services and helps to achieve higher daily income and increase safety perception and satisfaction [58]. Ethiopia recently introduced a metered taxi transport involving ICT smartphones app-based applications to improve customer safety. Despite transport preferences and interests, security issues remain a challenge and require enabling policy reform addressing the safety issues while fostering transportation access.
Realistic transportation planning, management, and monitoring potentially addressing safety and equity issues require a better understanding of local contexts, constraints, and prospects [60, 91]. Several studies have emphasized the significance of local contexts driven by socio-economic, societal changes, and external influences impacting policy reform and institutional changes [4, 43, 59, 66]. Transportation is a base for societal well-being and socio-economic development since it facilitates people and commodities movements. Understanding these systems’ operational characteristics, roles, and contributions in meeting society’s mobility needs requires designing an effective management system. Developing an effective management system is guided by enabling policy reform and related institutional changes fitting to the local contexts and system.

Nevertheless, several interrelated factors might determine the policy reform resulting from institutional changes and access to sustainable transportation. Historical transport developments, socio-cultural transitions, and fossil fuel dependency could be among the main factors playing significant roles. The impacts of these factors on the newly emerging informal transportation have not been identified for sub-Saharan Africa with significantly diversified culture, historical developments (colonial legacy), and resources but sharing similar socio-economic situations. This study aims to evaluate the impacts of these factors on the African transport demands, policy reform, institutional changes, and their implication for sustainable development goals related to transportation. The results are crucial in creating insights on enabling policy reform and institutional changes for a diversified transport system improving access to affordable and equitable transportation services. The finding is also vital to motivate scientists in the transport research field to carry out in-depth studies on complementary transport modality’s effective and efficient management system.

Methods
This study uses a realist review approach [71] due to the nature of the study involving complex factors determining access to sustainable transportation and policy interventions. A realist review approach is suitable to understand complex social interventions based on an emerging realistic approach to evaluation. Realist review provides a detailed and more practical understanding of complex social interventions leading to better planning and implementation of the programs. It considered relevant studies on transport access situations, options, and challenges for providing sustainable and need-based transport for the people in Africa. This study used published literature in English. Studies were reviewed regardless of the year of publication, and there were no restrictions by type of setting. Most recently published reports and some grey literature were included. Systematic reviews, case studies, analytical cross-sectional studies, policy review papers, and available relevant studies were also considered.

The databases, including Scopus, Web of Science, PubMed, ScienceDirect, DOAJ, JSTOR, and Google Scholars, were used to access published scientific articles. Google was used for grey literature and reference lists to the papers reviewed. We screened titles and abstracts retrieved through the search strategies in various electronic bibliographic databases for inclusion. For this, we used search terms including access to transport, sustainable transport, alternative transport, transport infrastructure, impacts of transport access, intermediate transport, informal transportation, transport policy, Ethiopia,
Sub-Saharan Africa, and developing countries. Despite much literature on the topic, this review fine-tuned specific studies relevant to access to sustainable transport in Sub-Saharan Africa and socio-economic factors potentially affecting people's livelihood and the environment. For the sake of summarizing the findings by thematic area, the evidence was synthesized and presented section by section. Accordingly, information on historical transport development in Africa, policy, and related institutional changes are presented in History of modern transportation in Africa, current developments and prospects section. The socio-economic impacts of improved transportation and its acceptance depend on fossil fuel energy consumption for transport, thus discussed in the Fossil fuel consumption and its impact on sustainable transportation section. The impacts of socio-economic changes on transport demand and institutional changes section outlines how social changes influence transportation preferences and demands. This section emphasizes and discusses the socio-economic impacts of formal and informal transport services and the need for a complementary management system. These factors would significantly impact policy reform and institutional changes to provide access to sustainable transport.

**History of modern transportation in Africa, current developments and prospects**

Human being has passed through several transport transitions [28, 43, 93]. In human beings' history, animals have played vital roles in providing transportation and improving socio-economic developments. Donkeys were among domesticated animals to serve people by transporting goods and people, particularly in Africa and the Near East. Donkeys are more suited for transport in mountainous and arid regions and are an essential resource in many African today [50]. The use of donkeys by farmers is changing rapidly in many African countries through trial-and-error and farmer-to-farmer diffusion of ideas and innovative techniques of extending to other services. Beyond serving as pack animals, donkeys are now pulling simple and locally made carts with few apparent technology changes. The changes could be related to the increasing transportation need for people and goods managed by pull carts [38]. Progressively, donkeys are being replaced by human-powered transport-laden bicycles in most developing countries [87]. This development shows the structural and functional shifting of the transport modes to non-motorized transport modes to address diversified societal needs.

Apart from that, a significant development in modern transportation services in Africa was made during the colonial era due to increasing economic, social, and political forces. South Africa, Ghana, and Nigeria are some countries where significant development in railways expansion has been made from the beginning of the mid-nineteenth century [42, 88]. The railway's infrastructure developments were made in the colonial era because of colonies' growing interests in military occupation and accessibility to more trade routes. As a result, there was a perception that railways were a colonial transportation technology, whereas paved roads were a post-colonial technology that emerged due to independence [26, 43]. A substantial expansion of road infrastructure in many Sub-Saharan African countries was made in the 1950s through post-independent official development assistance channeled in the form of bilateral and multilateral agencies. The study shows a significant development gaps between railways dominating in the 1900s and roads
infrastructure development mainly after 1930th because of the wrong perception associated to colonial effects [43]. This played a vital role in many countries’ economic growth. The existing pretexts are changing, and the transport infrastructure development plan is occurring in most African countries to achieve economic growth [43, 51]. The East African corridors have established a transportation network based on their historical connections [51]. Moreover, the African Union has declared considerable transport infrastructure development and networking to link the major production and consumption centers among major African cities and ports to improved regional and continental trade. The continental transport network is part of the AU’s Agenda of 2063 and includes north to south and east to west, going through the Saharan region [68]. The project is a vital element of the African continental free trade area agreement, signed by 44 African countries [27, 68]. Such an ambitious plan will have significant political, economic, and socio-cultural implications to unite Africa and use its vast resources. The continental infrastructure development may significantly contribute to the regional economic development and lift millions out of poverty by facilitating income generation and more jobs creation. The ambitious plan could be challenged by a high level of corruption and historical instability to maintain the intercontinental agreement [27].

Ethiopia is one of the African countries with a history of abandoned railways but currently building a standard gauge railway network consisting of up to 5000 km of railways [54]. The railway network serves a strategic goal to allow Ethiopia sustainable and stable economic development. The railway network aims to increase trade activities by connecting the country to the world market by ensuring seamless access to seaports for transporting most imports and exports [23, 54]. The central railway’s connection is to Djibouti port, Ethiopia’s major import and export trade route. The Ethiopian-Djibouti railway also has a historical root of the colonial era to connect Djibouti ports to mainland Ethiopia to facilitate trade routes; however, they were not functional for several decades [54, 81]. The rail transport of goods comes to be a better option than road transport in terms of volume, costs, safety, transportation speed for both imports and exports, and reduction of fuel consumption and the environment. The country’s railway plan extends to the metropolitan electric railway to solve the current urban transport problems and connect the country’s major cities in different directions [45]. Currently, the Addis Ababa light railway transport (LRT) provides its services to over 67,000 users per day [8]. The re-emerging of the railway infrastructure development with renewable energy-based electricity indicates a crucial institutional change towards sustainable and environment-friendly development.

The Ethiopian transport infrastructure development also includes road construction networking to all areas of the country. As elsewhere in other African countries, the Ethiopian road infrastructure development was mainly made in the 1980s, although initiated around the 1855 [29]. The country currently has a road network coverage of over 120,000 km with an ambitious expansion plan [95]. Expansion of the road infrastructure, including rural areas, improves the link between rural and urban by facilitating resource flows, trade, and job opportunities, contributing to socio-economic improvements. However, most of the major cities are overloaded with massive motor transportations to satisfy the growing transport demands. For instance, Addis Ababa City currently provides public transport services, with over 3.6 million trips happening in the city daily.
The city provides public transport services with over 700 buses (which carry 30 people seated and 70 standing), tram consists of two lines, covering about 34 km and serving 39 stations. Over 10,000 white and blue Minibus taxis that can seat at most 12 people, about 460 Higher midi-buses that seat 22 to 27 people, 366 supplementary vehicles, and about 6500 Saloon taxis that seat four people and over thousands of three-wheel vehicles serving at the peripheral areas [31, 64].

Nevertheless, major transport services of the city are provided by informal transport service providers [46]. The city recently introduced taxis of different types ranging from three-wheel vehicles to luxury Para-transit informally providing on-demand transportation services. However, the current transportation system is not well-coordinated and regulated to address the city’s transport problems, including the issues of equity and need-based services. Moreover, the available road infrastructure is not adequate to facilitate smooth and efficient transportation services for needy customers. The available infrastructure was constructed in the form of highways mainly to fit the motorized transportations and not suitable to non-motorized transport modes (pedestrians and bicyclists) informally satisfying the societal needs. Some cities like Addis Ababa are now shifting to street approaches to complement motorized and none-motorized demands. Management of both systems involving appropriate infrastructure, arrangement of system addressing complementary modes, and structural adjustment requires a policy reform and institutional changes fitting to the local contexts. The Ethiopian situation could be typical of other Sub-Saharan African countries experiencing similar challenges.

**Fossil fuel consumption and its impact on sustainable transportation**

Africa is one of the continents with substantial oil resources potentials expected to boost the regional economy. Nevertheless, this resource is not evenly distributed, and currently, 38 of the 53 African countries are net oil importers [3]. Libya, Nigeria, Algeria, Angola, and Sudan are countries with significant oil reserves and production, producing more than 90% of the continent’s oil. Therefore, the hiking price of oil is an opportunity for these countries to contribute to their socio-economic developments while remaining a challenge for the net-importing countries. On the other hand, rising oil prices lead to a decrease in output and consumption, high expenditure of net foreign exchanges, and loss of assets to importing countries.

Moreover, increasing oil prices have significant implications on commodity prices, costs of public transport, and household services, resulting in high costs of living [62]. Nevertheless, an empirical finding indicates the low response rate of exporting oil prices to local employment due to inefficient energy use, overdependence on abundant energy resource deposits, and unstable world energy prices [4]. Hence, net-fossil fuel importing countries risk economic loss due to high inflation and rising local commodity prices [67].

The oil consumption trend in Africa shows a significant increase since 2000 [41], particularly in the transport sector, and consumption in the other sectors more or less remains low (Fig. 1). The increasing demand in the transport sector could be due to improved socio-economic conditions and growing vehicle populations. It was estimated that developing countries would own 56% of the world’s vehicles by 2030 [25].
Fig. 1  Oil products final consumption by sector, Africa 1990–2018 (Source: [40]).
The increasing vehicle ownership expansion in developing countries has implications for transport services, environmental policies, and the global oil market.

Improving income drives most economically better-off people to have a private car as a manifestation of economic class, which hiking oil prices may not hinder them from using. However, increasing private cars among these populations significantly affects the large segments of the population striving for daily subsistent income due to increasing competition on hardly imported oil, congestion, traffic accidents, and air pollution [25, 39, 86]. The private car-dominated transport system also has enormous implications on local air quality. Thus, a transport policy for both population categories needs to be developed to alleviate the economically better-off population’s demands and those struggling for daily subsistent income. Electric vehicles and electricity as transport fuels significantly reduce oil-based transport challenges and related socio-economic and environmental problems while satisfying the increasing demand [7]. The large majority striving for daily income needs affordable and suitable transportation access, which conventional transport mode may not solve. An appropriate transport mode addressing their needs should be equally considered to tackle the economic and environmental impacts of increasing fossil fuel consumption.

Dependence on fossil fuel-based transportation has significant consequences, particularly for landlocked countries paying additional costs for port rent. This results in high oil prices for consumers. The prices users pay for the fuel have significant impacts on individuals and the country. High oil prices can affect the balance of payments, gross domestic product (GDP) and government budgets, and household income due to the increasing price of goods and other services, including transport costs [53]. Moreover, most transport facilities currently in use are old and inefficient, resulting in high fuel consumption, traffic accidents, and greenhouse gas emissions [9]. This indicates an urgent need for sustainable transport policy considering technological innovation and institutional changes. Without institutional changes, addressing the fossil fuel and demand-related issues driven by socio-economic development and infrastructure gaps could be challenging. For instance, results presented in Fig. 1 show the progressive increase in fuel consumption in the transport sector while consumption in other sectors remains steady. The increase could be related to the increasing car population among economically better-off individuals and the absence of regulation for inefficient used-vehicle imports in most African countries. The growing fuel consumption could have significant consequences to the livelihood of poor people unable to afford the transport costs and commodity prices. Hence, most poor people would be forced to shift to non-motorized transport modes and informal modes. Addressing the transport demand shift and providing affordable transportation to the majority needs policy reform and institutional changes.

The impacts of socio-economic changes on transport demand and institutional changes

Sustainable economic growth and poverty reduction need to address complex and interconnected issues requiring the collaboration of all economic sectors to meet the current generation’s needs without compromising future generations’ long-term needs. Sustainable development goals focus on inter-and intra-generational equity
targeting societal welfare, economic growth, and environmental protection [60, 91]. As a result, road transport is the main transport mode, with motorized transportation responsible for transporting goods and passengers in Africa [76, 90]. Transportation also provides essential social services such as health, education, job opportunities, and income generation.

Existing modern transportation involves many challenges and problems in the cities [73]. Due to the increasing population and rural-urban migration, the current public transport services in many developing cities do not sufficiently address the population’s mobility needs. Societies have different expectations and behaviors to choosing a transportation service [65]. Formal public transport services are often unreliable, inconvenient, uncomfortable, or dangerous, particularly during peak hours. Due to the high number of occupants per travel, city buses are becoming sources of disease transmission, particularly respiratory diseases [24]. As a result, people enforced to pay a high amount of money to take Para-transit services [1, 12]. Informal Para-transit services are becoming popular to provide on-demand mobility.

Many African cities rely on Para-transit because of their flexible stops, lack of formal schedules, and routes. However, such transportations are not affordable for low-skilled workers working in informal sectors and low-income people due to their high costs. The emergence of bicycle and motorcycle taxi services in East Africa can be considered a spontaneous entrepreneurial response to the increased transport challenges [82]. Mini-busses make up the bulk of public transport, and small towns are popular with three-wheel Indian-made motor vehicles [11, 49, 52]. These transport modes are suitable to save time and satisfy customer needs at shorter distances. In many areas where road infrastructure and fossil fuel are limited, walking and non-motorized transport remain essential transportation services. Transport planning should prioritize people and their livelihoods by improving mobility and access to goods and services [92]. Intermediate transport mode is becoming an alternative transport where conventional transport means fail to meet the growing diversified transport demand [32].

Nevertheless, uptake of this transport mode depends on the dynamic social changes and technical competencies of the service providers. The dynamicity of the changes can be related to saving travel time attached to economic values and change in lifestyle through time. The mobility benefits of increasing transportation efficiency save a lot of time that can be used productively for other activities. Understanding the changes and translating accessibility to transportation for gained economic and social benefits facilitates the available transport’s acceptability.

A growing and diversified transport demand and job-seeking youth are putting tremendous pressure on the local administration and policymakers to focus on infrastructure development and ways to reach the majority [21, 63, 70]. Accessibility to transportation includes getting desired goods, services, and activities at any time and place. SDG 11 aims to address four crucial attributes related to safety, affordability, accessibility, and sustainability of the transport system focusing on improving road safety and public transportation [91]. Increasing access to public transportation provides many benefits from cost, safety, and environmental perspectives compared to private vehicles [48]. Nevertheless, public transports are mainly arranged for transporting people, but most poor people travel with their goods.
Moreover, the need for public transportation services is affected by individual character and lifestyle, social status, the type of trips, the quality of the services, and transport situations [14]. Most people in urban areas of developing countries travel to work, run small businesses, and engage in income generation activities. The modern public transport system may not be feasible to address these types of journeys. Instead, people need to commute with their goods, travel quickly, and arrive based on their needs. A significant improvement needs to consider specific locational choices and a more comprehensive range of activities and social services such as access to education, healthcare, farming, and other social services [61]. The intermediate transport mode can be arranged and operated as a contract taxi service, which passengers set themselves [32]. This kind of self-arrangement route requires sufficient cost regulation and management system to secure the safety of customers and service providers. Therefore, public transportation accommodating both people and goods should be provided to complement the available conventional public transport. This type of transport mode is getting attention in developing country’s transport policy and strategic planning [15, 30, 84].

It has been indicated that intermediate transport systems have great potential to meet the transport need of the majority of most low-income people and help job creation [16, 17, 46]. Nevertheless, the intermediate transport modes and operations require complementary services with a conventional transport system to meet the diversified demands. Management of this system is determined by the socio-technical systems and social practice at the society level [34, 94]. The socio-technical system involves the technological and social components of the system contextualized as per the specific system [35]. Any system comprises a set of interacting sub-systems involving people with different capabilities, sharing common goals, following accepted ways, and using technology, operating within a physical infrastructure, and sharing specific cultural values and norms. The design and performance of any transport system are thus can only be understood and improved if both social and technical aspects of the system are brought together and treated as interdependent parts of a complex system [20, 33, 94]. The socio-economic impacts of the intermediate transport mode depend on the transport facilities to satisfy the demand, the service provider’s technical competencies, safety and security of the services, prevailing socio-cultural values, affordability of the transport mode to stimulate customers, and enabling policy to address its complementarity with the conventional public transport.

Addressing the complementarity of the services and acceptance of the services depends on the social changes affected by social practices. Social practices involve the ways people follow diverse concerns, become aware of new possibilities at their best through experiences or practice, and adjust themselves to fit the demands and structures of local institutions [72]. The social practice theory helps to understand the behavioral change made in society due to available materials, local meanings and competencies of the practice, and the relationship between them. Williams [94] argues that transport facilities and how people travel determine the sustainability of the transport system, which is achieved due to social changes. The acceptance of intermediate transport as a better and complimentary transportation system is influenced by local social practices, shared values, technical fitness of the facilities to the local transport needs, and attached socio-economic impacts. This includes available technologies, tangible physical entities,
materials, objects, skill, know-how, symbolic meanings, and aspirations [85, 94]. The social changes influence society to prefer intermediate (informal) transport modality and the conventional transport system. Hence, it is essential to understand the existing socio-economic and socio-cultural conditions associated with the local transportation system and demand.

Moreover, the African demographic structure is dominated by a jobless young population grown and educated in an era of globalization. Most of these young generations have full access to global social media and information technologies. Social media and information technologies substantially influence youth to create their own identity and global networking [56, 59]. The demand for essential services, including transportation, would also follow their new identity, which needs to understand from the global and local perspectives. In Africa, women are equally accessible to education and other transportation services traditionally limited to men. Despite the old tradition of discouraging women from using bicycles, there is increasing interest in using bicycles to do business and go to school with males in Africa [78, 79]. Most youths are self-conscious about their physical fitness, thus besides the benefits of time-saving and increasing efficiency, using bicycles as a transport option also increases physical activities [2, 10, 69]. The study indicates a growing interest in the bicycle business by men and women in Malawi for income generation and leisure activities in Ghana and South Africa [78].

Nevertheless, considering bicycles for urban transportation and uptake of the services relies on the availability of suitable bicycle roads (lanes), bikes at affordable costs, and local maintenance facilities. In cities like Addis Ababa, where walking as a mode of transportation accounts for 70% of all trips and 60% of modal share [89], finding a strategy to address this demand is an urgent. The city in particular and the country in general now has developed a Non-Motorized Transport (NMT) Strategy for 2020–2028 with technical assistance from the Institute for Transportation and Development Policy (ITDP) and with support from the United Nations Human Settlements Program and UN Environment program [18, 30]. Implementing this strategic plan requires significant infrastructure modifications and responsible and dedicated institutional changes. Investments in transport infrastructure can be fair and justified if the accessibility of the disadvantaged groups in society is considered and prioritized with the appropriate modes of transport predominantly used by them. Otherwise, giving significant attention and accessibility to motorized transport would undermine the most sustainable modes of transport and aggravate the existing traffic congestion and equitable access. Prioritizing and promoting non-motorized transport infrastructure will potentially improve accessibility and equity for the majority of poor urban residents.

Providing sustainable transportation requires an integrated policy involving urban transport and other relevant development sectors. However, proper policy actions and measures must be carefully sought to realize the system's full applicability and sustainability within the local system. Hence, people can choose their suitable means of transport according to their needs and income capacity to afford. One transport mode may not fit all; diversified transport facilities are needed to meet the demand. Beyond meeting the majority's transport demand, the informal transport mode can be vital to serve the majority of the youth out of a job as a means of income generation. Hence, careful planning and implementation are required by involving private partners, financial
institutions, and local actors to provide access to improved and affordable transport for all while providing an opportunity for job creation for the majority of the jobless youth.

**Conclusion**

This review paper looked into the influence of historical transport policies, consumption of fossil fuel, and socio-economic changes on institutional changes and accessibility to sustainable transport. Our analysis considered the existing local contexts and constraints related to socio-economic development that contributed to societal transport modal changes and how these conditions affect the acceptance of existing transport modes. Understanding these factors helps devise the required policy reform and institutional changes to improve the acceptance of transport facilities fitting to the local society’s needs. Without institutional changes, providing safe, affordable, accessible, and sustainable transportation to all by 2030 may not be realistic. For instance, public transport is better to reduce transport costs and transport-related issues like congestion, traffic accidents, and air pollution. However, it may not be enough to address the transport need of the people traveling with their goods and specific needs. Hence, complementary transport services involving the informal and conventional public transportation modalities are needed to improve access to sustainable transportation, addressing societal needs while creating job opportunities for youth. This study recommends further study on the detail management approaches of the complementary services involving formal and informal transportation in urban areas.

**Abbreviations**

SDG 11: Sustainable Development Goal 11; NMT: Non-motorized transport; GDP: Gross domestic products; ITDP: Institute for Transportation and Development Policy.

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