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ORIGINAL ARTICLE

Impacts of infrastructure (in)equity and social (in)justice on democratic nation-building processes in Ethiopia

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ABSTRACT

Inequity in infrastructure distribution and social injustice's effects on Ethiopia's efforts to build a democratic society are examined in this essay. By ensuring fair access to infrastructure, justice, and economic opportunity, those who strive for social justice aim to redistribute resources in order to increase the well-being of individuals, communities, and the nine regional states. The effects that social inequity and injustice of access to infrastructure have on Ethiopia's efforts to develop a democratic society were the focus of the study. Time series analysis using principal component analysis (PCA) and composite infrastructure index (CII), as well as structural equation modeling–partial least squares (SEM-PLS), were necessary to investigate this issue scientifically. This study also used in-depth interviews and focus group discussions to support the quantitative approach. The research study finds that public infrastructure investments have failed or have been disrupted, negatively impacting state- and nation-building processes of Ethiopia. The findings of this research also offer theories of coordination, equity, and infrastructure equity that would enable equitable infrastructure access as a just and significant component of nation-building processes using democratic federalism. Furthermore, this contributes to both knowledge and methodology. As a result, indigenous state capability is required to assure infrastructure equity and social justice, as well as to implement the state-nation nested set of policies that should almost always be a precondition for effective state- and nation-building processes across Ethiopia's regional states.

Keywords*: institutional capacity (IC); infrastructure governance (IG); infrastructure equity (IE); social justice (SJ); nation-building processes (NBP); principal component analysis; composite infrastructure index; structural equation modeling; regional states of Ethiopia*

1. Introduction

> "Throughout history, it has been the inaction of those who could have acted; the indifference of those who should have known better; the silence of the voice of justice when it mattered most; that has made it possible for evil to triumph." Haile Selassie, King of Ethiopia

The impacts of infrastructural inequity and social injustice on Ethiopia's democratic nation-building processes are examined in this paper. Social justice also advocates work to redistribute resources, such as infrastructure, in order to improve the well-being of individuals,

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communities, and Ethiopian regional states by ensuring equitable access to infrastructure, justice, and economic opportunity. This is because infrastructure is not only a pillar of economic capacity but also has a direct impact on human capital, social inclusion, state- and nation-building, and environmental sustainability. So, its expansion is a major concern for both the governments (federal and regional states) and citizens (Bel, 2011; Organisation for Economic Co-operation and Development (OECD), 2015; Prud'homme, 2004; Wimmer, 2018).

Therefore, infrastructures, such as energy grids, transportation highways, telecommunication services, universities, airports, and industrial parks, are deemed essential physical services and installations necessary for society's functioning and social fairness/justice. Water and irrigation facilities are not included in this research. This is because these infrastructures are largely under the jurisdiction of the regional states in Ethiopia. As a result, the focus was mostly on the federal government's equitability in basic infrastructure allocation among the nine regional states and two city administrations. Infrastructure equity is also critical for Ethiopia's state-building and nation-building processes. This is mostly due to the fact that infrastructure equity is the foundation of a country's competitiveness, prosperity, and even social well-being (OECD, 2015).

Fairness/justice, or unfairness-injustice-inequity, is a general definition of equity (Adams, 1963; Litman, 2021). Social justice, on the other hand, is a concept that refers to the equitable distribution of wealth, public goods, opportunities, and social rights among individuals, groups, and the general public (Liebig et al., 2016; Schraad-Tischler and Kroll, 2014). Explicitly achieving economic and social justice has always been at the heart of democratic arguments, as well as a focal point for political debate and social activism. Nonetheless, the organizing force of the concept of justice has been pushed into a variety of political arenas in recent years. As a result, more than ever before, movements for justice have been extended across political events, from the global to the local (Soja, 2013). Ethiopia's federal government has made enhancing infrastructure quality and ensuring fair access to all types of public infrastructure investment as top priorities in its budget. According to government statistics, the Federal Democratic Republic of Ethiopia (FDRE) allocates more than half of its annual budget (excluding block transfers) on capital expenditures, such as infrastructure (Harris et al., 2019).

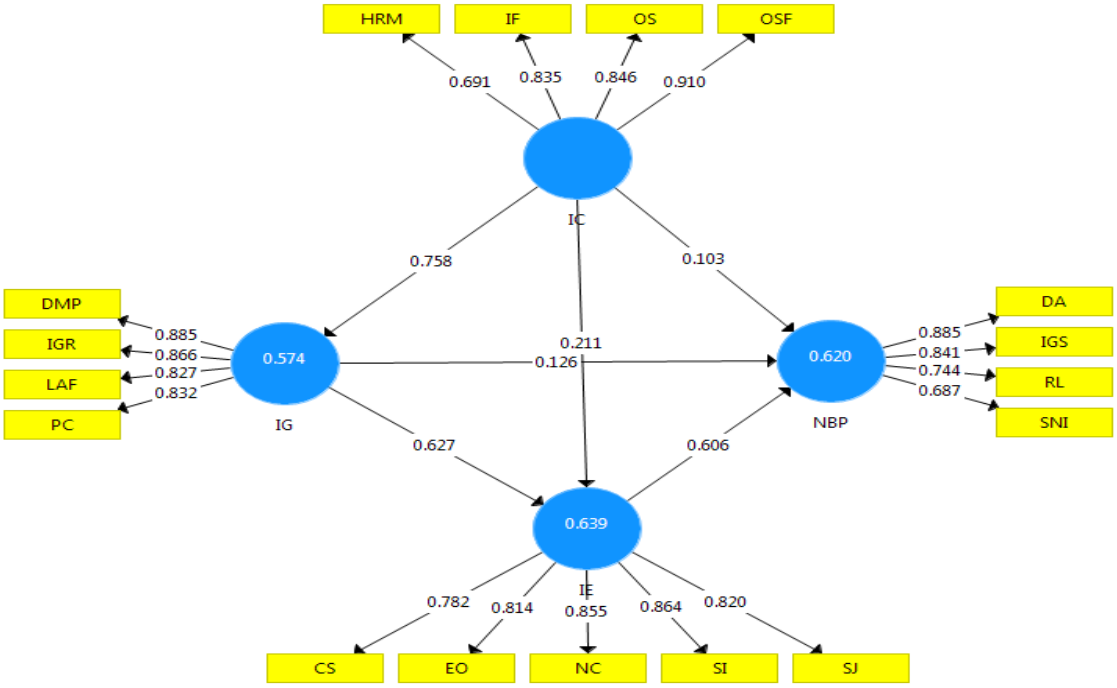
In terms of capital spending, nation-building processes must allow civil society, citizen/regional states, and democratic state institutions to participate. In Ethiopia, these create greater equity and social justice. As a result, establishing a democratic state is a vital component of

that process (Dinnen, 2006; Stepan et al., 2011). In general, this paper used principal component analysis (PCA) to create a composite infrastructure index to measure infrastructure inequity. The study also used structural equation modeling to create an empirical model. The impact of constructs/variables, such as government institutional capacity and infrastructure governance, on the equitable distribution of public infrastructure investments and the nation-building processes was also investigated. This research also aimed to ascertain the causal link between these constructs. In addition, in-depth interviews and focus group discussions were employed to supplement the quantitative approach in this study. As a result, four constructs/variables (institutional capacity (IC), infrastructure governance (IG), infrastructure equity (IE), and nation-building processes (NBP)), as well as factors such as the 17 measuring indicators (see **Figure 1**), have an impact on how successfully Ethiopia's fixed infrastructure assets are planned and allocated equitably between regional states. Furthermore, the study produced various insights on the effects of institutional capacity, infrastructure governance, and equity on state- and nation-building processes. These factors particularly derive from federal, regional, civil society, and multilateral organizations. Furthermore, when it comes to federal budget allocations, the federal government does not critically take regional decision-making autonomy into account nor respect it (Desalegn and Solomon, 2021a).

Equally important, as long as unmet infrastructure demand continues, it will continue to be a major impediment to doing business in most African nations, reducing firms' productivity by around 40% (World Bank, 2013). This is also a serious difficulty in Ethiopia. In other ways, the Ethiopian federal government uses infrastructure investments in the construction sector as a tool for job creation, increased work for local firms, and ultimately poverty alleviation and economic growth, all of which have a significant impact on social justice, particularly for women (Patra and Acharya, 2011; Rubin, 2006; Wismadi, 2015). However, empirical evidence suggests that these development goals may not be accomplished as planned due to large regional disparities in infrastructure distribution and the quality of public-goods administration (Kanth and Geiger, 2017; Mohanty et al., 2018).

This study contains theoretical and methodological advances that have far-reaching implications. This paper's contribution begins with the development of broad determining elements for equity in infrastructure and nation-building concepts. It looked at the composite infrastructure index in Ethiopia, which included nine regional states and two state administrations. It also considered the interrelationships between the four construct variables and 17 measured indicators, totaling 120 items. More crucially, the conclusion of this study indicated that the government should examine policy proposals more closely (such as infrastructure policies that promote opportunity and inclusion). As infrastructure is the skeleton support of communities and regional states, this would considerably enhance the management of equitable infrastructure access (Desalegn and Solomon, 2021a).

The paper's other importance is in providing a fraction of methodological improvement to the factually challenging subject of how to evaluate infrastructure (in)equity and other broader implications across Ethiopia's regional states. Hence, the paper developed and empirically tested a composite infrastructure index, as well as a model, that can be used as a measure of perception, attitude, and performance in relation to the effects of infrastructure (in)equity on nation-building processes in developing countries such as Ethiopia. As a result, the technique provides the



Legend:

IC = Institutional Capacity, which comprises Human Resource Management (HRM), Organizational Structure (OS), Organizational Systems and Frameworks (OSF), and Infrastructure Funding (IF)

IG = Infrastructure Governance comprises indicators of Intergovernmental Relations (IGR), Decision-Making Process (DMP), Land Acquisition Framework (LAF), and Political Commitment (PC)

IE = Infrastructure Equity embraces factors of Equal Opportunity (EO), Social Justice (SJ), National Competitiveness (NC), Spatial Intervention (SI), and Citizen Satisfaction (CS)

NBP = Nation-Building Processes comprise Rule of Law (RL), Democratic Accountability (DA), Shared National Identity (SNI), and Inclusive Growth and Sustainability (IGS)

Source: Adopted from Desalegn and Solomon (2021b) and authors' own data

Figure 1. Graphical representation of empirical model in SEM-CFA

knowledge and expertise necessary to bring a computed output to bear on the inevitability of strategic planning, equitable resource allocations, democratic decision-making, and appropriate state- and nation-building processes.

Finally, the literature supporting the conceptual comprehensive framework, the study's methodology, and the analysis of the paradigms based on empirical evidence, as well as policy implications, are designated below.

2. Literature review

2.1. Theory of (in)equity and social (in)justice

In relation to the issue of inequity and social injustice, Harvey (2009) raised the following questions which are very crucial for this paper.

"How do we specify need in a set of territories in accord with socially just principles, and how

do we calculate the degree of need fulfillment in an existing system with an existing allocation of resources?" (Harvey, 2009, p. 117–118).

It is also stated that "[a] long literature has studied specific infrastructure expansions as potential drivers of development and structural transformation" (Moneke, 2020a, p. 1). Thus, equity theory, both theoretically and conceptually, focuses on determining whether resource allocation is equitable to both relational partners (individuals, groups, communities, and regional states) (Adams, 1963; Litman, 2021). Individuals who see themselves as under- or over-benefited may sense unhappiness, according to equity theory, and this dissatisfaction leads to decisions to "restore equity" (Adams, 1963; Huseman et al., 1987; Liebig et al., 2016; Litman, 2021). There is a distinction between "equity" and "distributive justice", according to Cook and Hegtvedt, in that "the former involves notions of exchange and the latter concerns general fairness in allocation situations" (Cook and Hegtvedt, 1983, p. 218). Theories of distributive justice (in which outcomes are distributed evenly and fairly throughout an organization) require the conditions under which specific distributions are made, whereas procedural justice (which determines if the process of allocating outcomes/rewards is fair by making the procedures fully transparent) is now seen as "just" or "fair" (Cook and Hegtvedt, 1983; Litman, 2021). As a result, one of the justice theories reflects that fairness is determined by comparing the ratio of costs and gains for each partner (Adams, 1963).

In terms of terminology, no universally accepted phrase has been established, as fairness, equity, and justice are sometimes used interchangeably depending on the context, adding to the ambiguity. Solidarity or (spatial/territorial) cohesion is also used in the infrastructure sector (Litman, 2021; Thomopoulos et al., 2009). Equity, on the one hand, is described as fairness/justice, or unfairness-injustice-inequity (Adams, 1963; Litman, 2021). Social justice, on the other hand, is the equity of an individual's activities and the rewards that he or she receives from his or her community, society, or country (De Coninck et al., 2013). Therefore, the terms "equity" and "fairness/social justice are used interchangeably in this research. Many countries have made equitable/justifiable infrastructure distribution a policy priority as a result of these factors (Calderón and Servén, 2014). This is a critical challenge in developing genuine infrastructure equity policies, as well as in national development in general.

As a result, ensuring social justice is a top priority for government policy. In order to ensure social justice, "[v]iewing infrastructure through an equity lens is an opportunity to examine, who benefits, who pays, and who decides" (Rubin, 2006, p. 5). Equity is concerned with resource allocation and is inextricably tied to ideals of fairness and social justice (Adams, 1963; Litman, 2021). Large-scale plans to improve infrastructure should be given high priority as a result of a long-term policy. This has used infrastructure for nation-building (Hooper et al., 2017). In light of the large theoretical literature, investments in infrastructure are critical to ensuring high levels of living standards and economic growth (Bel, 2011; Hooper et al., 2017; Wimmer, 2018).

Society categorizes concerns of equity for practical reasons and does not attempt to coordinate allocation decisions across many sectors. As a result, each problem must be dealt with on its own merits, based on the norms and patterns accumulated over time for that situation (Felder, 2010). In other words, according to Pearce and Paxton (2005), social justice is founded on four concepts. Equal citizenship, social minimum, equality of opportunity, and fair distribution are the four pillars. The framework of the social justice study is primarily concerned with distributional issues. Even

still, the fact that this approach entails highly subjective judgments remains a challenge (Pearce and Paxton, 2005). In particular, the FDRE's constitution (1995) emphasizes the importance of equity in ensuring fairness, social justice, and harmony (FDRE Ministry of Education, 2019, Unpublished). In terms of social justice, it has been suggested that the situation of Ethiopia is historically useful in this regard. A mass movement advocated progress, such as land nationalization and a decentralized government system. This was started by a student movement. The consequences spread throughout institutions, resulting in a polity that is more sensitive to citizens' rights than exists elsewhere in East Africa (De Coninck et al., 2013).

The Basic Social Justice Orientations (BSJO) scale assesses justice views in reference to four key concepts of benefit and burden distribution in a society ("Equality", "Equity", "Need", and "Entitlement") (Liebig et al., 2016). The BSJO scale is an eight-item scale that assesses potential, such as "Equity" (only if the rewards and costs in question are distributed based on existing individual contributions and efforts). In today's world, "social justice" is commonly understood to mean "distributive justice". "Social justice" is a critical component of any political community's or regional state's legitimacy and stability. The use of moral principles and criteria to determine how finite resources should be distributed among people, groups, organizations, communities, and regional states is known as distributive justice (Schraad-Tischler and Kroll, 2014). Indicators for measuring social fairness have also been identified by Merkel and Giebler (2009). This validation process consists of three steps: "developing principles" (equal distribution of primary goods and equal opportunity in developing capabilities), "deriving single dimensions" (poverty prevention, public compensation, labor, intergenerational justice, and so on), and "finding indicators for measuring these fundamental dimensions of social justice, such as social cohesion" (Merkel and Giebler, 2009). In poor countries such as Ethiopia, they might be feasible.

In other words, welfare analysis is mostly centered on monetized effects, with a particular focus on income distribution. When it comes to measuring infrastructure, monetary implications are not the only factors to consider. It is clear that an alternate valuation method or framework is needed to assess the indirect consequences of significant infrastructure projects that have equity problems (Thomopoulos and Grant-Muller, 2013; Thomopoulos et al., 2009). By quoting Young (1994), Thomopoulos et al. (2009) analyzed the three basic equity theories, as well as the core principles adopted in reality, to address equity concerns in the infrastructure sector. These are egalitarian, where everyone has equal rights or benefits for a particular provision or system; utilitarian, where the goal is to improve the overall welfare of society; and Rawlsian, where the goal is to maintain the current status quo between those who are better-off and those who are worse-off as much as possible, after everyone has safeguarded one's fundamental rights. These criteria have also been applied to the evaluation of infrastructure (Thomopoulos and Grant-Muller, 2013; Thomopoulos et al., 2009).

Therefore, different researchers believe that equity theory can be adapted into several basic propositions of under- or over-benefited equity theory in regard to infrastructure equity. For example, the more stressed individuals or regional states are as a result of seen infrastructure inequity/disparity, the more they will seek to alleviate their stress and increase perceived levels of infrastructure inequity (Huseman et al., 1987; Merkel and Giebler, 2009; Wismadi, 2015). On the other hand, the distributional patterns of infrastructure equity might be thought of in terms of social equity (achieving equity across socioeconomic categories) or spatial equity (achieving equity across

geographic areas) (Chotia and Rao, 2015; Rubin, 2006; Treuhaft et al., 2013). As a result, authorities must continue to work to eliminate infrastructure unfairness and imbalance by pursuing a growth-oriented agenda (Chotia and Rao, 2015; Simon and Natarajan, 2017).

By reassessing equity norms, social comparisons, and cognitive and behavioral processes in the infrastructure sector, infrastructure inequity/disparities can be eliminated, resulting in a more efficient and effective development process (Chotia and Rao, 2015; Simon and Natarajan, 2017). Furthermore, Son (2013) stated that, despite the fact that equity has long been a major policy goal, global disparity persists. Although the two are related and used interchangeably, according to Son (2013), equity is not the same as equality. Giving everyone what they need to succeed is what equity is all about. Treating everyone the same is what equality entails. Equality seeks to promote fairness, but it can only succeed if everyone starts at the same place and requires the same assistance (Litman, 2021; Son, 2013). In addition, Son (2013) also mentioned equity, unlike efficiency, is essential "a moral issue".

Similarly, equity refers to how effects (benefits and costs) are distributed and whether that distribution is regarded as fair and correct (Litman, 2021). However, equity analysis may be difficult due to the several sorts of equity to consider the various effects and methods of quantifying those impacts, and the various ways in which individuals can gather together for equity study (Litman, 2021; Son, 2013). Furthermore, it is an abstract concept; for example, a given decision may appear fair one way but inequitable the next (Litman, 2021; Son, 2013). Equity analysis will become increasingly important and necessary in the future (Litman, 2021). This is because policies that promote spatially balanced growth are frequently justified on the basis of equity (Scott, 2009). Improved equity analysis in planning can reduce conflicts and delays and better reflect a community's needs and values (Litman, 2021).

In other ways, in terms of implications for policy-makers in governments and national organizations, Anderson and O'Neil (2006) have identified the need to be committed to the values of equality (equal privileges and prospects) and cohesion (equity and social impartiality). Basically, "infrastructure equity" is about equitable public infrastructure, as well as investments, that can generate enormous national and regional community benefits, such as jobs, business opportunities, and access to infrastructure (Rubin, 2006; Treuhaft et al., 2013). All notions could help not only to ensure infrastructure equity but also social justice. And hence, in order to promote equity and social justice, democratic state- and nation-building is fundamental (Hooper et al., 2018).

2.2. Theory of state- and nation-building processes

Despite their widespread use, the terms "state-building" and "nation-building" remain controversial and ambiguous. These processes are intertwined and often required in countries with weak states and no sense of common community, but they are also distinct. The task of developing functioning states capable of accomplishing the essential elements of modern statehood is referred to as state-building (Dinnen, 2006; Hundara, 2017; Linz, 1993; Stepan et al., 2011). It also refers to the establishment, reformation, and consolidation of a public framework in a specific territory that is capable of supplying public goods, such as infrastructure. Whereas nation-building refers to the more abstract process of developing a shared sense of identity or community among the various ethnic groups that make up the population of a specific state, state-building is defined as contributors to the strengthening of the functionality of "weak" and "fragile states" (Alesina and Reich, 2015;

Dinnen, 2006; Linz, 1993; Stepan et al., 2011).

It is also stated that a nation will remain united if its residents share enough common interests and values and are able to communicate with one another (Alesina and Reich, 2015; Hundara, 2017). Infrastructure-led growth is not a new occurrence, and its equitable allocation to keep Ethiopia together has always been a point of contention (Rammelt, 2018). Thus, the question is how infrastructure is shared or distributed fairly and evenly across Ethiopia's regional states in order to enabble the country. In Ethiopia today, there is also a low level of social cohesion (i.e., the inclination of elites to collaborate with one another in order to succeed). The goal of democratic nation-building, in this context (Bejakovic and Meinardus, 2011; Litman, 2021; Wimmer, 2018), is to establish a common ability to achieve public goals and to pursue a shared vision of the future, while ensuring equitable infrastructure development and social justice.

As a result, equitable development is a positive development strategy that ensures that everyone, especially low-income residents, communities, and others in danger of being left behind, participates in and benefits from the nation's economic change (Rammelt, 2018; Rubin, 2006; Son, 2013). However, most people rarely consider infrastructure equity and how roads, schools, parks, telecommunications, and airports are all part of a larger system that sustains individuals and regional states, until in times of crisis (Rubin, 2006). Furthermore, low-income nations, such as Ethiopia, have comparatively weak public investment management structures, and upgrading those institutions could significantly improve public investment efficiency (Gurara et al., 2017; Rammelt, 2018). Hence, anchor institutions that can function as intermediates in bringing together a diverse variety of stakeholders to work on regional equity issues are crucial for building relationships and facilitating change. The government's ability to generate excellent planning and feasible policies, as well as the ability to construct a framework that ensures the good performance of various actors in carrying out federal policies, is hampered by a lack of institutional capacity (Bel, 2011; OECD, 2015; Prud'homme, 2004). This is due to the fact that the development of essential institutions to run and maintain Ethiopia's infrastructures has received little attention (Rammelt, 2018; Shiferaw, 2017).

2.3. Considering Ethiopia's strategies, policies, and actions in infrastructure equity/justice

The nation is presently going through a period of transformation with intermittent conflicts. The main query that might be posed is this: Why, despite showing a sign of promising economic progress, does the political system that seeks to accept variety fall short of its objective? The business sector has been seriously affected by the worldwide rise of unplanned protests. Some academics had made an effort to respond to the query by discussing the improper application of the federal system. Additionally, some scholars contend that the federal government's intrusion through its laws and centralized party structures limited the ability of regional states to exercise their right to self-government. Others blame the Tigray Peoples Liberation Front's (TPLF) tactics against those ethnic groups (Amhara and Oromo) who would have jeopardized its bastion of political power in the nation.

Moreover, the country lacks tranquility, as a result of ethnic warfare. Ethiopia is now a combat zone as a result. The aforementioned factors significantly contribute to the nation-building process's current fragility. The issue of infrastructural inequity is another, and possibly the most significant, factor influencing Ethiopia's political turmoil. The escalation of identity conflicts and political

discontent in a nation that adopted a federal arrangement to accept variety and is dedicated to bringing about economic development, which started to succeed, is best explained by looking at the equity of this economic progress. The nation has been spending a significant amount of money, among other things, on the development of its infrastructure, particularly its roads, energy, telecommunications, higher education (university infrastructure), airports, and industrial parks. As a result, the primary goal of this paper was to investigate how institutional capacity, infrastructure governance, and infrastructure equity affect the process of constructing a nation, specifically in Ethiopia.

Consideration of strategies, policies, and activities, such as budgeting decisions, land acquisition, spatial development, and building rules and policies that can interfere with infrastructure equity and social justice in Ethiopia is critical. The role of fiscal policy in the federal system is central to the interplay between the federal and regional governments when it comes to budgeting decisions. Fiscal decentralization in Ethiopia is considered by resource sharing between the two governments through shared revenue, General Purpose Grant Transfers (GPGTs), and Specific Purpose Grants (SPGs) as well as the federal capital spending. As a result, federal capital spending is a fundamental policy tool that influences both growth and equity between regional states. For example, it spends on highways that connect regions and adjacent countries, national public utility infrastructure (e.g., electricity and telecommunications), tertiary education (universities), airports, and growth-promoting industry-related outlays (e.g., industrial parks) (Harris et al., 2019).

Assuming that aggregate federal capital spending cannot be easily broken out by regional states, this study focused solely on the access to infrastructure equity of six primary categories (roads, electricity, telecommunications, higher education (university infrastructure), airports, and industrial parks) of capital spending; no other types of capital spending were included. Furthermore, the evaluation of infrastructure equity necessitates consideration of changes through time. Another issue to note is that this report excluded the Addis Ababa Master Plan and the development of condominiums in the Addis Ababa area. As a result, the majority of questions of fiscal justice voiced by politicians, legislators, regional representatives, and political elites concern the federal budget's spending side. So, in many developing countries, poor infrastructure quality and inadequacy are seen as major marketing difficulties and hurdles in nation-building processes (Chotia and Rao, 2015; Wimmer, 2018)

Land acquisition is seen as one of the biggest roadblocks to governments' aspirations to expand infrastructure in many developing countries (Ghimire et al., 2017). As a result, the lack of legal enforcement to control the price of properties acquired for infrastructure projects is seen as the root of the problem (Dang and Pheng, 2015; Ghimire et al., 2017). In this scenario, public land is critical to the network of networks and other facilities that are required to promote socioeconomic development. However, vis-à-vis land, Soja (2010) stated that "[d]irect social or collective ownership of land or common spaces has almost disappeared" (Soja, 2013, p. 44). Harvey (2009) also emphasized that "[l]and and improvements have numerous different uses which are not mutually exclusive for the user" (Harvey, 2009, p. 159).

If one considers the case of Ethiopia, under the constitution of Ethiopia (1995), Article 40(3) says "the right to ownership of rural and urban land, as well as of all-natural resources, is exclusively vested in the State and in the peoples of Ethiopia". Prior investments, such as those in infrastructure

development and service provision, were highly unequal and often excluded the most vulnerable and marginalized, according to Lemma and Cochrane (2019). Furthermore, construction currently accounts for 71.4 percent of Ethiopia's industry sector, making it the country's most important economic activity (Deloitte, 2019). Over the years, the construction sector has recorded robust growth, owing to public infrastructure expenditure.

Finally, the framework for equitable infrastructure development brings people and places together to create strong communities and regional states. As a result, through the government's deep interventions in Ethiopia, the theoretical framework has been established by combining theories of coordination failures for resource allocations, equity in development, and infrastructure equity for state- and nation-building processes (using democratic federalism as a device).

3. Methodology

Ethiopia has had notable and consistent economic growth and progress throughout the past few decades, particularly from 2007 to 2017 and 2018 (National Planning Commission of Ethiopia (NPC), 2019, Unpublished). As a result, the nation is now among the developing economies with the fastest rates of growth in Africa, and it has made significant progress in reducing poverty. Fiscal policies that promote growth have helped this process. Without a doubt, fiscal policy has been crucial in transforming rapid economic expansion into long-term development. The Ethiopian government has made a considerable investment in infrastructure development as part of overall national development initiatives, particularly in the last 15 years. This emphasis is essentially due to the government's demonstration that the nation's existing and extremely subpar social and economic infrastructure would surely obstruct the goals of the overall national development. The following are a few examples that illustrate the improvement (2017) and infrastructure access at that time (1997):

The length of Ethiopia's road network at the end of 1997 was 26,550 km. In contrast, it was 120,000 km in 2017 when the Universal Rural Road Access Program was included, and only 14,000 km, or roughly 13 percent, of that distance was paved (d'Orey and Prizzon, 2017; Iimi et al., 2018). Only 648 towns and small villages were served by the total electric power generating capacity of 378 MW by the end of 1997. According to Ethiopian Electric Power's (2017/18) Annual report (Unpublished), it was 4,250 MW and 6,238 towns and rural villages. Only Addis Ababa had 400,000 subscribers Long-Term Evolution capacity and, overall, Ethio-telecom's telecom density was 67 percent and the second-generation network coverage was 85 percent. The plan was successful, and as a result, the country has had significant success in industries, including road transportation, power, urban development, and building. In addition, there are 11 federal industrial parks spread out across the country (Harris et al., 2019); 46 universities, including 4 state-owned universities (Ethiopian Civil Service University, Defence University College, Ethiopian Police University College, and Oromia State University); 170 accredited private-owned higher education institutions (Ministry of Science and Higher Education of Ethiopia, 2019, Unpublished), including 4 private universities; 22 airports (Ethiopian Airport Enterprise, 2018, Unpublished); and more.

A solid infrastructure is required to support the social and economic ties that build a strong nation (Dinnen, 2006; Hippler, 2005). Economic research has recently focused a lot of attention on the variables that can help explain the equitable geographical allocation of public infrastructure investments (Albalate et al., 2012). The study is therefore highly relevant to interregional

infrastructure projects, the participation of regional and national stakeholder groups in the approval and funding of those projects, the large population at risk from equity and other external factors, and the degree of regional disparity in goals and priorities for decision-makers in the infrastructure sector (Litman, 2021; Macharis et al., 2009; Thomopoulos and Grant-Muller, 2013; Thomopoulos et al., 2009). Additionally, it makes a contribution by providing some critical methodological advancement to the factually complex issue of how to evaluate equity and other broader consequences (Litman, 2021; Thomopoulos et al., 2009). In light of this, Ethiopia has started to become increasingly concerned about the perception of significant inequalities in the distribution of social and economic infrastructures across the nation (Harris et al., 2019).

In spite of Ethiopia's encouraging overall record of better allocation of resources to pro-poor sectors, there is intensifying debate among policymakers, parliamentarians, academicians, the elite, and the public at large around the extent of infrastructure equity (Harris et al., 2019). This is because the building processes of a state and nation necessitates a physical, social, and media infrastructure that is distributed by the entire civil society (Dinnen, 2006; Hippler, 2005).[1] The study also demanded international understanding of infrastructure equity but grounded this within the Ethiopian context. In addition, the Constitution and government policy documents, such as the Growth and Transformation Plan (GTP), which speak to issues of equality and equity, were examined so as to guarantee that the definition of infrastructure equity would be outlined within the Ethiopian context.[2]

In most cases, a mixed-method approach is chosen to achieve complementary objectives. For the first course, time-series data availability and nation coverage across several metrics of infrastructure performance are uneven (Calderon et al., 2019). Thus, initially, a time-series study of public infrastructure investments was used to evaluate the extent to which infrastructure in Ethiopia has been used equitably throughout the past 20 years. This study also used principal component analysis (PCA) to calculate the composite infrastructure index (CII). PCA is a multivariate numerical technique for reducing the number of variables in a data set to a manageable number of "dimensions" (Chotia and Rao, 2015; Patra and Acharya, 2011; Vyas and Kumaranayake, 2006). When specifying PCA in SPSS/STATA, the user has the option of deriving eigenvectors (weights) from the data's correlation matrix or covariance matrix (Vyas and Kumaranayake, 2006). As a result, PCA was used to aggregate infrastructure components, such as electricity, roads, telecommunications, and other infrastructures in order to comprehend and gauge the trend and pattern of regional disparities in terms of infrastructure equity between Ethiopian regional states (Calderón and Servén, 2014; Chotia and Rao, 2015; Patra and Acharya, 2011). See **Table 1** for more information.

Second, the quantitative survey was the primary method used in this study, with data analysis involving 120 items, 17 measured indicators, and four construct variables in order to measure key factors affecting the equity of government-funded infrastructures using structural equation modeling–partial least squares (SEM-PLS) by using Smart PLS 3 software (Hair Jr., Hult, et al.,

1. "Nation-building is, on the one hand, *a process of socio-political development*…. Nation-building can, on the other hand, be *a political objective as well as a strategy*…. [emphasis added]" (Hippler, 2005, p. 7).

2. The Growth and Transformation Plan I (GTP) is a national five-year development plan created by the Government of Ethiopia to improve the country's economic well-being and work towards eradicating poverty. The four overarching objectives of GTP I are 1) maintaining at least an average real GDP growth rate of 11% per annum and attaining the Millennium Development Goals (MDGs) by 2014/15; 2) expanding access, ensuring the qualities of education and health services, and achieving MDGs in social sectors; 3) establishing conditions for sustainable nation-building through the creation of a stable democratic and developmental state; 4) ensuring the sustainability of growth by maintaining macroeconomic stability. Coverage period: GTP I: 2010 to 2015, GTP II: 2016 to 2020).

Table 1. Composite infrastructure index (CII) with ranks

No	Region	CII	Rank
1	Afar	0.6373	4
2	Amhara	0.4968	7
3	Benishangul-Gumuz	0.4176	8
4	Dire Dawa	1.0015	2
5	Gambela	1.2418	1
6	Harari	0.5830	5
7	Oromia	0.7010	3
8	SNNP	0.4109	9
9	Somali	0.1914	10
10	Tigray	0.5057	6
Country-level mean value		0.6187	

Source: Based on Chotia and Rao (2015) and authors' calculation

2021; Monecke and Leisch, 2012; Wong, 2013). The association was tested during the literature research and pilot test, and the factors and related items were identified. SEM-Confirmative Factor Analysis (CFA) was employed in this study. The model contained two major conceptual components: (1) the target constructs of interest (NBP (dependent variable) and (2) the three primary dimensions (IC, IG, and IE) (independent variables), which represented key determinants of the target constructs.

The constructs and their interrelationships, which formed the measurement and structural model, are shown in Figure 1. Finally, in-depth interviews and focus group discussions (FGDs) were employed to collect data for the qualitative research that accompanied the quantitative survey (Creswell, 1998). In acquiring information and providing insights into current issues and the consequences of infrastructural (in)equity and social (in)justice on Ethiopia's nation-building processes, the methodologies complement each other.

4. Data description

The Ethiopian Ministry of Finance and Economic Cooperation and the National Planning Commission of Ethiopia provided data, such as the Gini coefficient, GDP, and other pertinent information. Other sector-specific data were also gathered through reports and document reviews from each sector (Ministry of Transport, Ethiopian Road Authority, Ethiopian Electric Utility/Power, Ethio-telecom, Ethiopia Airport Enterprise, Ethiopian Industry Parks Development Corporation, and Ministry of Science and Higher Education, for example). The paper then went on to discuss the trends in road, electrical, and telecom infrastructure, as well as regional poverty and infrastructure.

Firstly, the researchers used all of the following indicators to calculate a CII using PCA: Roads

per 1,000 sq.km of area and roads density per 1,000 sq.km of area with 1,000 people; electricity—number of megawatts per 1 million people and number of substations per 1 million people; telecommunications—telecom density per 100 people, mobile networking capacity, and fixed and data line service network capacity; and other infrastructures—number of airports per 1 million people and number of universities per 1 million people across regional states.

Secondly, the study was done in four Ethiopian regions between January and July 2019. In total, 1,037 questionnaires were distributed in person to relevant respondents, with 947 of them being returned. Six unengaged responses and 37 surveys were erroneously completed during the preliminary analysis. A total of 904 people completed the survey and returned it in a timely manner. As a result, the response rate was approximately 87 percent. A response rate of 80% has been set as the benchmark for evaluation (Fincham, 2008). According to Saldivar (2012), an 80%–85% response rate is acceptable because the survey is conducted in person. Hence, such a sample size is sufficient for statistical analysis (Hair Jr., Black, et al., 2010).

Finally, Creswell (1998) recommended a sample size of 5 to 25 people. So, a total of 23 individuals were identified for in-depth interviews, including 10 federal institutions with 10 individuals and four regional state institutions (regional president office, road, electric, and telecommunication) with 13 interviewees (in Oromia, Amhara, Tigray, and Benshangul-Gumuz). Only 18 of them volunteered to be interviewed (8 federal and 10 regional). Furthermore, the FGDs were supposed to be eight, but they were only four (one city in each of the four regions: Adama, Bahir Dar, Mekelle, and Assosa) due to early saturation. As a result, the sample size met the study's minimum requirement for in-depth interviews.

The data were obtained at a single point in time ("cross-sectional") but not over a period of time ("longitudinal") by repeatedly monitoring or interviewing the respondents. The indicators were chosen to better understand and analyze the trend and pattern of regional infrastructure disparities in Ethiopia. This was the most current time period in which data were available. For standardization, a normalizing formula was used. These indicators' factor loading and weights were also determined using the formula in **Anpendix 1**. The CII for each Ethiopian regional state was calculated using the PCA approach. The regions were then ranked using the computed CII in order to examine regional differences in terms of infrastructure equity.

5. Results and discussion

5.1. Level of infrastructure inequity in Ethiopia

The rural-urban inquiry in regional-state (geopolitical location) is primarily concerned with the impact of geographical position and the availability of public goods such as infrastructure, services, and goods in Ethiopia. There is also a strong desire to investigate the impact of social heterogeneity along "ethnic and political lines". Hence, it is necessary to "assess the degree to which ethnicity is shaping inclusion and exclusion through its influence on power and political decision-making" (Cochrane and Rao, 2019, p. 13). Moreover, "[s]trengthening policy coherence is necessary to improve the utilization of limited resources and set a pathway through which the government can ensure no one is left behind" (Lemma and Cochrane, 2019, p. 1). This is also very "vital in order to maximize synergy among sectoral interventions that would otherwise be fragmented at times with

trade-offs" (Lemma and Cochrane, 2019, p. 1).

As a result, this paper used the CII to compute the physical infrastructure inequity/imbalance in Ethiopia, which was estimated for Ethiopia's nine states and one city government. The regional states were then categorized depending on their CII rankings. The Addis Ababa city administration was left out of the analysis due to its high infrastructure stock values.

Ethiopian regional states were categorized into relatively sound and lagging regions according to their CII ranking. The CII's sound regional states (Gambela, Dire Dawa, Afar, and Oromia) had higher values than the average (0.6187), while the lagging regional states (Tigray, Harari, Amhara, Benishangul, SNNP, and Somali) had lower values than the average. The standard deviation was 0.3050, while the mean CII value for all regions was 0.6187. This clearly demonstrates dispersion/differences between regions in terms of CII ratios.

This finding suggests that inequity and social injustice exist in Ethiopia's regional states. In addition, this article looked at how access to infrastructures, such as road connectivity, energy, telecommunications, industrial parks, airports, and universities, is distributed in Ethiopia's atlas, demonstrating the perils of injustice across the country. See **Anpendix 1** for the composite infrastructure index's formula, as well as **Figures 1–6** in **Anpendix 2** for inequity/injustice in infrastructure allocation throughout Ethiopia's regional states.

5.2. Questionnaire survey

5.2.1. Measurement model

SEM-PLS was used to assess the interrelationships between the four constructs (IC, IG, IE, and NBP) and 17 indicators. In reflective models, indicators are a group of things that collectively reflect the latent variables (LV) being measured (Haenlein and Kaplan, 2004; Hair Jr., Black, et al., 2010; Hair Jr., Hult, et al., 2021). Because the other indications are representative, dropping one sign may not change the meaning of the LV (Hair Jr., Hult, et al., 2021). Cronbach's alpha was greater than 0.8 for all measures (excluding shared national identification (0.687) and HRM (0.691); see Figure 1). A reflective indicator loading greater than 0.5 items, on the other hand, indicates a good measurement of the latent construct (Hair Jr., Hult, et al., 2021). As a result, these exceptions were more than 0.50, indicating that they were noteworthy. The study must then assess the indicator reliability and internal consistency reliability to ensure that they were satisfactory (Wong, 2013). Each construct's composite reliability (CR) value must be less than or equal to 0.60 (Awang, 2015) or >0.70 (Hair Jr., Black, et al., 2010). All constructs had a CR of >0.80, indicating that the factors were reliable.

Under the aspect of construct validity, there are two prominent terms used in CFA: convergent validity (CV) and discriminant validity (DV). CV is assessed based on the average variance extracted (AVE). The AVE value for each construct must be >0.5 (Hair Jr., Black, et al., 2010). In this study, the AVE value for each construct was >0.5. In another way, an indicator's outer-loading should be above 0.708; since that number squared (0.7082) equaled 0.50, i.e., at least 50% (Fornell and Larcker, 1981). DV was fulfilled with all the considered criteria because the square root of AVE values for IC, IG, IE, and NBP were greater than the corresponding latent variable construct (LVC). Then, DV was met as the square root of AVE>LVC (Hair Jr., Hult, et al., 2021). DV was also assessed based on the square root of AVE and the correlations among latent constructs. Firstly, a correlation among constructs must be <0.85 (Awang, 2015; Hair Jr., Black, et al., 2010) and the

square root of AVE must be greater than the inter-construct correlations (Fornell and Larcker, 1981). The correlations among constructs IC, IG, IE, and NBP were <0.85. Thus, the square root of AVE was greater than the inter-construct correlations of all constructs. The constructs were well measured by their indicators and were valid.

5.2.2. Structural model

Evaluation of the structural model was conducted using the coefficient of determination (R^2), the assessment of the significance of path coefficients, and the predictive relevance of the structural model. In general, R^2 values of 0.75, 0.50, or 0.25 for endogenous constructs can be described as respectively substantial, moderate, and weak, respectively (Hair Jr., Black, et al., 2010; Hair Jr., Hult, et al., 2021). The resulting R^2 values of 0.639, 0.574, and 0.619 for the endogenous constructs (IE, IG, and NBP) can be described as respectively moderate. In another way, Q^2 values greater than zero suggest that the exogenous constructs have predictive relevance for the endogenous constructs (Hair Jr, Hult, et al., 2021). The resulting Q^2 values for IE, IG, and NBP (0.410, 0.393, and 0.367 respectively), which were larger than 0, indicated that both endogenous constructs had predictive relevance.

5.2.3. Interpreting relationships

Insufficient institutional capacity (IC) of the government was hypothesized as the root construct affecting other constructs, which were IG, IE, and NBP, in Ethiopia. Specifically, insufficient IC of the government was hypothesized to have an indirect critical position among factors affecting the NBP in Ethiopia. This is consistent with the literature on development policymaking and the role of government institutions (Todaro and Smith, 2021), and insufficient attention is usually paid to the development of the necessary institutions to operate and maintain infrastructure equity in Ethiopia (Rammelt, 2018).

This study also hypothesized that the lack of infrastructure governance would be positively related to the inequitable allocation of public investments in infrastructure. The lack of IG can have a significantly negative impact on returns to infrastructure investment, and ignoring governance weaknesses can significantly dampen economic returns to infrastructure projects in developing countries (African Development Bank Group, 2011). The lack of infrastructure equity was also hypothesized as the root construct affecting the NBP in Ethiopia. The PLS-SEM analysis and the tests of significance indicated that inequitable infrastructure development had direct effects on the NBP. This created a direct relationship between the lack of IE and insufficient NBP. Inequitable infrastructure development had a negative effect on the NBP by discouraging everyone's participation and benefit from the nation's economic transformation. This is also directly related to sayings such as by the rural population of Ethiopia that stated, "The road is our bloodline!" (Rammelt, 2018, p. 15). Thus, equity concerns the delivery of infrastructure resources and is unavoidably related to ideas of fairness and social justice (Bejakovic and Meinardus, 2011). In other ways, a fair allocation of resources must be one that "all 'prospective members of society' would agree on, before they recognized which position they would occupy" (World Bank, 2005, p. 77).

Therefore, the lack of IC, IG, and IE was hypothesized as the root construct affecting the NBP in Ethiopia. As mentioned above, the goal of nation-building is to form the collective ability to accomplish public results and to follow a shared vision of the future (Hundara, 2017), which needs

to build strong IC, IG, and IE in Ethiopia. This is reflected in the literature, where productive capacity is said to be "the accumulation of human capital and the institutions that facilitate inclusive and sustainable economic growth" to build Ethiopia (Shiferaw, 2017, p. 1). It is stated that "federalism has rightly the potential to address all identity, diversity and governance-related problems the highly centralized and undemocratic systems unfold" in Ethiopia (Hundara, 2017, p. 4).

As shown in Figure 1, the estimated path coefficients of the relationships among target constructs are illustrated. These interrelationships were also required to ascertain the causal link among these constructs. As the magnitude of the coefficients indicated, the lack of IC has the biggest impact (0.758) on IG, and the lack of IG has the next biggest impact (0.627) on IE. The lack of IE has the third-highest impact (0.609) on the NBP. The lack of IC has a significant impact (0.211) on IE, whereas the lack of IG (0.125) and IC (0.101) of the infrastructure sector does not directly have a significant impact on the NBP in Ethiopia.

In general, the above results illustrate that both the internal and external factors have high influences on the effects of IE on the NBP in Ethiopia. Therefore, the lack of proper HRM, OS, OSFs, and IF is the result of insufficient IC of the infrastructure sector in Ethiopia. Similarly, the lack of IGR, DMP, LAF, and PC is the result of IG problems in the infrastructure sector in the country. The scarcities of finding EO, SJ, NC, SI, and CS of the infrastructure sector are also the result of inequitable infrastructure allocation in the country. Similarly, the lack of RL, DA, SNI, and IGS is also the result of the insufficient NBP of the country. So, the quantitative analysis shows that the OSF, with a loading factor of 0.910, is the biggest factor that can cause a system change in the infrastructure development in Ethiopia to ensure infrastructure equity and then social justice.

5.3. Interviews

In-depth interviews and focus group discussions (FGD) were undertaken after the questionnaire survey yielded results. In a nutshell, respondents were asked to explain why the aforementioned issues arose and how to overcome them in order to improve the equity of Ethiopia's government-funded infrastructure development and nation-building processes. According to all interviewers and focus groups, institutional capacity, infrastructure governance, and infrastructure equity have significant impacts on the nation-building processes. Institutional capacity, the interviewees felt, is the foundation for nation-building in every country, including Ethiopia. They also stated that infrastructure is critical for national consensus, as well as for the creation of convincing platforms. In general, 89% of interviewees said that there is a lack of equitable infrastructure distribution, which has a significant negative impact on Ethiopia's nation-building processes. Moreover, all focus groups agreed that infrastructure allocation in Ethiopia is not equitable. They also pointed out that in earlier years, infrastructure projects in Ethiopia were awarded based on political influence rather than established criteria. Furthermore, all FGDs, including the investigators, confirmed that infrastructural equity is lacking across Ethiopia's regional states.

Furthermore, the majority of the interviewees and all the FGDs concluded:

> "[I]nfrastructure is unfairly distributed among the regions; that is why the majority of the population is unhappy with the federal government. Moreover, there is no justice in the country at all; for instance, the court's judgment, as well the infrastructure distribution, are done based on higher politicians' interference. Furthermore, the existing infrastructure funds

are not fairly distributed. There are no transparency and accountability for the fair distribution of infrastructure. In addition, factors to infrastructure inequity/inefficiency and ineffectiveness are political instability in Ethiopia; the political ideology of the incumbent government, such as ethnic federalism and the revolutionary democratic developmental state, a principle which is against the role of liberalism in the allocation of public investments in infrastructure; lack of clear accountability and responsibility, demarcation among stakeholders and institutions, and lack of a monitoring system; and, deteriorating national consensus among citizens…." (Interview data)

Even though there are rules and criteria for infrastructure allocation, the issue is that the road map, standards, and criteria were not followed, resulting in an uneven distribution of infrastructure development. The lack of spatial intervention/planning and proper implementation is the cause of this. The fundamental reason for this is the tyrannical political authorities intervening illegally. Thus, this is against the Ethiopian constitution's Article 89(1), which says that the "government shall have the duty to formulate policies which ensure that all Ethiopians can benefit from the country's legacy of intellectual and material resources". Sub-Article 2 also says that "the government has the duty to ensure that all Ethiopians get equal opportunity to improve their economic condition and to promote equitable distribution of wealth among them" (Federal Democratic Republic of Ethiopian constitution, 1995).

It should also be noted that in the past, if someone had asked why something had transpired the way it did, those irresponsible government authorities had given no rational and obvious replies (through extractive institutions or narrow elites). The experts were also convinced that infrastructure misallocation was one of the causes of Ethiopia's current crisis. As a result, political leaders across the country lack common understanding, trust, empathy, and love for one another. Furthermore, because the authorities do not assess the stakeholder valuation of the infrastructure sector on a regular basis, their understanding of infrastructure stakeholders is weak.

5.4. Factors affecting interrelationships of four constructs (IC, IG, IE, and NBP) in Ethiopia

Several studies have found that the high regional disparity in infrastructure distribution and quality of public infrastructure investments could be characterized by the lack of planning and policy-making process (Dang and Pheng, 2015). This paper identified the factors that negatively impacted the equitable allocation of infrastructure investments and the nation-building processes, which also contributes to the social (in)justice in Ethiopia. This confirms that "[i]njustice anywhere is a threat to justice everywhere" (Soja, 2013, p. vii). Finally, all the three analysis results (time series analysis, questionnaire survey, and in-depth interviews and FGDs) disclose that there is a lack of equity in infrastructure distribution, which results in social injustice, and this has negatively impacted the state- and nation-building processes in Ethiopia.

6. Recommendations and conclusion

6.1. Recommendations

Allocating infrastructure in an equitable manner is growing more intricate and multidimensional. Road, energy, cell phones, and internet connection restrictions restrict the potential revenue of

modern accessibility and facilities in underdeveloped nations (United Nations Department of Economic and Social Affairs, 2020). The empirical findings demonstrated that Ethiopia's nation-building processes and infrastructure equity have been negatively impacted by a lack of social and distributive justice; spatial intervention and planning; national and regional infrastructure competitiveness; and citizen, stakeholder, and public satisfaction across the nine regional states in Ethiopia. The federal government of Ethiopia does not give equitable infrastructure allocation the essential attention, despite the fact that it has a significant impact on processes of state- and nation-building. As a result, societal discontent, larger-scale conflicts, and mistrust and corruption in the federal and regional states spread throughout the nation. The absence of fairness in infrastructure is one of the current factors, which has a detrimental effect on the nation-building efforts being made in the nation. This is mostly caused by a lack of social equity, which is the achievement of equity over socioeconomic groups in society, or spatial equity, which is the achievement of equity over geographical locations or regions, as well as a lack of gender and environmental equity in Ethiopia (NPC, 2018, Unpublished; Duranton and Venables, 2019; Litman, 2021; Rammelt, 2018; Thomopoulos and Grant-Muller, 2013; Thomopoulos et al., 2009; Wismadi, 2015). Additionally, there is a strong association between asset inequality and the infrastructure index, indicating that increasing infrastructure equity also promotes inclusive growth across regional states in Ethiopia (NPC, 2018, Unpublished).

According to different scholars, there are also ways to reduce infrastructure inequity and social injustice. A huge redistribution of infrastructure resources and a key change in public policy need to be considered necessary to restore decades of systematic geographical discrimination across regions in Ethiopia (Soja, 2013). "Equity sensitivity" keeps an eye on the standards of equity theory and favors the outcome/input ratios to be equal to those of other like regional states in Ethiopia (Huseman et al., 1987). When a citizen or a regional state in Ethiopia experiences unease due to perceived infrastructure inequity, they will work to decrease that strain. The greater the stress they experience, the more effort they will put into decreasing it (Adams, 1963; Rubin, 2006). Nevertheless, the means of decreasing infrastructure inequity will differ depending on the circumstances and will not all be equally adequate to a community or regional state in Ethiopia (Treuhaft et al., 2013). Execution to address this deficit in planning and assessment needs to be effectively directed at an institutional level to increase accountability and transparency—potentially by integrating equity within the evaluation of large infrastructure schemes by applying an appropriate framework in the country (Thomopoulos and Grant-Muller, 2013; Thomopoulos et al., 2009). This will permit decision-makers to not only become acquainted with the pertinent theory but also to apply it in practice and by doing so, to accomplish their duty for "public accountability" and "distributive justice" across regions in Ethiopia (Thomopoulos et al., 2009). Thus, guaranteeing social justice is a central concern for public policy, which is a central task in making genuine policies on infrastructure equity and in national development more generally in Ethiopia. In addition, Treuhaft et al. (2013) identified the following seven basic principles that can result in greater infrastructure equity across regions in Ethiopia: 1) infrastructure decisions must be fair and beneficial to all, 2) infrastructure plans should be known as equally critical governmental and societal responsibilities that yield equitable results, 3) budget priorities within infrastructure areas must be thoroughly evaluated using an equity lens, 4) services and opportunities generated by infrastructure decisions must be available and accessible to everyone in all kinds of communities, 5) employment and economic benefits related to building and maintaining infrastructure must be distributed throughout the regions of Ethiopia, 6) fair financing

mechanisms, and 7) community engagement (Treuhaft et al., 2013).

While capacity-building needs a medium-term time frame, changes in policies and regulations can be implemented in a shorter time frame. Hence, enhancing institutional capacity reveals the leading role of the government in organizing and coordinating infrastructure development in Ethiopia. Governance and equity are also essential prerequisites for building effective infrastructure and the nation. Thus, the government must address those challenges encountered in the areas of planning, mechanisms for coordination and dialogue, human resources, measurement and evaluation, and many others in the regions of Ethiopia. In addition, the federal government of Ethiopia needs to take the important step to conduct a needs assessment to determine where the biggest infrastructure needs are. Besides that, this assessment needs to involve the regional states, and the criteria the federal government of Ethiopia will use (such as engaging regional states in determining which areas have the greatest needs and publishing the scoring criteria used to determine needs) must be made public.

In other ways, as mentioned above, indigenous state capacities as well as state-nation nested set of policies need to be considered in Ethiopia to have the right state- and nation-building processes. Fundamental issues need to be customized, such as an asymmetrical "holding-together" federal state, but not an asymmetrical "coming-together" federal state or a unitary state; both individual rights and collective recognition; parliamentary instead of presidential or semi-presidential government; polity-wide and "centric-regional" parties and careers; politically integrated but not culturally assimilated populations; cultural nationalists in power mobilizing against secessionist nationalists; and a pattern of multiple but complementary identities (Stepan et al., 2011). These also need to include the aforementioned seven infrastructure equity principles, which should be almost always prerequisites for successful state- and nation-building processes in Ethiopia. Besides, territorial (or regional) demarcation is traditionally linked to the state-building processes, while governing the division of the country's internal territory into two or more territorial constituent units or regional states as well.

6.2. Conclusion

Government policies, human capital, and regional/territorial/spatial disparities are likely to be the main drivers of inequities in infrastructure in Ethiopia, as revealed by the theoretical and empirical assessments. Additionally, it is asserted that the primary cause of the growing regional inequality is the uneven distribution of public spending among the wealthier regional states. Therefore, growing inequity has substantial effects on macroeconomic stability and growth, leading to inadequate distribution of infrastructure resources and a concentration of power in the hands of a select few. The state- and nation-building processes will be more constricted if the distribution of infrastructural development is far from equitable, and the path to fragility will continue.

The study reveals that, in quantitative and qualitative analyses, as well as time series analysis, public infrastructure distribution in Ethiopia has failed or has been disrupted, significantly affecting the country's state- and nation-building processes. These interrelationships necessitated the determination of the causal link between these constructs. The findings of this study have also suggested that theories of coordination, equity, and infrastructure equity are crucial. These will support equitable infrastructure access as a just and significant component of nation-building processes. The study also emphasizes democratic federalism as a means and as the state-nation

nested set of policies. Additionally, it also suggests that state capacities are crucial to supporting the equitable allocation of public infrastructure investments and the nation-building processes in Ethiopia.

Moreover, Lemma and Cochrane emphasized "the issues of policy incoherence, which results in the inefficient and ineffective utilization of scarce resources" (Lemma and Cochrane, 2019, p. 12). In areas that formally have access to electricity, for example, power consumption and supply reliability are basically insufficient in Sub-Saharan Africa (Falchetta et al., 2020). In addition, the federal government, in re-establishing infrastructure equity, needs to recall that the citizens or regional states could value diverse outcomes. The equity theory, established on the "norm of equity", undertakes that everybody is equally sensitive to equity and inequity/injustice (Huseman et al., 1987; Liebig et al., 2016). This adds to the pressure to make infrastructure investment give the impression of being both equitable and efficient.

Consequently, the result, from the discussion above, has been coordination problems due to a wide range of behaviors that matter for infrastructure development, which involve corruption, lack of transparency and accountability, and property rights in the allocation of public goods across the regional states in Ethiopia. These are also critical challenges for infrastructure equity and the nation-building processes, including the lack of rule of law, democratic accountability, shared national identity, and inclusive and sustainable growth in Ethiopia. Actually, Ethiopia's state- and nation-building processes are very weak. Then, it is significant to consider state-nation and nation-state policies (Stepan et al., 2011), which serve as an instrument for the state- and nation-building processes.

The equitable allocation of public investments in infrastructure does not end at planning and decision-making of infrastructure investments (Huseman et al., 1987; Rubin, 2006). There are a number of policies and activities that can cause infrastructure inequity interferences, including budgeting decisions, land acquisition, spatial development, and construction laws and policies. More importantly, the findings of this study suggest that the government should look more into policy initiatives (infrastructure policies that promote opportunity and inclusion). This would significantly improve the management of equitable infrastructure access. This is because infrastructure is the skeletal support of communities and regional states. Accordingly, this study has provided a good basis for generalizing the application of the CII for equity-based resource allocation for infrastructure and contributes to the debate of "people-centered" (e.g., workers, leadership, etc.) versus "place-based" (e.g., infrastructure, housing, etc.) development (Duranton and Venables, 2019; Wismadi, 2015). Understanding these linkages is critical for devising an effective framework for deep interventions in infrastructure in Ethiopia, be it at the national/federal/regional states/zonal/local government level or at the community level.

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Anpendixes

Anpendix 1: Composite Infrastructure Index Formula

For normalization, the following formula was employed:

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)}$$

where:

NV_{ij} = Normalized value corresponding to the X^{th} indicator, where i = corresponding state and j = corresponding indicator

Best X_i = Best/maximum value of the X^{th} indicator, where i = number corresponding to the state (in this case, values of nine regions and one administrative city under the X^{th} indicator will become the i series)

Observed X_{ij} = Observed/current value of the X^{th} indicator, where i = corresponding state, j = corresponding indicator, and Worst X_i = worst/lowest value of the X^{th} indicator

The factor loading and weights of these indicators were computed using the following formula:

$$I = \frac{\sum_{i=1}^{n} x_i \left(\sum_{j=1}^{m} |L_{xj}| * E_j\right)}{\sum_{i=1}^{n} \left(\sum_{j=1}^{m} |L_{xj}| * E_j\right)}$$

where:

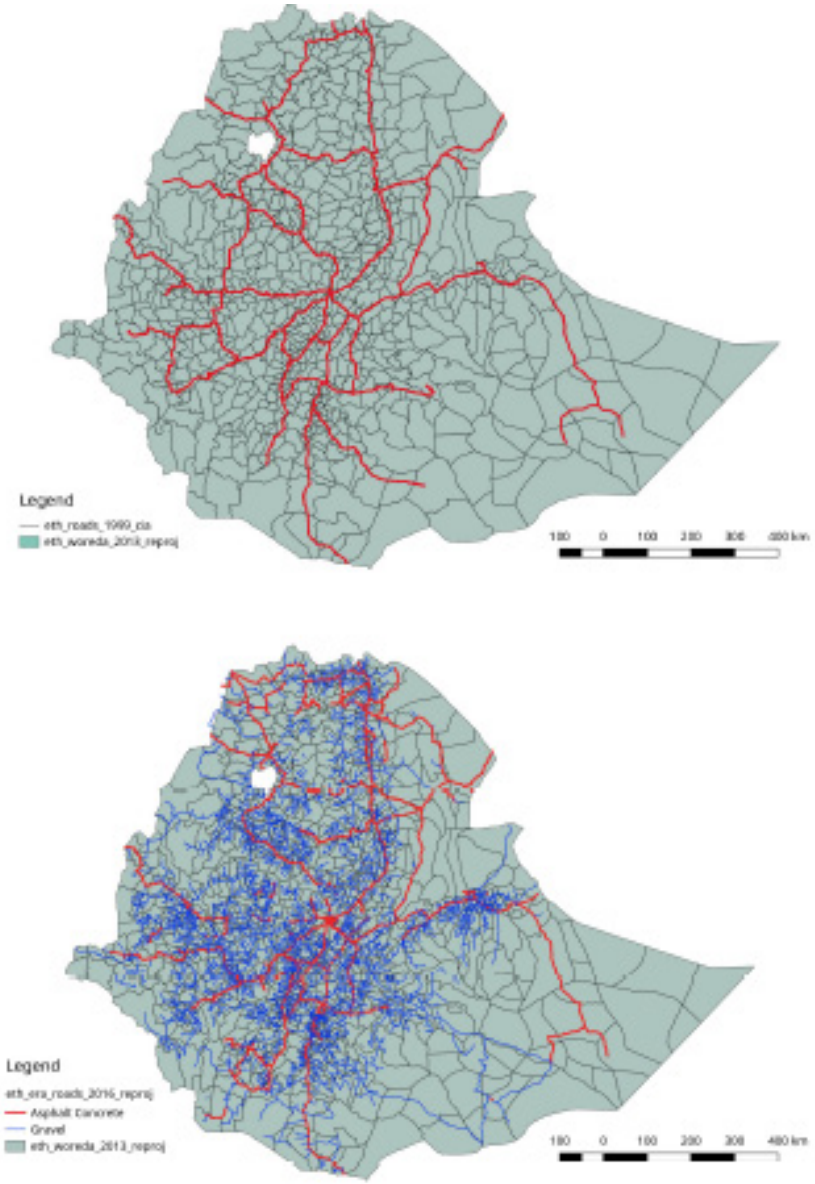
I is the index for a particular category (region)

x_i is the i^{th} indicator under a particular category

L_{ij} is the factor loading value of the i^{th} variable on the j^{th} factor

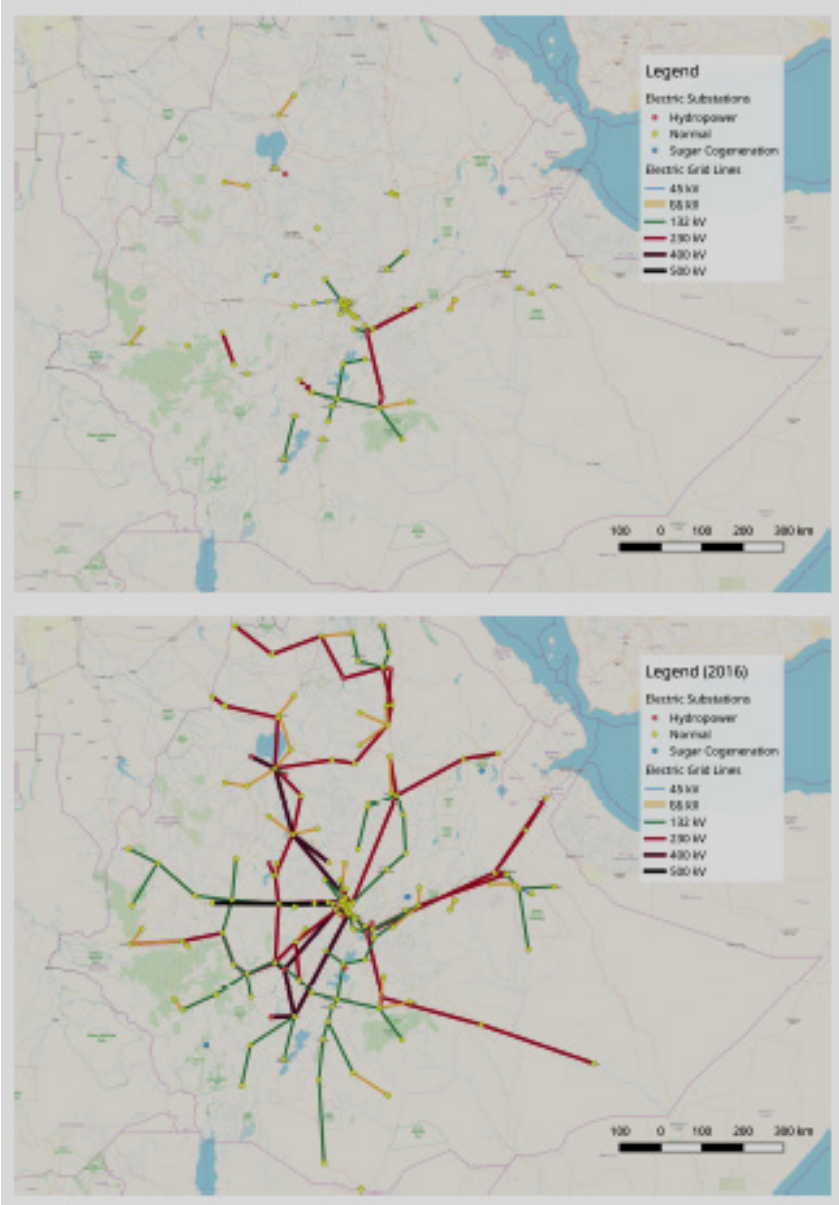
E_j is the eigenvalue of the j^{th} factor

Anpendix 2: Figures



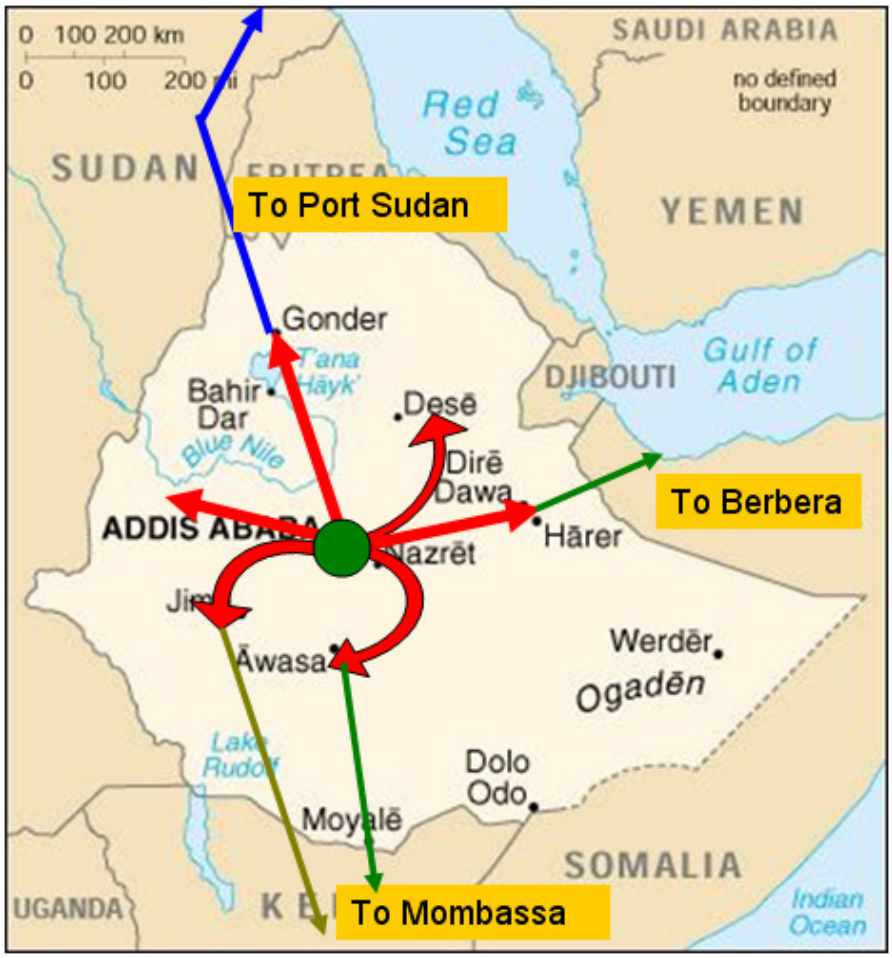
Source: Desalegn and Solomon (2021b) and Moneke (2020b)

Figure 1. Large-scale road network expansion (2000–2016)



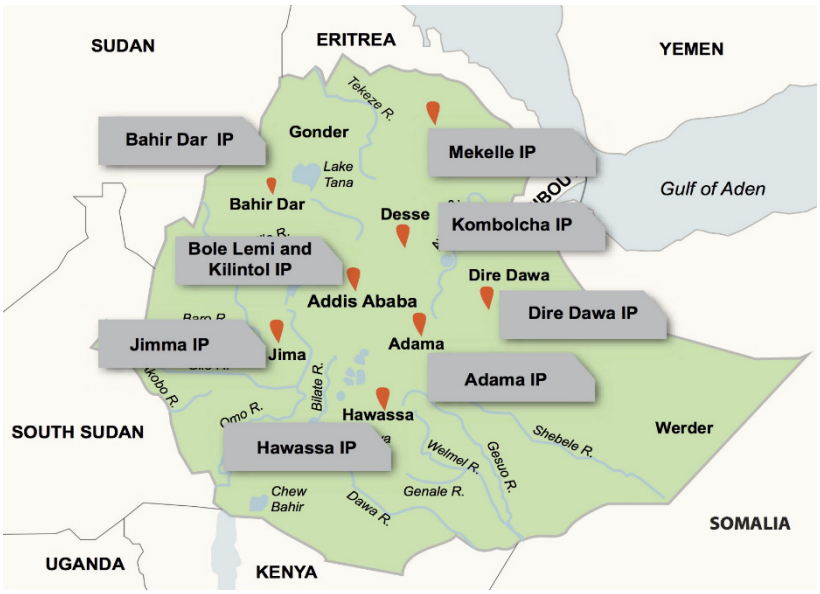
Source: Desalegn and Solomon (2021b) and Moneke (2020b)

Figure 2. Large-scale electricity network expansion (1990–2016)



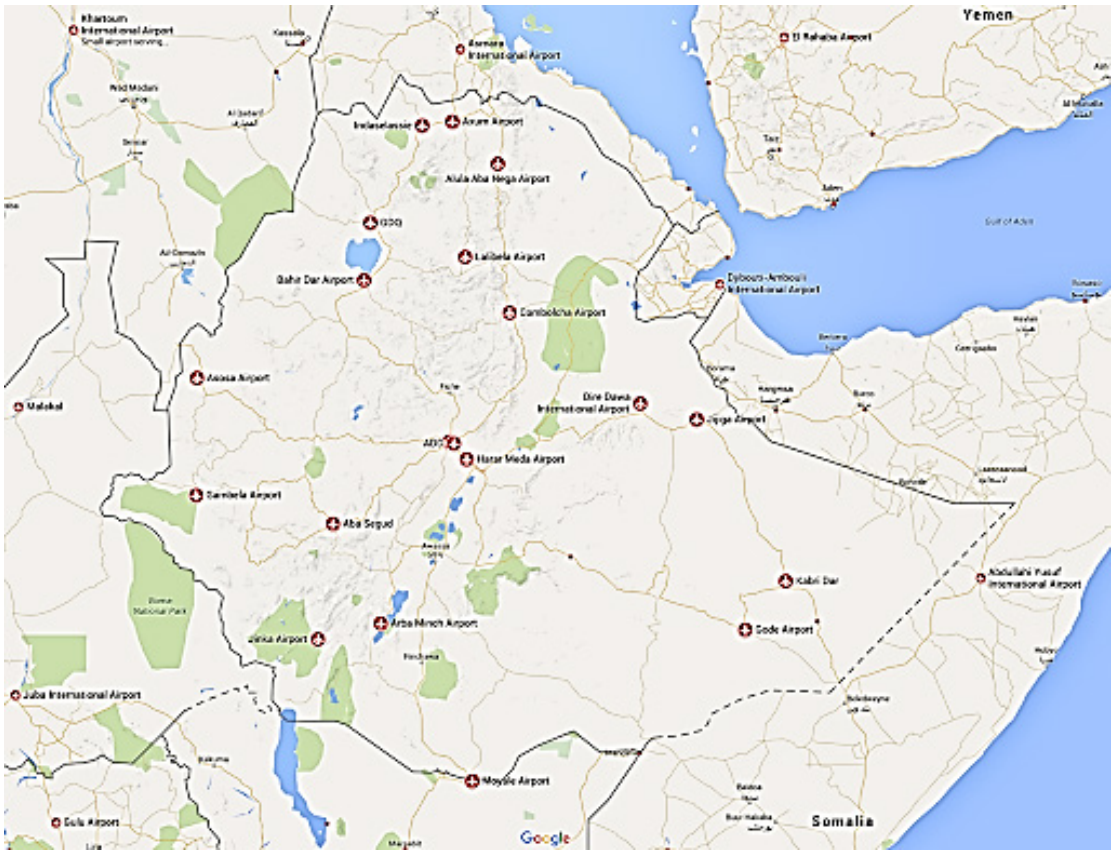
Source: Desalegn and Solomon (2021b)

Figure 3. Large-scale telecommunications network expansion (1991–2017)



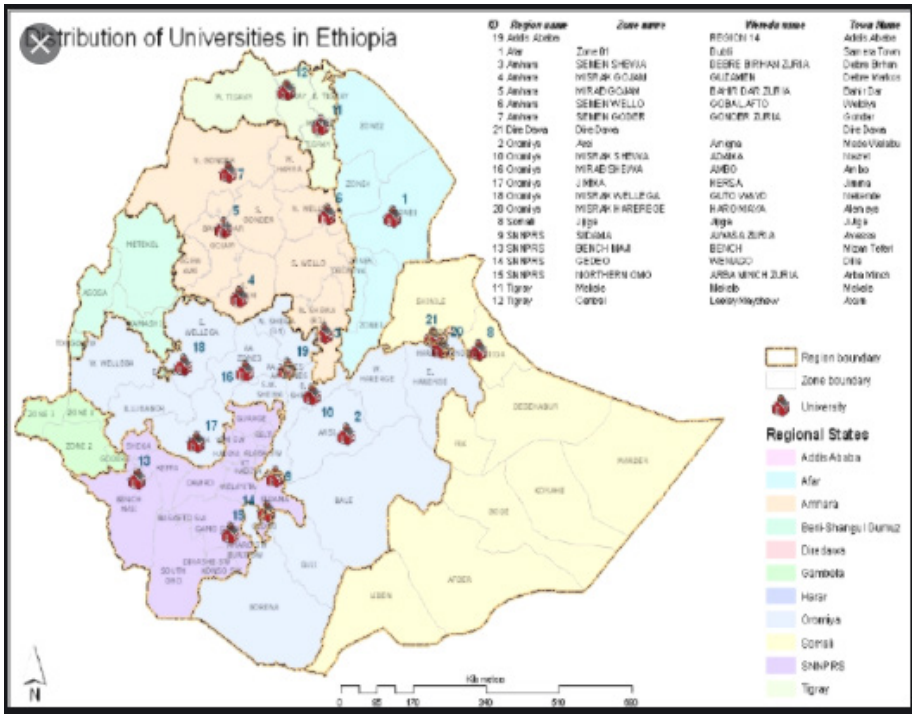
Source: Desalegn and Solomon (2021b)

Figure 4. Large-scale industrial parks network expansion (1991–2017)



Source: Desalegn and Solomon (2021b)

Figure 5. Large-scale airport infrastructure network expansion (1991–2017)



Source: Desalegn and Solomon (2021b)

Figure 6. Large-scale university infrastructure network expansion (1991–2017)