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**The role of the construction sector in
influencing natural resource use, structural
change, and industrial development in Zambia**

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Abstract: The construction sector plays a critical role in delivering quality infrastructure, which in turn influences the use of natural resource revenues towards achieving structural change and industrial development. We use industrial organization and political economy lenses to describe and understand the organization of and changes in the construction industry in Zambia, focusing on demand-side factors; supply-side issues; market interactions through pricing and costs; and public institutions, regulations, policies, and structures. We establish the main firm-level, industry-wide, and macroeconomic bottlenecks affecting Zambia's construction sector and offer options for dealing with the key bottlenecks. In particular, we suggest: institutional reforms and legal and regulatory changes governing procurement and contracting rules and systems; training and other capacity-building programmes; greater access for local contractors to existing financing sources, including the Skill Development Levy; a review and update of the local content and subcontracting strategy and policy; and state-supported and -financed/-resourced research and development programmes.

Keywords: construction, infrastructure, prices, cost, market structure, bottlenecks

JEL classification: B41, L11, L16, L74

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1 Introduction

The importance of good-quality infrastructure in determining the course of industrialization, structural transformation, and economic development in any economy is generally well established in the literature (ECA 2017; Page 2018). Economic infrastructure includes a range of basic services—physical structures, systems, institutions, services, and facilities—that are the foundational tool for developing the economy of a country, region, or city. The stock of physical infrastructure or physical assets is one of the bedrocks of industrial activity. It broadly determines the efficiency with which producers and consumers operate and interact in clearing markets, significantly shaping the fortunes of an economy.

A range of constructed or capital installations exist which qualify as (physical) infrastructure. These include: (i) *transportation systems* such as roads, bridges, walkways, rail, airports, and ports; (ii) *electric energy production and distribution systems* such as electric grids; (iii) *water and sanitation systems* that provide a supply of clean water, allow for water resource management, and support sanitation through waste disposal subsystems; (iv) *housing infrastructure*, including accommodation or buildings for residential and commercial purposes (retail stores, wholesale stores, and warehouses/storage facilities, including silos), office buildings, and extractive industry and manufacturing infrastructure or factories, which are specialized types of housing infrastructure; and (v) *telecommunication installations* like phone, television, or internet network installations, satellites, etc.

Because of the *public good* nature of most physical infrastructure, most efforts to install or build physical assets, particularly in developing countries like Zambia, tend to be public-sector-driven and state-funded. Granted, contemporary infrastructure projects in Africa are generally financed through loan and grant term-financing from (multilateral, bilateral, and regional) development corporation partners or through public–private partnerships, albeit mainly limited to energy projects. However, even these foreign-financed projects must eventually be paid for by the host countries through loan or grant repayments. Thus, for a number of African countries the ultimate direct financing of infrastructure projects out of domestic tax-payer resources has been inevitable and its scale sizeable.

However, the *private good* nature of some physical infrastructure, particularly residential and commercial accommodation buildings in the private domain, must not be forgotten. In Zambia, both the private residential housing and the commercial office and retail outlet (shopping mall) subsectors have seen tremendous growth in the past 18 years (2000–18), especially in urban areas. These dynamics are worth keeping in mind given the way they have changed the human settlement and retail aspects of the Zambian economy.

The construction sector is a critical determinant of how successful an economy will be at converting its public and private resources or investment efforts into physical assets. For instance, emerging evidence from a large sample of countries suggests that restricted sectoral competition results in relatively higher construction costs, which are in turn correlated with relatively poorer-quality infrastructure installations. Similarly, the success of building social infrastructure such as schools, health facilities, water and sanitation systems, and so on critically depends on the competitiveness of construction services. If construction services face bottlenecks or constraints in production and are unable to increase supply, any surge in demand, other things being equal, will force costs and prices to rise, reducing the output of physical asset for a given nominal investment outlay.

To deliver infrastructure, construction services require a range of critical factor inputs, including raw material inputs, (skilled and unskilled) labour, land, technology, finance, organization, and so on. Each can significantly enhance or constrain the expansion of physical assets. This study has a twofold objective, namely: (i) to identify the key bottlenecks and constraints in the construction sector in Zambia; and (ii) to identify policy options to enhance the sector's ability to respond to surges in demand for construction services.

We consider these issues over the past decades in Zambia, with a bias towards the last eight years (2010–17). Broadly, in this study, we employ industrial organization and political economy tools as the main conceptual and analytical lenses, and we draw on secondary data as the main basis of empirical observation and inferencing. The methodology we utilize is simple and straightforward, and is self-evident as part of the presentation of the main observations and insights.

The rest of the paper is structured as follows: Section 2 presents a basic description of the industrial organization of the construction sector in Zambia; Section 3 assesses the key bottlenecks, constraints, and challenges in the construction sector; and Section 4 concludes the paper with a summary of plausible policy options for dealing with key bottlenecks in construction.

2 Organization and change in Zambia's construction industry

The demand for construction services, which are responsible for expanding the stock of physical assets of infrastructure in Zambia, stems from the evolving demographic, political, and economic circumstances of the economy. These aspects are highlighted in turn in the subsections that follow.

2.1 Demographic, political, and economic changes and construction in Zambia

Zambia's population was projected at 16.4 million inhabitants in 2017 (CSO 2013). The country covers a land area of 752,618 km² (World Bank 2018b), meaning a fairly low population density of 22 persons per km² compared with an average density of 44 persons per km² in sub-Saharan Africa. The urban population is estimated at 42 per cent of the total population, with the rest (58 per cent) residing in rural areas. Outside the national parks, game reserves, Game Management Areas (GMA), and forest reserves, most rural and urban spaces in the country are occupied by human inhabitants, although some districts are very sparsely populated, with extremely low densities—e.g., Mulobezi in Western Province, with 3.0 persons per km², Luano in Central Province (3.6), Mufumbwe, North-Western (3.8), Ngabwe, Central (4.0), Kasempa, North-Western (4.1), and Sesheke, Western (4.3) (Brinkhoff 2018). These human settlement patterns in rural areas add to considerable pressure on the authorities to expand Zambia's public sector infrastructure development agenda to cater for the rural areas. This is because as long as they are inhabited, even the most sparsely populated areas are entitled to physical infrastructure (roads, bridges, electricity installations, telecommunication infrastructure, schools, health facilities, water and sanitation systems, buildings for residential and commercial use, etc.).

On the other hand, the high population densities in urban areas have raised demand for commercial and residential real estate, thus pushing up demand for building construction services in these areas. Lusaka District, where the capital city is located, has by far the highest population density at 5,808 persons per km² compared with, say, 856 persons per km² in the second most densely populated district, Kitwe (Brinkhoff 2018). Lusaka has therefore established itself as the most preferred destination for private investments in residential housing, as well as in commercial private buildings for office accommodation and retail space (shopping malls and supermarkets).

The demand for related building construction services is therefore much greater in Lusaka than in other parts of the country.

Added to these human settlement pressures, the current political dispensation is anchored on an economic philosophy of state-led development, to be achieved primarily through public goods infrastructure expansion. The *2011–2016 Manifesto* of the ruling political party in Zambia, the Patriotic Front (PF), asserts that:

Under the MMD government, investment in infrastructure development has been limited and the pace of development slow. Part of this is due to an obsession with maintaining ‘tight money’ through fiscal and monetary policies. This has resulted in many parts of Zambia resembling ghost towns despite more than five years of record mineral prices and a production boom. (Patriotic Front 2011: 29)

In 2011, when the PF came to power, its manifesto locked the country into an ambitious infrastructure development path that persists today.

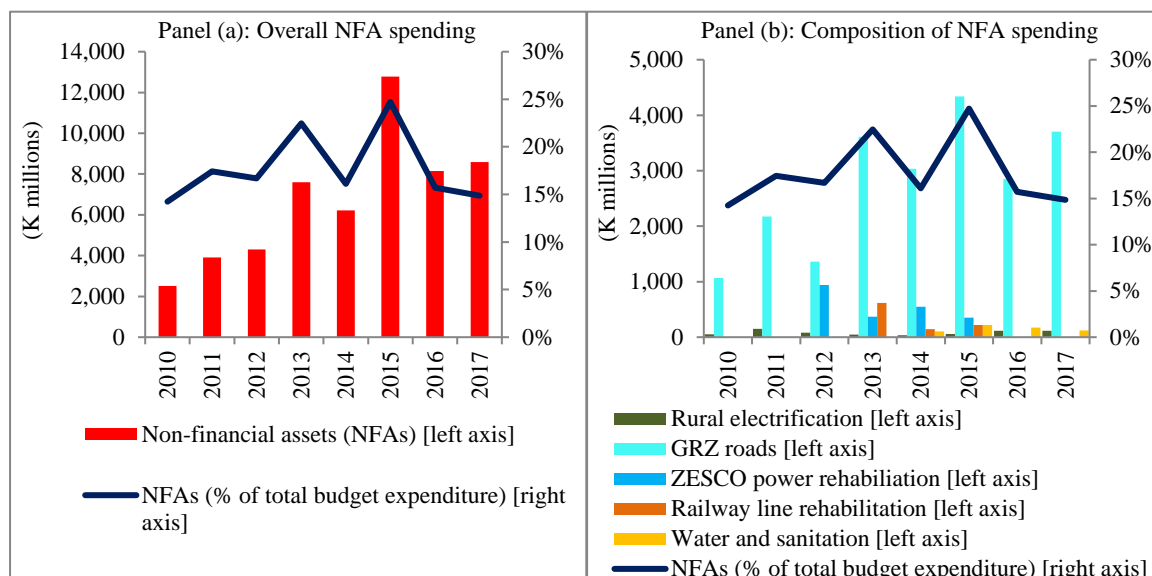
The public infrastructure development ambitions are also seen in the *Seventh National Development Plan 2017–2021* (7NDP; Republic of Zambia 2017). The 7NDP has ten Strategic Development Outcomes, including one on ‘Improved Transport Systems and Infrastructure’, which focuses on construction and rehabilitation of railways; development of aviation infrastructure and operations; construction and rehabilitation of the road network; and construction and rehabilitation of maritime and inland waterways. Beyond this, the Development Outcomes in agriculture, tourism, water and sanitation, information and communication technology (ICT), etc. all incorporate components of related infrastructure development.

Ultimately, the underpinning philosophy of a sustained expansionary fiscal path committed Zambia to, initially, two major infrastructure development undertakings, namely:

- The Link Zambia 8000 road project—also known as Accelerated National Roads Construction Programme (ANRCP)—which was initiated in 2012, aiming to transform Zambia into a land-linked country through extension of the surfaced core road network by 8,000 km in three phases; and
- The creation of new districts and revitalization of old ones, which saw an expansion of the total number of districts from 72 in 2011 to at least 108 in 2017 (Brinkhoff 2018), with all the new districts requiring administrative infrastructure (offices and personnel housing, schools, health facilities, road network, etc.).

To date, Zambia’s political commitment to development through infrastructure expansion has remained consistently strong, particularly during the period 2013–17. The country’s nominal expenditure on non-financial assets (NFAs) (or capital spending on physical assets) grew from ZMK2.5 billion in 2010 to a peak of ZMK12.8 billion in 2015 before slowing down somewhat to ZMK8.3 billion in 2017 (Figure 1, Panel (a)). Concurrently, the share of NFA expenditure increased from 17 per cent of total budget expenditure in 2010 to a high of 25 per cent in 2015 (the year before the general elections of 2016), but declined to a period low of 14 per cent in 2017 (a year after the elections).

Figure 1: Public expenditure on physical assets



Notes: GRZ = Government of the Republic of Zambia; ZESCO = Zambia Electrical Supply Company.

Source: Authors' construction from Ministry of Finance Annual Economic Reports (available at: www.mof.gov.zm/?page_id=5246, accessed Feb–August 2018) and Fiscal Tables (provided privately).

The government roads programme was the most dominant planned non-financial capital expenditure item in the National Budget during 2010–17 (Figure 1, Panel (b)), accounting for an annual average allocation of 42 per cent of NFAs over the period. The other major capital expenditures, such as rural electrification, power rehabilitation, railway line rehabilitation, and water and sanitation were relatively small and intermittent to varying degrees during the period. Surprisingly, significant electric power rehabilitation expenditures were made during 2012–15, with part of the financing (about US\$255 million, or 34 per cent) meant to come from borrowed proceeds (US\$750 million) from the 2012 Eurobond (World Bank 2017). However, the notable expenditure seen in Figure 1, Panel (b), failed to protect Zambia from the power shortage that would ensue as a result of a partial drought in 2015 (see Box 1).

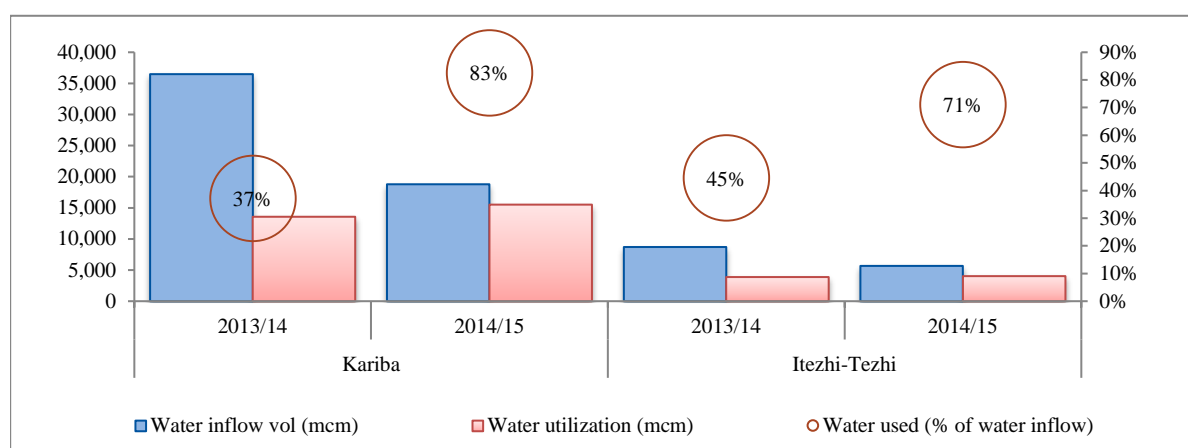
Overall, it can be expected from the foregoing that the demand for construction services in Zambia will continue to be significantly influenced by the public sector's demand for and expenditure on major infrastructure development projects and programmes. In turn, these decisions will continue to be significantly determined by the political dispensation, particularly the appetite for infrastructure development as a key avenue towards economic growth and development.

As the political economy factors driving construction and infrastructure development in Zambia continue, policymakers and decision-makers would do well to pay attention to the efficiency of the country's investments. Although somewhat cursory, one popular and quick way of gauging the efficiency or productivity of investment is to calculate and assess the incremental capital–output ratio (ICOR). The ICOR is computed as the investment-to-GDP ratio (investment as a percentage of GDP) divided by the GDP growth rate (per cent). It measures the marginal amount of investment capital necessary for an economy to generate an extra unit of production output (or GDP). Overall, the higher the ICOR value, the lower the productivity of capital (or the higher the inefficiency of production).

Box 1: Sources of the 2015/16 electric energy supply shortage

The 2015/16 electric energy supply shortage that occurred starting in July 2015 resulted from a combination of a partial drought in the 2014/15 rainy season and the mismanagement of the diminished water resources by water authorities and the main power producer, ZESCO. Water inflows into Zambia’s main reservoirs for hydroelectric power generation—Kariba and Itzhi-Tezhi—reduced by 35–48 per cent in 2014/15 compared with the levels of 2013/14. Despite this, the Zambezi River Authorities and ZESCO depleted about 83 per cent and 71 per cent, respectively, of the water in the Kariba and Itzhi-Tezhi reservoirs between January and July 2015 (Figure B1). In absolute terms, 15.5 billion cubic metres of the water in Kariba was used in the first seven months of 2015 compared with 13.6 billion cubic metres during the much better inflow-yielding January–July 2014. Similarly, 4.03 billion cubic metres of water were depleted from Itzhi-Tezhi in January–July 2015 compared with 3.9 billion cubic metres in the first seven months of 2014. Electricity production thus declined dramatically in the second half of 2015 because of the combination of a drought and costly (water overuse) mistakes in the first half.

Figure B1: Water inflows and utilization during January to July of each season

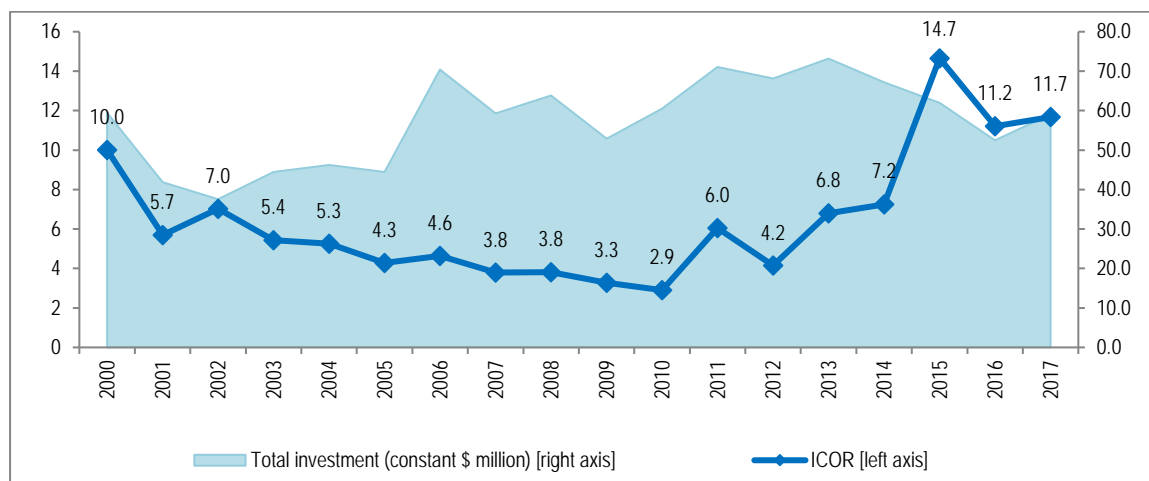


Source: Authors’ construction based on Cheelo and Banda (2017).

Over the period 2000–17, Zambia’s ICOR first declined steadily between 2000 and 2010, reflecting gains in production efficiency during the period (Figure 2). On average, over 2000–10, the country’s annual ICOR value was 5, implying that US\$5 of capital investment was necessary to generate \$1 of extra GDP. Then, from 2011 onwards, except in 2012, the ICOR value increased markedly and sustained high value until the close of the period. The annual average ICOR value over the latter period was 9, implying that to generate \$1 of extra GDP now required not \$5 but \$9 of capital investment—suggesting that Zambia became less efficient in its use of capital. The country’s capital stock has become increasingly less growth-enhancing, thus raising questions about, among other things, the quality of investment spending and in particular the quality of the construction services that are responsible for the capital formation (or installation of infrastructure).

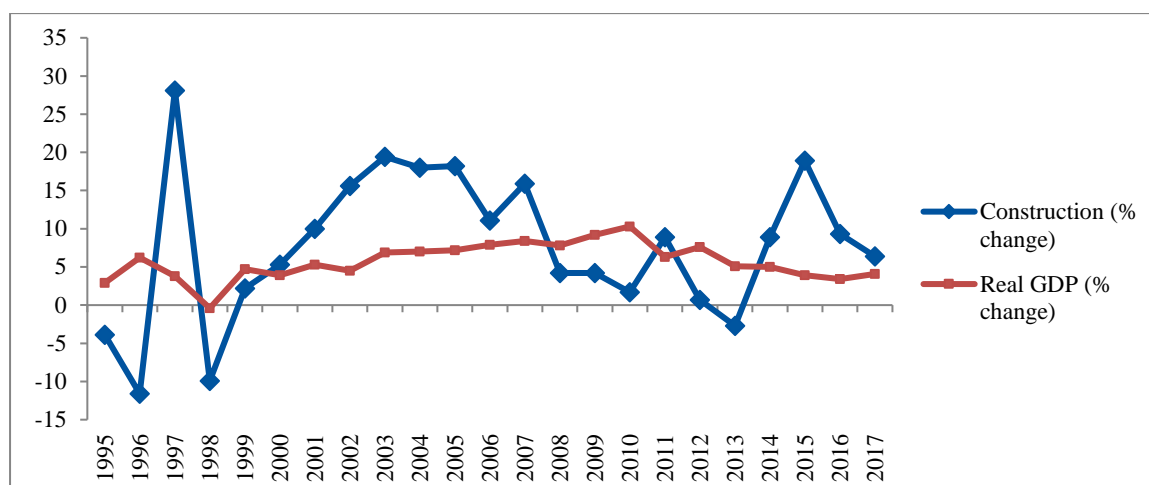
From the perspective of sectoral economic activity, the growth of the construction sector has been impressive over a sustained period. This performance has been significantly underpinned by Zambia’s aforementioned high propensity to spend on infrastructure development. Save for two short episodes (2007–09 and 2012–13), the real growth rate in construction value added has always been higher than the overall real GDP growth rate since the turn of the twenty-first century (Figure 3). However, construction sector growth has also seen a higher degree of volatility than the overall real GDP growth trajectory.

Figure 2: Real total investment and capital productivity



Source: Authors' construction based on IMF (2018).

Figure 3: Percentage changes in GDP, by type of economic activity (constant prices)

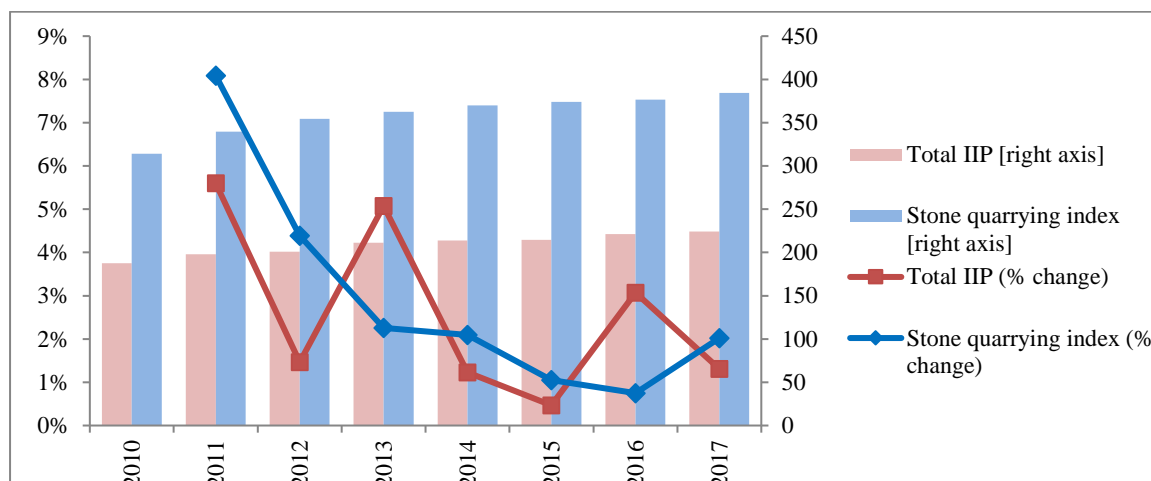


Source: Authors' construction based on CSO National Accounts data (provided privately).

Figure 4 lends further support to the argument that construction services have grown faster than the average growth of the economy overall. The figure shows, for 2010–17, the total index of industrial production (IIP) and the stone quarrying (production) index (one of 12 sub-indexes used in the construction of the total IIP). Stone quarrying provides a key input into construction, and its relative performance reflects the relative strength of underlying demand for construction services. In the case of Zambia, the stone quarrying production index was consistently higher than the overall IIP and, although the growth in overall and stone quarrying industrial production declined over time, stone quarrying growth was consistently higher than total IIP growth, except in 2013 and 2016.

Underpinned by robust growth, the contribution of construction services to the economy has increased markedly. The share of construction in economic activity increased rapidly from 3.6 per cent of GDP in 1995 (three years after the liberalization reforms of 1992) to a sectoral peak of 10.9 per cent in 2000, and then declined marginally to 10.3 per cent in 2017 (CSO 2018).

Figure 4: Industrial production, total and stone quarrying (indexes and percentage changes)



Source: Authors' construction based on CSO National Accounts data (provided privately).

In terms of employment, out of the total of 5.9 million employed persons in 2014 (CSO 2015), construction accounted for 182,806 workers (or 3.1 per cent of the total). Of these, 59,085 (32 per cent) were employed in the formal sector while 123,721 (68 per cent) were in the informal sector.

The average earnings for paid employees in construction in 2014 was ZMK1,834 per worker (ZMK1,851 for men and ZMK1,401 for women) compared with relatively higher earnings overall across all industries combined (ZMK2,344 both genders, ZMK2,427 men, and ZMK2,129 women). On the other hand, the average work time for employed persons (15 years or older) in 2014 was 44.7 hours per week (44.8 hours for men and 42.3 hours for women) compared with 40.7 hours per week on average overall across all industries (43.4 hours for men and 37.2 hours for women). This indicates that, on average, workers in construction typically worked for longer than their counterparts in other industries but earned relatively less. And this is despite the impressive real growth in construction sector value added and shares of GDP at the macroeconomic level.

2.2 Construction industry organization: Cost and pricing implications

The construction industry can be viewed in terms of the supply of and demand for construction services. The industry is therefore organized in terms of the number of suppliers and consumers, the pricing mechanisms, the ease of entry and exit, the level of information flow (or asymmetries), and so on (industrial organization lens).

On the supply side, the National Council for Construction and Zambia Institute for Policy Analysis and Research (NCC and ZIPAR 2017) report that the NCC recorded 3,081 registered firms in 2016. This increased to 3,791 as of 30 September 2017 according to the NCC list of registered contractors (NCC 2018). In terms of ownership, NCC and ZIPAR (2017) estimated that most of the firms (91.4 per cent) in the construction industry were Zambian-owned, with foreign-owned firms only accounting for 4.4 per cent and jointly owned firms for 4.2 per cent. Although foreign-owned firms constituted less than 5 per cent, they generally dominate the industry in terms of the value of contracts awarded. For instance, in 2014, 90 per cent of foreign-owned construction firms which submitted public tender bids successfully secured the tenders, compared with the 3.8 per cent of Zambian-owned firms which were successful in the same year.

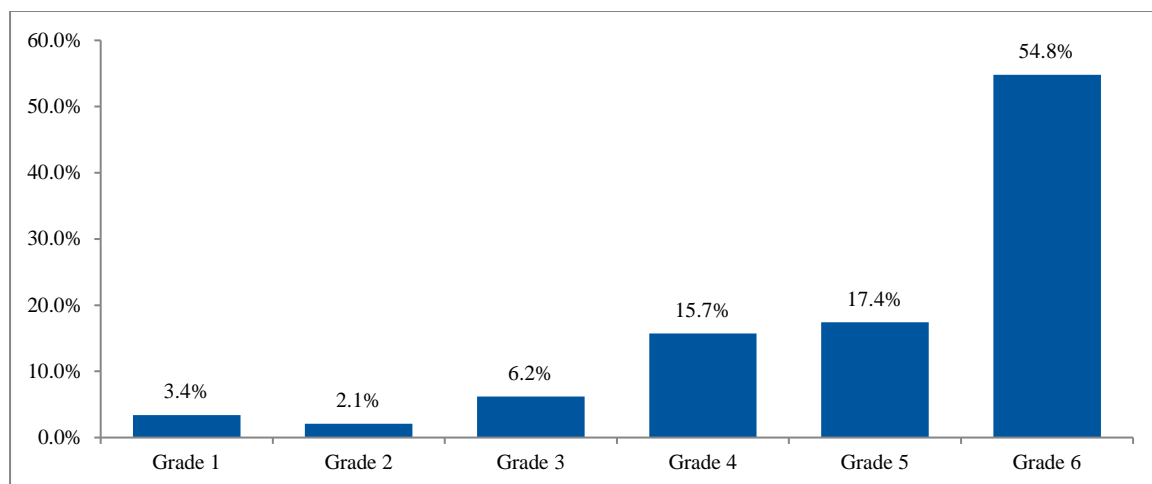
In the Zambian context, it is important to note that construction firms are graded based on each firm's capacity to deliver, which is determined as a mix of the firm's previous contracts, access to

credit, numbers of professional and technical staff (human resource competence), financial position (including operating capital endowment), and state of technology. The grading system is numeric, with 1 the highest grade attainable and 6 the lowest. The higher the grade, the higher the annual registration fees a firm is required to pay. In 2014, the registration fee was ZMK7,750 for Grade 3 firms and only ZMK625 for Grade 6 firms.

The NCC and ZIPAR (2017) survey shows that the majority of the firms in construction (87.9 per cent) in Zambia in 2017 were registered in the lower grades (4–6), while firms in higher grades (1–3) account for about 12.1 per cent (Figure 5). This is corroborated by the registration pattern revealed in NCC (2018) (Figure 6). With firms in lower grades having limited values on the contracts that they execute, this market composition entails that higher-grade firms—i.e., firms that can generally afford higher registration fees—are inherently able to capture significantly larger market shares.

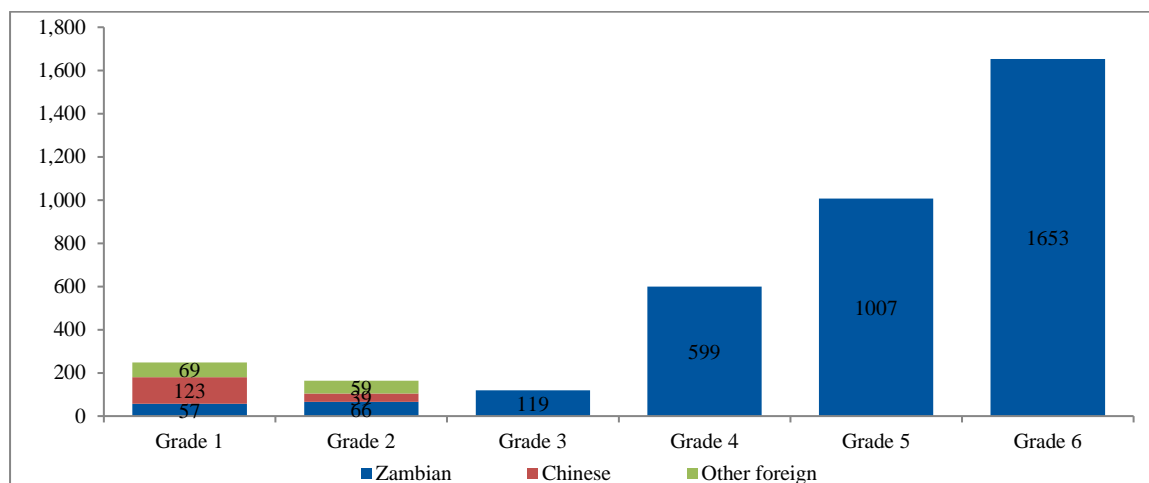
Thus, while the construction sector, on the supply side, allows for a fairly high degree of openness, making room for firms to freely enter into and exit from the market, the registration fee, operating capital endowments, human resource competence, and state of technology all allow firms to significantly differentiate the construction services they are able to offer, thus posing a constraint on lateral firm movement to higher grades within the sector. It is on the basis of observations like these that the Ministry of Commerce Trade and Industry (MCTI 2018) has argued that, while the number of infrastructure projects in the construction sector in Zambia has been on the increase, there has been limited participation of local firms and inputs; MCTI has therefore argued for a local content strategy.

Figure 5: Grading of construction firms in Zambia, by overall proportion (percentage)



Source: Authors' construction based on NCC (2018).

Figure 6: Grading of construction firms, by number and ownership



Source: Authors' construction based on NCC (2018).

At face value one might expect the construction industry in Zambia to be characterized by monopolistic competition—a type of imperfect competition where market entry and exit are highly feasible and, more importantly, where many price-taking producers (firms) sell goods or services that are differentiated from one another and hence are not perfect substitutes (Gans et al. 2003). But, as we show later in this section, the industry is actually characteristic of an oligopoly, with very few dominant firms within each of the six construction sector service areas, namely: (i) Category B—general building and housing; (ii) Category C—general civil engineering works; (iii) Category E—general electrical and telecommunications; (iv) Category M—mining services: construction works within mining areas; (v) Category Me—mechanical engineering works; and (vi) Category R—general roads and earthworks.

It is partially in light of this industrial structure and the limitation that it imposes on local participation that Phiri (2016) analyses the 20 per cent subcontracting policy in the Zambian construction sector, assessing its efficacy in developing the capacity of local contractors, and finds that:

- It would be difficult to grow the capacity of local contractors using the policy because of a limited and weak implementation framework;
- The policy statement only covered the road subsector and was silent on the other salient subsectors such as building and energy installation construction;
- The policy did not have any measures or implementation framework for how its objectives would be achieved; and
- Foreign contractors were not willing to build the capacity of local contractors as there was no incentive for them to do so.

Saasa also finds that:

the 20 per cent sub-contracting initiative is neither policy nor law. NAMSSC has been pushing the Government to work on a legislation which would lead to increased compliance. The initiative has not been working as earlier envisioned ... The transfer of technology or skills development is not working because RDA nominates political cadres with no qualifications and knowledge in construction but may produce NCC registration certificate. These politically-inclined beneficiaries normally trade-off the 20 per cent with Chinese contractors. Those

that manage to participate face delayed payments of up to two years. (Saasa 2018: 26)

Clearly, issues of efficiently, effectively, equitably, and justly promoting local content in construction should be a high priority on the Zambian agenda for construction sector development if the sector is to deliver the structural change and industrial development it is meant to bring to the country.

The demand side of the construction industry can be compartmentalized into three broad sub-groups of consumers of construction services, namely households, private firms, and the government.

Households' direct demand for construction services is mainly exerted through demand for housing accommodation. According to the Living Conditions and Monitoring Survey (LCMS) of 2015 (CSO 2016), the distribution of households by the type of housing they occupy and by tenancy status (Table 1) reveals current (2015) housing service consumption patterns across the country. About 81.3 per cent of urban households are resident in detached houses, flats/apartments, or semi-detached houses, compared with only 16.6 per cent of households in rural areas.

Table 1: Percentage distribution of households, by type of housing and tenancy

Type of housing unit								
	Traditional hut	Improved traditional hut	Detached house	Flat/apartment	Semi-detached house	Servants' quarters	Other	Total no. of households
Zambia	32	21.5	28.5	10.4	5.5	1.3	0.8	3,014,965
Rural	52.9	29.9	14.2	1.3	1.1	0.1	0.4	1,718,060
Urban	4.3	10.2	47.4	22.5	11.4	2.8	1.4	1,296,905
Tenancy								
	Owner-occupied	Rent from institution	Rent from private owner	Free Housing	Other	Not stated		Total no. of households
Zambia	70	1.8	22.2	5.9	0.5	0.0		3,014,965
Rural	90.8	1.1	2.0	5.8	0.3	0.0		1,718,060
Urban	41.4	2.8	49.0	6.1	0.8	0.0		1,296,905

Source: Authors' construction based on CSO (2016).

Moreover, the largest proportion of urban households (49 per cent) occupied rented private accommodation, followed by households in owner-occupied residences (41.4 per cent); in rural areas the vast majority (90.8 per cent) are resident in owner-occupied houses. Notwithstanding these patterns, the draft national housing policy (MLGH 2016) estimates that Zambia's housing deficit was at 1,539,000 units in 2016, of which 40 per cent were urban area deficits and 60 per cent were rural. The situation analysis in the draft policy suggests that Zambia has continued to experience rapid urbanization (and great demand for urban housing) due to, among other things, the limited economic opportunities and poor access to economic and social infrastructure, including social amenities and services, in rural areas.

Regarding firms' demand for construction services or infrastructure, surprisingly little information and data exist to offer deep insights. In principle, it is argued that demand mainly comes indirectly, in terms of business needs for logistical support infrastructure (storage, office accommodation, transportation, energy, telecommunications, etc.). According to the last *Zambia Business Survey* (Clarke et al. 2010), such logistics infrastructure services, particularly transport and land access, were relatively serious obstacles for micro, small, and medium-scale enterprises (MSMEs) in Zambia in 2008, whereas they were relatively lesser constraints for large firms, except in the case

of electricity, which was the most significant obstacle (Table 2). The main take-home point here is that the presence of obstacles implies that at least a latent demand for construction services will exist as firms seek options to address the supply shortfalls behind the constraints.

Table 2: Most serious obstacles to firms' operations (2008)

Large firms		MSMEs	
Potential obstacle	Rank	Potential obstacle	Rank
Electricity*	1	Access to finance	1
Macroeconomic instability	2	Transport*	2
Cost of finance	3	Cost of finance	3
Tax rates	4	Access to land*	4
Access to finance	5	Corruption	5
Corruption	6	Crime	6
Crime	7	Macroeconomic instability	7
Tax administration	8	Electricity*	8
Trade regulation	9	Political environment	9
Transport*	10	Business licensing/registration	10
Access to land*	11	Telecommunication*	11
Worker education/skills	12	Tax rates	12
Political environment	13	Trade regulation	13
Telecommunication*	14	Worker education/skills	14
Business licensing/registration	15	Labour regulation	15
Labour regulation	16	Tax administration	16

Notes: Rank ranges from 1 (most serious) to 16 (least serious), based on firm perceptions; * related to construction services demand and logistics infrastructure.

Source: Authors' construction based on Clarke et al. (2010).

To the extent possible, firms and households transfer their demands for construction services to the government by demanding physical infrastructure as a public good. In turn, the government's demand for construction services as the state yields to public pressure is typically seen in its infrastructure spending habits. The infrastructure expenditure habits of the Zambian government have already been considered in Section 2.1.

Based on the interaction of supply and demand within the industrial organization context of construction, price determination is highly opaque, given a fairly high degree of information and supplier participation asymmetries. NCC and ZIPAR (2017) attempt a decomposition analysis of the firm types or categories in the construction sector. The market structure analysis finds that the sector is generally reflective of an oligopolistic market across the firm categories (Table 3), implying a strong possibility of collusion in price fixing and market-share capture.

Table 3: Market structure, by construction firm category

Firm category	No. of firms	Product	Entry barriers	Price control	Concentration ratio (C5)	Hirschman-Herfindahl Index (HHI)	Market structure
Building and housing	1,269	Differentiated	None	Some	65%	1,935	Oligopoly
Road and earthworks	138	Identical or differentiated	Moderate	Considerable	86%	2,529	Oligopoly
Civil engineering works	224	Differentiated	Moderate	Considerable	94%	5,818	Oligopoly
Mining services	151	Differentiated	Moderate	Considerable	96%	2,403	Oligopoly
Electricity and telecom works	1,093	Differentiated	None	Some	78%	1,979	Oligopoly
Industry outlook	2,875	Identical or differentiated	None to moderate	Some to considerable	63%	670	Oligopoly

Notes: Concentration ratio (C5) is a common measure of the market share of the five largest firms in the industry; ranging from 0% to 100%, it shows the extent of market control of the largest firms in the industry, illustrating the degree to which an industry is oligopolistic. Typically, a C5 value of 0% depicts perfect competition; 1% to 40% means close-to-perfect competition to oligopoly; 40% to 70% means most likely an oligopolistic industry; and 70% to 100% means ranging from an oligopoly to monopoly. The HHI is an alternative measure which gauges level of market competition in an industry. It ranges from 0 to 10,000 'points', with higher points denoting higher levels of market concentration or monopoly power among few firms. That is, a higher HHI score depicts lower levels of competition in the industry.

Source: adopted from NCC and ZIPAR (2017)

2.3 Construction regulations and public institutions

Regulations and public institutions are often erected to rectify key market failures such as some of those encountered in the foregoing narrative. The legal and public sector institutional environments surrounding any given sector are therefore key determinants of how well the sector will perform. This subsection briefly highlights some of the key regulations and public institutions in construction.

Important procurement laws and regulations in construction in Zambia

UNZA and COLMAK (2010) highlight seven pieces of legislation and broad agreements that are important in guiding and regulating the construction sector in Zambia. These are:

- The Public Procurement Act No. 12, 2008
- The Anti-Corruption Act
- The Penal Code Act
- The Public Interest Disclosure (Protection of Whistleblowers) Act No.4, 2010
- The Competition and Fair Trading Act, CAP 417
- Public Service Terms and Conditions of Service
- International Agreements, including the United Nations Convention against Corruption, the African Union Convention on Preventing and Combating Corruption, and the COMESA (Common Market for Eastern and Southern Africa) Procurement Directives.

These legislative and regulatory procurement arrangements make up the legal framework to which public procurement—including construction procurement—is anchored.

Important governance and regulatory institutions and other stakeholders

The overarching governance body for infrastructure development and therefore construction services is the Ministry of Housing and Infrastructure Development (MHID). The ministry was created in September 2016 to superintend the designing, procuring, and construction of all public infrastructure. It is responsible for various functions, including the following: architecture; aviation infrastructure; building and construction industry policy; education infrastructure; health infrastructure; maritime infrastructure; national housing policy; and land-transport-related infrastructure. Six key statutory bodies are under the governance and direction of the ministry, namely: the Association of Consulting Engineers of Zambia (ACEZ)/Engineering Institution of Zambia (EIZ); the National Council for Construction (NCC); the National Housing Authority (NHA); the Quantity Surveyors Registration Board (QSRB); the Road Development Agency (RDA); and the Zambia Institute of Architects (ZIA).

The apex regulatory public institution in the construction industry in Zambia is the NCC. It is a statutory body set up under the National Council for Construction Act No. 13 of 2003 and is responsible for the promotion, development, training, and regulation of the construction industry in the country. The NCC is a cornerstone institution in regulating and assuring the quality of construction services given its role as registrar of contractors in Zambia.

Another important institution for construction in Zambia is ACEZ, a representative body for consulting engineers in the country. ACEZ exists to promote professional interests, rights, powers, and advancement of the profession of consulting engineers; promote training of engineers; establish a code of conduct of consulting engineers; and serve the public in matters connected with engineering. Under the Engineering Institution of Zambia (EIZ) Act No. 17 of 2010, Section 19(2)(c), consulting engineers are required to be members of ACEZ and to also register with the Engineering Registration Board in the college of consulting engineers. By law, this means that membership of ACEZ is mandatory for any organization or person providing or intending to provide engineering consultancy services, and only those consulting firms/companies that meet the above requirement should be engaged to provide engineering services on a consultancy basis.

As of June 2018, ACEZ had 70 registered members, including 54 Lusaka-based engineering consulting firms, four Copperbelt-based firms, two firms with dual (Lusaka and Copperbelt) physical presence, eight sole practitioners (all Lusaka-based), and two associate members (both Lusaka-based). The ratio of ACEZ-registered consulting engineers to NCC-registered construction contractors was 1:54 in 2018. The skewed spatial distribution of consulting engineers implies that their services outside the capital, Lusaka, should be at higher cost, taking into account accommodation, transportation, and other incidental costs on out-of-Lusaka services.

Architects and quantity surveyors are also key service providers in the construction sector. Practising architects are registered with ZIA, which is founded on the Zambia Institute of Architects Act Cap 442 of 1995. On the other hand, practitioner quantity surveyors are registered with and regulated by QSRB, under the Quantity Surveyors Act (Cap 438) No. 37 of 1995. In relation to ZIA and QSRB, this study did not find systematic and reliable information on the numbers of practitioners registered with the respective statutory bodies. However, the legal provisions or legislation governing the practices are clear and available in the public domain.

Public procurement and therefore procuring public sector entities are an important source of demand for construction services in Zambia. An overview by UNZA and COLMAK (2010) reveals that, as of 2010, Zambia's procuring entities are well documented. A total of 174 procuring entities across ten categories were captured in the baseline report, with the largest two categories being Ministries and Government Departments, accounting for 21 per cent of the total, and

Statutory Bodies (20 per cent), while the smallest two categories were Banking and Lending Institutions and Media Institutions, each accounting for 2 per cent.

Typically, once physical assets are installed in Zambia they are managed and operated either by the procuring entity or by a specially established body corporate or statutory body. The governance structure that oversees the manager and operator of the infrastructure will then depend on the overall governance structures superintending the procuring entity, body corporate, or statutory body. Typically, a separate regulatory authority will also have been established to independently and impartially regulate the sector that the procuring entity, body corporate, or statutory body operates in. For instance, for public roads the RDA is the procurer, manager, and operator of the infrastructure while MHID is the overall governance authority that among, other things, appoints the RDA board of directors. Interestingly, the regulation of the RDA (a statutory body established through the Public Roads Act No. 12 of 2002) is split between NCC and the Road Transport Safety Agency (RTSA), a statutory body under the Ministry of Transport and Communication (MTC).

Recent research suggests that more reliable and effective principal-agent arrangements between MHID and RDA should be sought in order to improve the independence and professionalism that RDA is meant to have. Saasa (2018) argues that MHID commands an overbearing influence over the ultimate decisions regarding which road investments are pursued. The study noted a lack of independence of the RDA in the implementation of road projects and public infrastructure works due to political interference from its parent ministry.

In addition to the above, the construction sector draws the attention of cross-cutting oversight and watchdog institutions including the Parliament (oversight) and the Auditor General's Office, and non-governmental organizations (e.g., Transparency International—Zambia, Zambia Land Alliance, etc.). These use various approaches to foster the accountability, transparency, and overall good governance of the industry.

3 Bottlenecks in the construction sector

What are the key bottlenecks to supply responses? These can be categorized into three broad fields, namely: firm-level, firm-specific factors; industry-wide factors; and national or macroeconomic bottlenecks. We consider each of these in turn.

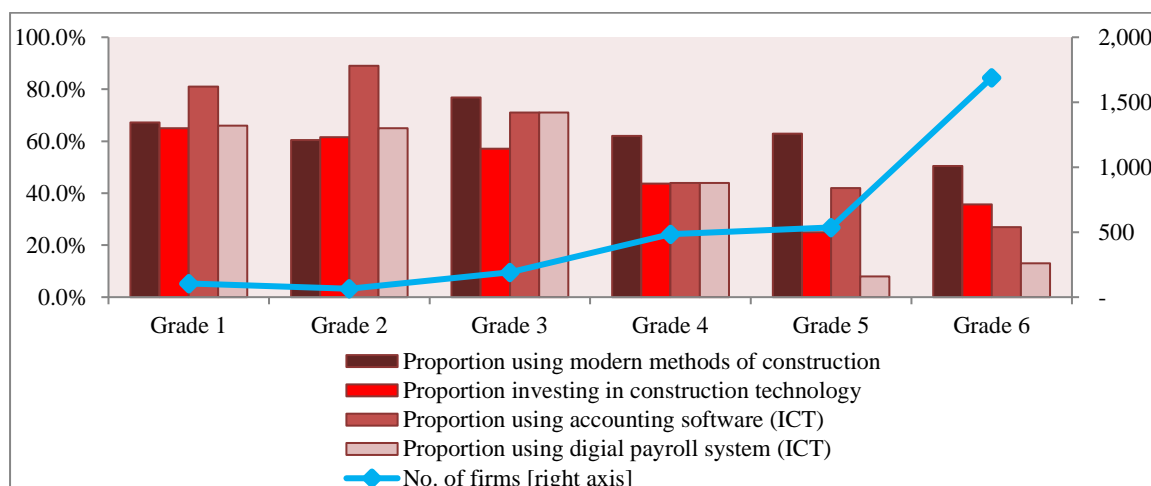
3.1 Firm-level bottlenecks

NCC and ZIPAR (2017) isolate a number of firm-specific challenges and bottlenecks that affect the competitive pricing of construction services. For instance, when viewed by NCC grade, construction firms have vastly different characteristics in terms of operational investment decisions (Figure 7) and levels of exposure to external constraints and challenges.

As seen in Figure 7, the lower-grade firms (Grades 4–6) generally invest far less in modern methods of construction, construction technology, and basic ICT than their higher-grade (Grades 1–3) counterparts. Moreover, more low-grade firms face challenges with access to finance and high labour turnover than do their counterparts in the high-grade groups. Implicitly, the state of technology, in particular construction methods used, is low, adversely affecting the price and quality of physical infrastructure that the industry is able to supply. Similarly, the issue of disparate levels of access to information and resulting information asymmetries—for instance, in knowledge about government tenders and tender procedures—have already been discussed. Suffice to say

that this too results in suboptimal pricing and can also negatively affect the quality of infrastructure that construction services can deliver.

Figure 7: Decisions on various operational attributes, by firm grade



Source: Authors' construction based on NCC and ZIPAR (2017) summary statistics.

The firm-level diversity also promotes an oligopolistic market structure in which the largest, most dominant firms possibly collude in setting prices and deciding on the supply of construction services, thus pseudo-affecting supply responses. Granted, Zambia has competition regulations and laws and a Competition and Consumer Protection Commission, but behaviours such as collusion are hard to detect and even harder to prove. And even when evidence is provided, enforcement in terms of prosecution may be problematic as it is often the responsibility of other agencies that can be somewhat far removed from the industrial significance of these cases.

Ultimately, construction services are highly differentiated by firm grade, firm category, and a host of other firm-specific characteristics, thus preventing competitive pricing from emerging in the industry. Firms are able to significantly influence the final price on contracts because their product is quite differentiated from what other firms might offer. In turn this acts to distort or even delay supply responses to rising demand for construction services.

3.2 Industry-wide bottlenecks

The industry-wide bottlenecks include a variety of structural challenges, systemic inertias ('red tape'), and constraints which affect sectoral firms indiscriminately, but which larger, more sophisticated firms can better contend with given their larger operating capital outlays, among other things. For instance, other things being equal, the earlier-mentioned cost of registration with NCC—e.g., a fee of ZMK7,750 per year for Grade 3 firms compared with ZMK625 per year for Grade 6 firms—forces smaller firms with financial constraints to stay small.

The industry also faces significant constraints to doing business, particularly in relation to acquiring a construction permit. Table 4 shows, for instance, that dealing with construction permits still takes in excess of six months (189 days) and the number of procedures (ten) is still relatively high compared with other doing-business indicators like registering property and starting a business. This naturally constrains the supply responses of contractors trying to set up shop and do business in Zambia.

Table 4: Selected doing-business indicators

DB year	Dealing with construction permits			Registering property			Starting a business	
	Procedures (number)	Time (days)	Cost (% of Warehouse value)	Procedures (number)	Time (days)	Cost (% of property value)	Procedures (number)	Time (days)
2006	11	230	10.4	6	73	9.6	7	36
2008	11	207	10.7	6	73	9.6	7	34
2010	11	207	7.3	6	42	6.6	7	19
2012	10	208	6.5	5	45	8.3	7	19
2014	10	189	3.9	5	45	8.6	7	8.5
2016	10	189	2.6	6	45	15.0	7	8.5
2018	10	189	3.1	6	45	9.9	7	8.5

Note: 'DB year' = 'Doing Business year', the 12-month period adopted by the World Bank for the Ease of Doing Business Survey.

Source: Authors' construction based on World Bank (2018a).

Weak institutional support and commitment in the industry is also a challenge which can serve as a significant constraint to construction services supply. Weak institutional commitment is clearly demonstrated in that, in March 2017, the (International) Board of Construction Sector Transparency (CoST) initiative informed Zambia's Ministry of Housing and Infrastructure of its decision to revoke the membership of CoST Zambia.¹ This was because over an extended period CoST Zambia had not demonstrated progress towards implementing CoST standards. Thus, although the country was among the eight where CoST was successfully piloted between 2008 and 2011, by 2015 it had been declared 'inactive', having failed to make meaningful progress for an extended period. CoST Zambia was given a further six months to get itself 'reactivated' through appropriate policy reform and compliance measures. With no high-level commitment or movement from the responsible institutions, the timeline and all subsequent timelines lapsed, forcing the board to take its March 2017 decision. The risk is high that weaknesses in transparency, accountability, and good governance will continue to obtain, making room for vices like corruption and rent-seeking.

In some instances, the room for corruption is created by the over-design and over-specification of construction projects at inception. Anecdotal evidence on road construction costs in Zambia compared to Kenya (Appendix 1) is a first-line indication of the possibility of over-design and over-specification related to corruption and rent-seeking. On average, road construction costs in Zambia were around US\$1.6 million per km, which, on the face of it, was not very different from the average in Kenya (\$1.5 million per km). However, once it is observed that the road projects selected in the Kenyan case were all relatively more complex urban road engagements with an average road length of 20 km, we readily notice than the Zambian case, with a fairly large number of long truck road projects (of 120 km length on average), has some seemingly overpriced roads. In particular, many experts and observers have aired suspicions that the Lusaka–Ndola dual carriageway construction project (commissioned in late 2017) and the Chikwa road construction project (of 2018), worth an estimated US\$3.3 million and \$3.1 million per km respectively, were grossly over-specified and thus overpriced. Saasa (2018) provides evidence lending support to these suspicions (Box 2).

¹ CoST is an international country-centred multi-stakeholder initiative, involving the public and private sectors as well as civil society, designed to promote transparency and accountability in publicly financed construction (<http://www.ncc.org.zm/important-information/cost-zambia>).

Box 2: An eye on reducing high road construction costs: A solution for the roads sector's positive contribution to infrastructure-led development

'Zambia is a high-cost country in the area of road construction relative to regional comparator countries. The high construction costs are caused by, inter alia, the onerous procurement processes and the fact the Government has quite often floated bids for road infrastructure projects without prior designs and plans that should provide indicative estimation of cost. An audit of RDA by the Auditor General's Office revealed serious anomalies, which included RDA inability to pay contractors on time; poor or absent engineering designs; single sourcing, which is contrary to Government regulations; over-procurement; and generally poor workmanship. Given the evident non-availability in a number of cases of detailed engineering road designs (which should include pavement and geometric designs, environmental management, drawings and estimated construction costs) before tendering and construction, opportunities for cost escalation have remained pervasive. Yet, contrary to this requirement, many road projects in Zambia are procured and commenced without detailed designs. This has resulted in bidders generally determining the cost independently of Government, a state of affairs that has triggered significant cost escalation, which, in turn, has opened opportunities for arbitrariness and corruption in price determination. Furthermore, guidance from the Attorney General provides that all price variations should not exceed 25% of the contractual price. Yet the audit of RDA that covered the 2012–2015 period reported that excessive variations on some contracts have ranged from 50% to 400%. In addition to this, Zambia currently lacks adequate transaction advisory services, a state of affairs that could partially explain the higher costing of road construction in the country than the regional average. In the light of these considerations, the current approach to procuring road works in Zambia remains highly inefficient and is clearly contributing to the country's mounting and unsustainable debt burden. Yet investments in roads should help minimize the debt distress instead of exacerbating it. The situation is worsened by the fact that, because roads with lower economic returns are also being constructed, the potential for good returns from such investment is seriously curtailed. Going forward, Government should work towards streamlining its road works procurement system by reducing on processes that result in cost escalation.' (Saasa 2018: 4–5)

Indeed, Transparency International Zambia (TIZ) is on record as having recently cited 'cadreism' as a major source of corruption in the construction sector in Zambia (Lifuka 2018). TIZ's opinion is that the common problems faced by the construction industry include the non-disclosure of beneficial owners of bidding construction companies and rigging of tenders, among others.

While cadreism and 'cadre-preneurial contract trading' (the specialization by politically connected cadres in the illicit capture of public tenders and their sale on illegal secondary tender markets) might be a new phenomenon, evidence of strongly suspected corruption in the construction sector is now becoming increasingly well documented. The Auditor General's report for the year ended 2016 (OAG 2017) records over 20 major construction-related counts of financial irregularity and/or misconduct on the part of procuring entities (ministries, provinces, and spending agencies) and/or contractors (see Appendix 2). Construction- or infrastructure-related anomalies, irregularities, misconduct, and so on amounting to a total of ZMK213.3 million (equivalent to US\$22.5 million) were observed in the 2016 financial year.

An FIC (2018) report provides further evidence of possible corruption and malpractice in the construction sector:

Construction: During the year [2017], it was observed that some businesses in the construction sector made large cash deposits. This is unusual considering that payment for services provided in this sector are made either by cheque or other safer electronic means instead of cash. It was noted that a total of USD 9,668,421.14 and ZMW 14,150,918.70 cash deposits were made by construction businesses. In 2017, a total of USD 3,430,852.81 and ZMW 391,553,520.20 cash withdrawals were reported to the Centre. It was further observed that a number of construction companies awarded contracts by some quasi-government institutions had no capacity to execute the works, while others were not tax compliant. (FIC 2018: 10)

Essentially, a staggering US\$55.96 million of suspicious and questionable cash transactions were made between procuring entities and contractors in 2017.

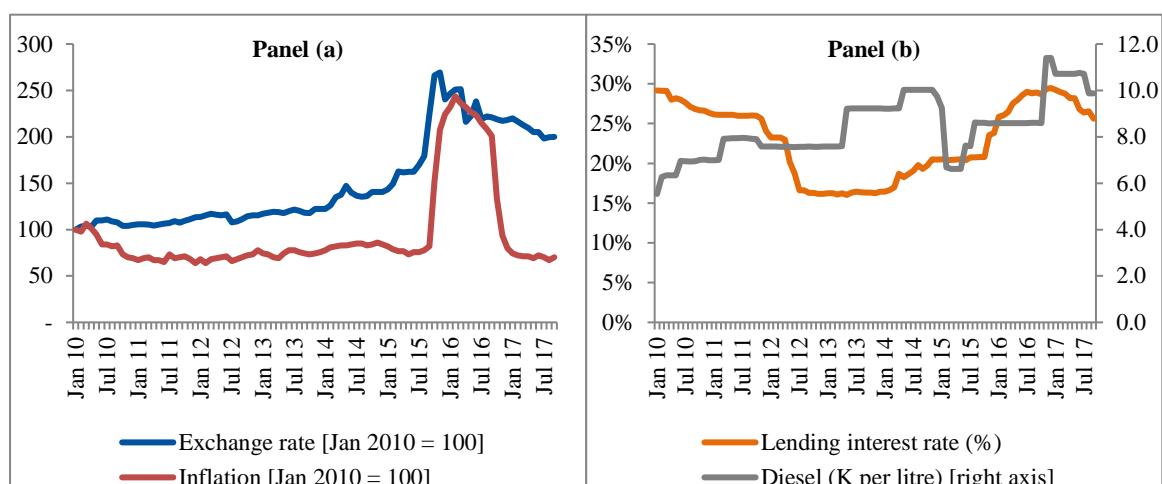
Moreover, the underlying weaknesses in the legal framework—which CoST Zambia should have helped to address—have been prevalent for over a decade. UNZA and COLMAK (2010) report that the legal requirement for the release of material project information (MPI) established by the Public Procurement Act No. 12 of 2008 was (and still is) focused on the disclosure of the best-evaluated bidder only. The disclosure of the winning contractor and consultant’s name and the contract value are the only details required to be disclosed. The other MPIs that should be required to be released include: the scope of the projects; the tender procedure; a list of tenderers; the contract programme; and details of any re-award of main contract. Of the pre-tender MPIs, only the Environmental Impact Assessment is permitted by law to be released.

Unfair advantages among foreign-owned firms also cause supply response distortions, particularly insofar as the equitable distribution of public tenders and construction contracts is concerned. Anecdotal evidence abounds of China’s influence in the construction sector landscape in Zambia. Many practitioners and even officials in the Ministry of Finance argue that large-scale infrastructure projects that are bankrolled using Chinese loans always come with ‘fine print’ in loan contracts, whereby the transactional benefits are all captured by Chinese entities. Thus, financial handling takes place through Chinese financial intermediaries and the awarding of project contracts is mainly (80 per cent plus) to Chinese firms, most of whom are Chinese state-owned or state-affiliated entities that are subsidized by the Chinese government to do business in Africa.

3.3 Macroeconomic factors serving as construction bottlenecks

The main macroeconomic bottlenecks relate to variables with a direct impact on the cost of construction services. These include the adverse business shocks and uncertainty associated with a local currency collapse, coupled with heightened inflation such as occurred in Zambia from mid-2015 through most of 2016 (Figure 8, Panel (a)). They also include factors like high credit or borrowing costs (high interest rates) and fuel price hikes due to policy reforms (Figure 8, Panel (b)).

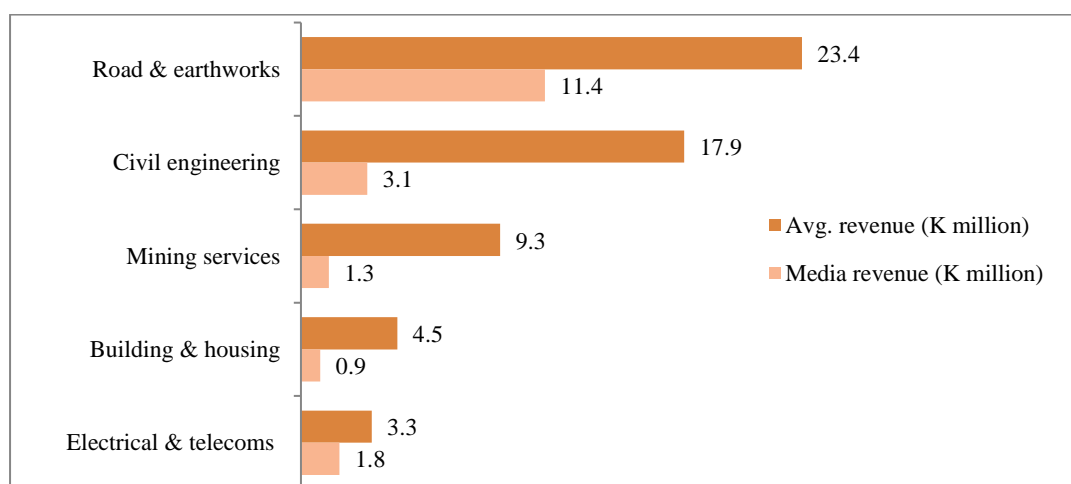
Figure 8: Selected macroeconomic stability indicators



Source: Authors' construction based on BOZ fortnightly statistics (available at: <http://www.boz.zm/monetary-and-financial-statistics-New.htm>, accessed February 2018) and CSO monthly bulletins (available at: <http://www.zamstats.gov.zm/index.php/publications/category/1-monthly-bulletin>, accessed April 2018).

Another major risk, which is perhaps not yet a bottleneck, is the high level of public debt. According to the IMF (2018), Zambia's public debt stock rose from 19 per cent of GDP in 2010 to 62 per cent in 2017 and is projected to increase further to 72 per cent of GDP by 2023. This first-line indication is therefore that the country's debt stock is very close to unsustainable levels or may have already breached the sustainability threshold. Considering that the debt was accumulated mainly to cover three large public expenditure items—the wage bill, debt service interest payments (both consumption expenditure items), and large infrastructure projects, particularly the GRZ roads programme (mentioned in Section 2.1)—the anticipated forced slowdown in public spending and borrowing is likely to dampen demand for infrastructure and therefore construction services. Given that the supply of construction services has been significantly stimulated by the government's infrastructure expenditure (see the disparity of revenues in the roads and earthworks construction subsector compared to the other subsectors in Figure 9), the anticipated reversal of fortunes underpinned by the debt overhand is likely to have a significant adverse effect on the industry.

Figure 9: Annual revenue (turnover) by construction firm category



Source: Authors' construction based on NCC and ZIPAR (2017)

4 Summary options for dealing with key bottlenecks

From the foregoing, what institutional, governance, and policy reforms are desirable for the construction sector in Zambia? We recommend the following:

4.1 Institutional, governance, and regulatory reforms

- Key institutions charged with the governance of the construction sector should be reformed through the establishment of ‘carrot-and-stick’ mechanisms like Cabinet Office-administered performance-based contracts throughout these organizations.
- The law should be strengthened in terms of the provisions for procuring entities in construction (as well as in other sectors) to proactively release necessary or material project information into the public domain; and for the much talked-about international price benchmarking.
- The construction authorities (MHID and NCC) should work towards strengthening, streamlining, and simplifying the procurement and contracting rules and systems, particularly assessing processes that have in the past resulted in information and participation asymmetries; loss of RDA independence; and risks of rent-seeking, cost escalation, financial irregularity, corruption, misconduct, and malpractice.
- The authorities should establish a contract unbundling policy and law, particularly for large contractors, so that no single large-scale contractor is awarded contracts to execute, say, more than 60 per cent of the works as a monopoly services supplier. The unbundling of contracts will create room for smaller contractors to participate in some aspects of the unbundled infrastructure development projects.

4.2 Industry-support policies and reforms

- The authorities should consider establishing training and capacity-building programmes that improve the sharing and use of information and knowledge and enhance know-how or competency, thus reducing information asymmetries—particularly to the benefit of local service providers.
- The private sector is already substantively supporting training and local skills development through contributions to the statutorily determined Skill Development Levy (SDL), a 0.5 per cent levy on gross remunerations (payroll) payable by employers with effect from 1 January 2017, under the Skills Development Levy Act No. 46 of 2016. However, due to reported juridical disagreements between the Ministry of Higher Education (MOHE) and the Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) over who is charged with administering the SDL funds, the operational framework has to date not been formulated. Stakeholder authorities like the construction authority should readily intervene to ensure that slippages that impede the training and skills development of practitioners under their charge are fully and swiftly resolved. Specifically, they should ensure that the rightful proportion of the proceeds of the SDL starts to flow to the construction private sector towards skills development.
- The authorities should review and update the local content strategy of MCTI and the partial policies such as the 20 per cent subcontracting policy (assessed in Phiri 2016) towards establishing a robust and comprehensive (all-inclusive) local content policy and implementation framework for construction services.
- Within the overall local content policy and strategy, the authorities should establish viable options for increasing access to finance (operating capital) for local contractors. An important financing option will be negotiated tied aid and tied development finance from

bilateral partners like China who have a significant contractor presence in Zambia. For instance, access to Chinese government development assistance to Zambia by Chinese contracts should be conditional on the contractors demonstrating a willingness and ability to build the capacities of local contractors through skills, technology, and operating-capital transfer partnerships.

- The authorities should consider establishing publicly supported and financed/resourced skills development and research and development programmes towards improving upon the currently low standard of methodology and technologies used by the majority of local contractors in construction; contractors, particularly local contractors, should be given sufficient knowledge and comparative advantage of the quality and safety standards for construction in Zambia.
- The authorities should explore other options for the mobilization and ring-fencing of affordable finance, including trade credit to frontrunner or winning sectors like construction.

References

- ASCO Zambia Ltd (2016). *Environmental and Social Management Framework Final Report: Consultancy Services for the Design and Preparation of Bidding Documents for a Countrywide Roll-Out of the Output and Performance Based Road Contracts—OPRC Region 1. Contract No: RDA/CS/OIS/001/015*. Lusaka: Road Development Agency. Available at: <http://www.rda.org.zm/index.php/reports/environment-reports> (accessed June 2018).
- Brinkhoff, T. (2018). 'Zambia: Administrative Division. Provinces and Districts'. City Population. Available at: <https://www.citypopulation.de/php/zambia-admin.php> (accessed September 2018).
- Cheelo, C., and T. Banda. (2017). 'A Tightening Balancing Act: Economic Implications of Zambia's Balance of Payments Performance'. ZIPAR Working Paper 24 (June). Lusaka: Zambia Institute for Policy Analysis and Research (ZIPAR).
- Clarke, G.C., M.K. Shah, and R.V. Pearson (2010) 'Zambia Business Survey: The Business Landscape for MSMEs and Large Enterprises in Zambia'. Lusaka: FinMark Trust, Zambia Business Forum, Republic of Zambia, Private Sector Development programme, and World Bank.
- CSO (2013). '2010 Census of Population and Housing—Population and Demographic Projections 2011–2035'. Lusaka: Republic of Zambia Central Statistical Office.
- CSO (2015). '2014 Labour Force Survey Report'. Lusaka: Republic of Zambia Central Statistical Office.
- CSO (2016). *2015 Living Conditions Monitoring Survey (LCMS) Report*. Lusaka: Republic of Zambia Central Statistical Office.
- CSO (2018) *The Statistician*, Volume 7. Lusaka: Republic of Zambia Central Statistical Office.
- ECA (2017). 'Comprehensive Report on Developments in Africa's Regional Integration in the Context of Trade, Investment, Infrastructure, Industrialization, Land Management, Food Security and Agriculture, with a View to Influencing Policy'. Economic Commission for Africa, Committee on Regional Cooperation and Integration, E/ECA/CRCI/10/2. Addis Ababa: UN Economic and Social Council.
- FIC (2018). 'Money Laundering/Terrorist Financing Trends Report 2017'. Kabulonga: Financial Intelligence Centre.
- Gans, J., S. King, R. Stonecash, and G.N. Mankiw (2003). *Principles of Economics*. South Melbourne: Thomson Learning.
- IMF (2018). World Economic Outlook Database: April 2018 Edition?. Available at: <https://www.imf.org/en/Publications/SPROLLS/world-economic-outlook-databases> (accessed June and August 2018).
- Lifuka, R. (2018). Presentation to Construction Sector Anti-Corruption Forum, Intercontinental Hotel, Lusaka, Zambia, 7 February.
- MCTI (2018). 'Strategy Paper on the Promotion of Local Content'. Lusaka: Ministry of Commerce Trade and Industry.
- MLGH (2016). 'National Housing Sector Policy for Zambia: First Draft'. Lusaka: Ministry of Local Government and Housing.

- Mulenga, N. (2018). 'Improved Rural Connectivity Project (IRCP) using Output and Performance Road Contracts (OPRCs)'. Presentation to the Road Development Agency, Mulungushi Conference Center, Lusaka, March 2018.
- NCC (2018). 'Register Contractors: Registrations as at 30th September 2017'. Lusaka: National Council for Construction.
- NCC and ZIPAR (2017) 'Baseline Survey of the Zambian Construction Industry: Final Report'. Lusaka: National Council for Construction and Zambia Institute for Policy Analysis and Research.
- OAG (2017). 'Report of the Auditor General on the Accounts of the Republic for the Financial Year Ended 31st December 2016'. Lusaka: Office of the Auditor General.
- Page, J. (2018). 'The Road Not Taken: Structural Change in Africa Reconsidered'. In B.S. Coulibaly (ed.), *Foresight Africa: Top Priorities for Africa in 2018*. Washington, DC: The Brookings Institution.
- Patriotic Front (2011). *2011–2016 Manifesto*. Lusaka: Patriotic Front.
- Phiri, F. (2016). 'An Analysis of the Twenty Percent Subcontracting Policy in the Zambian Construction Sector: Its Efficacy in Developing Capacities of Local Contractors'. Masters dissertation. Lusaka: University of Zambia.
- RDA (Road Development Agency) (2012). *Strategic Plan 2012–2016*. Lusaka: RDA.
- RDA (2013). 'Pave Zambia 2000: Use of Concrete Block Paving and Cobblestone Technology to Rehabilitate Urban and Township Roads in Zambia'. Lusaka: RDA.
- RDA (2014). *Road Maintenance Strategy, 2014–2024*. Lusaka: RDA.
- Republic of Zambia (2017). *Seventh National Development Plan 2017–2021*. Lusaka: Ministry of National Development Planning.
- Saasa, O. (with C. Musonda) (2018). *Pro-Growth Road Infrastructure Development in Zambia: Challenges, Opportunities and Policy Options*. Report. Lusaka: Premier Consult Ltd Economic Social & Business Consultants.
- UNZA and COLMAK (2010). 'Zambia CoST Baseline Study Report'. Lusaka: University of Zambia (UNZA) and COLMAK.
- World Bank (2017). 'How Zambia Can Borrow Without Sorrow'. Zambia Economic Brief (December). Washington, DC: World Bank.
- World Bank (2018a). 'Doing Business'. Available at: <https://datacatalog.worldbank.org/dataset/doing-business> (accessed August 2018).
- World Bank (2018b). 'Data: Zambia'. Available at: <http://data.worldbank.org/country/zambia?view=chart> (accessed April 2018).

Appendix 1: Road construction costs in Kenya and Zambia, selected projects

(A) Completed and ongoing road projects, Kenya

<i>Project Name</i>	<i>Length (km)</i>	<i>Contractor</i>	<i>Status</i>	<i>County</i>	<i>Cost (Ksh)</i>	<i>Cost (US\$)</i>	<i>Cost per km (US\$)</i>
Construction of Kapsoya Roads in Eldoret Municipality	8.1	Dittman Construction	Complete	Uasin Gishu	1,105,340,129	10,942,878	1,350,973
Construction of Northern and Eastern Bypass	70	CRBC	Complete	Nairobi	9,277,354,964	91,845,906	1,312,084
Construction of Access to Embakasi (Infinity) Industrial Park	2	Kiu Construction Company	Complete	Nairobi	382,478,143	3,786,537	1,893,269
Construction of Nairobi Eastern Missing Link Roads and Non-Motorized Transport (NMT) Facilities In Nairobi	17.2	Reynolds Construction Company	69.50%	Nairobi	4,578,162,618	45,323,855	2,635,108
Construction to Bitumen Standards of Meru Bypass Roads	23	H-Young (EA)Limited	53.00%	Meru	2,391,755,277	23,678,401	1,029,496
Construction to Bitumen Standards of Jomvu Kuu—Jitoni—Rabai Road, Mombasa County	11.7	Associated construction Ltd	6%	Mombasa	1,054,897,550	10,443,496	892,607
Construction of Kangundo Road—Greater Eastern Bypass Link Road	10	CAC Group (Kenya) Corporation Ltd.	Commencing	Nairobi	1,160,691,029	11,490,853	1,149,085
<i>Average</i>	<i>20</i>					<i>28,215,990</i>	<i>1,466,089</i>

(B) Completed and ongoing road projects, Zambia

<i>Project Name</i>	<i>Length (km)</i>	<i>Year</i>	<i>Status</i>	<i>Region</i>	<i>Cost (ZK)</i>	<i>Cost (US\$)</i>	<i>Cost per km (US\$)</i>
Rehabilitation of 100 km (of 135 km) of Lusaka and Chirundu international trunk road	100	2014	Completed	Lusaka/ Southern	504,330,300	81,000,000	810,000
Construction of Mazabuka bypass Road	5	2015	Unclear	Southern	57,014,788	6,483,374	1,296,675
Construction of Lusaka-Ndola dual carriageway plus Kabwe (45 km) bypass	366	2017	Unclear	Lusaka/ Central/ Copperbelt	11,357,880,000	1,200,000,000	3,278,689
Solwezi-Chingola road construction project	168	2017	Unclear	Copperbelt/ N- Western	1,400,000,000	147,914,928	880,446
Kitwe- Chingola dual carriage way construction	45	2017	Unclear	Copperbelt	561,000,000	59,271,625	1,317,147
Kawambwa-Mporokoso road	122	2018	Ongoing	Northern	1,423,706,400	142,200,000	1,165,574

Lumumba road (7.1 km) [Phase 1] plus L400 (146 km) township roads [Phase 2]	153	2018	Ongoing	Lusaka	2,402,880,000	240,000,000	1,568,627
Chikwa road (dual carriage) construction	0.58	2018	Ongoing	Lusaka	18,021,600	1,800,000	3,103,448
<i>Average</i>	<i>120</i>					<i>234,833,741</i>	<i>1,677,576</i>

Notes: For Kenya, the exchange rate is: KSH101.01 = US\$1.00; for Zambia, average exchange rates vary by year: ZMK6.23 = US\$1.00 in 2014; ZMK8.79 (2015); ZMK9.47 (2017); and ZMK10.01 (2018).

Source: Authors' construction based on ASCO Zambia Ltd (2016); Mulenga (2018); RDA (2012; 2013; 2014); and data obtained from Kenya Urban Road Authority, <http://kura.go.ke/projects/completed/>; Road Development Agency, <http://www.rda.org.zm/index.php/reports/annual-reports>; and National Road Fund Agency, <http://www.nrfa.org.zm/> (all accessed 29 June 2018).

Appendix 2: Construction-Related Misconduct and Irregularity according to the Auditor General

Ministry/government agency responsible	Activity/issue	Amount (ZK)	Status at Audit (2017)
Ministry of Home Affairs	Rehabilitation of the Commissioner for Refugees Houses in Makeni: in September, 2014, the ministry engaged Stecheal Contractors Ltd to rehabilitate three houses for the Commissioner of Refugees houses in Makeni at a contract sum of K224,121. The contract period was 3 weeks from September to November 2014. Among other works to be done were plumbing, electrical, painting, and excavation. As of February 2017, the contractor had been paid a total sum of K58,123 representing 25.9% of the contract sum.	30,130	A physical inspection of houses revealed that (although house No.1 had been handed over and had since been occupied) works costing K30,130 were still outstanding.
Ministry of Health	Weakness in Management of Infrastructure Projects: During the period from 2014 to 2017, the Ministry engaged 49 contractors with contracts totaling K199,578,471 to carry out various infrastructure development activities against which K53,926,653 were paid representing 27% of the total.	53,926,653	Scrutiny of records and physical verification of various projects in July 2017 revealed that several delays in the completion of projects and some stalled works.
Ministry of Home Affairs—Zambia Correctional Service	Weaknesses in the Management of Infrastructure Projects: Scrutiny of records and physical verification of various projects in August 2017 revealed weaknesses in the management of projects with delays in completing the following: Construction of Storage Shed— Kalonga Milling Plant: with Glands Industries as contractor; 27 weeks contract period for August 2014 to February 2015 (30 months); for sum total contract amount of K4,998,430 with K2,113,006 paid.	2,113,006	Total payment represented 42.27% but as at August 2017, several works were still outstanding and the contractor was not on site.
	Construction of Multipurpose Hall at Bothwell Imakando Staff Training College: Lima Agro Supplies (contractor); 20 weeks contract period from December 2013 to May 2014 (39 months); with sum total contract of K3,605,940 of which K323,745 paid.	323,745	Total payment was 8.98%, but several works were outstanding despite the progress, and the contractor was not on site.
Ministry of Transport and Communication	Construction and Rehabilitation of Airports—Construction of Kasama Airport Aerodrome: advance payment made to Messrs Anhui Shui'an Construction Group Corporation against the contract price of K141,012,639 inclusive of VAT for the construction of Kasama Aerodrome	28,202,523	As of April 2017, 24 months after the expected date of completion, works had not been completed.
Ministry of Works and Supply	Failure to Avail Claims and Copies of Certified Works for Construction of Chinsali Lodge: the Ministry entered into a contract with Zhengtai Group (Z) Ltd for the construction of Chinsali Lodge at a contract of K14,338,701 with a 15-month completion period. A site possession certificate was unavailable to ascertain the contract commencement date. A scrutiny of records revealed that an advance payment of K1,350,000 was paid to the contractor in December 2016.	1,350,000	As of August 2017, 8 months after payment was made, the construction was still at excavation level.

Ministry of Higher Education	<p>Infrastructure Development—New Districts: Abandoned Works: the ministry awarded 182 contracts countrywide. A sample selection of nine contracts awarded to eight contractors to construct Post Offices, Office blocks and houses at total sum of K37,249,521 revealed that as of July 2017 amounts totaling K14,336,734 had been paid leaving a balance of K22,912,786.</p>	14,336,734	Site visit in two Districts (Mpongwe and Lufwanyama) in April 2017 and a scrutiny of project status reports covering other Districts revealed that works were abandoned.
	<p>Science, Technology, and Innovation—Contract for Supply, Delivery and Installation of a Ground Receiving Station: In January 2015, the ministry entered into a contract with AVIC International (Z) Ltd for above-mentioned Ground Receiving Station for National Remote Sensing Centre at a total cost of K35,361,851 (approx. US\$4,021,134) and with a delivery period of 8 weeks. In December 2016, the ministry paid K15,000,000 to AVIC.</p>	15,000,000	There was no disclosure of the nature of the payment. The advance payment guarantee expired in March 2016 and performance security expired in January 2017 prior to delivery of the equipment.
	<p>Infrastructure Development: Construction of four Hostel Blocks at UNZA (Lot 1): in December 2014, the ministry engaged Hua Chang Infrastructure Limited to construct 4 hostel blocks at the University of Zambia Great East Road Campus in Lusaka at a contract sum of K57,247,313 (16% VAT inclusive). The contract period was 25 months from February 2015 to March 2017. As of June 2017, K12,727,611 had been paid to the contractor, with a balance of K44,519,702. The scope of works included construction of 4 x 4 storey hostel blocks with a student capacity of 160 students per block.</p>	12,727,611	Physical inspection in June 2017, revealed that works had stalled and that all the hostel blocks were only at slab level.
	<p>Infrastructure Development—Construction of Five Hostel Blocks at UNZA (Lot 4): in December 2014, the Ministry engaged Mango Tree Construction Company Limited to construct 5 Hostel Blocks at UNZA Great East Road Campus at a contract sum of K86,661,848 (16% VAT inclusive), was a 24-months contract period from February 2015 to February 2017. As of June 2017, K23,577,462 had been paid to the contractor leaving a balance of K63,084,387. The scope of works was construction of 5 x 4 storey hostel blocks with a student capacity of 160 students per block.</p>	23,577,462	Physical inspection in June 2017 revealed that works had stalled.
	<p>Infrastructure Development—Construction of Four Hostel Blocks at UNZA (Lot 5): in December 2014, the ministry engaged Wah Kong Enterprises Limited to construct 4 Hostel Blocks at UNZA Great East Road Campus at a contract sum of K73,062,600 (16% VAT inclusive), with a 21-month contract period from 9th February 2015 to 31st October 2016. As of June 2017, K8,890,928 had been paid to the contractor leaving a balance of K64,171,672. The scope of works was for the construction of 4 x 4 storey hostel blocks with a student capacity of 160 students per block.</p>	8,890,928	A physical inspection carried out in June 2017 revealed that the works had stalled and the Contractor was not on site. Further, the contract had since expired and there was no indication that it had been extended.

	<p>Infrastructure Development—Construction of External Works (Lot 7): in December 2014, the ministry engaged African Brothers Corporation Limited to construct external works at UNZA Great East Road Campus at a contract sum of K62,995,129 (16% VAT inclusive). The contract period was 52 weeks from February 2015 to February 2016. As of June 2017, K16,923,130 had been paid to the contractor leaving a balance of K46,071,999.</p>	16,923,130	Physical inspection in June 2017 revealed that the external works had stalled awaiting the completion of Hostel construction. The contract period had since ended with no indication of renewal.
	<p>Infrastructure Development—Delayed Completion of Construction of Four Hostel Blocks at UNZA (Lot 3): in December 2014, the ministry engaged Fair Face Enterprises JV Phumi Trading to construct 4 Hostel Blocks at UNZA Great East Road Campus at a contract sum of K74,968,616 (16% VAT inclusive). The contract period was 18 months from February 2015 to August 2016. As of June 2017, K25,354,673 had been paid to the contractor leaving a balance of K49,613,943 from the total contract sum. In June 2016, an upward adjustment of K19,319,665 was made to the contract to cover for the devaluation of the Kwacha bringing the revised contract sum to K97,379,427. The scope of works was for the construction of 4 x 4 storey hostel blocks with a student capacity of 160 students per block.</p>	25,354,673	Physical inspection in June 2017 revealed that construction works were in progress. However, the contract period had since ended and there was no indication that it was renewed.
Ministry of Defense	<p>Failure to Complete Construction of Water Tank Stand and Pump House at Zambia Air Force Lusaka: in February 2015, the ministry entered into a contract with Mercury Lines Limited, at a contract sum of K1,678,606 for the construction of a pump house, water tank stand and auxiliary works at Zambia Air Force (ZAF) Lusaka with a completion period of 12 weeks. In March 2016, the ministry paid the contractor an amount of K300,000.</p>	300,000	The contract had no advice of the Attorney General, no site possession certificate and no project ledgers. By August 2017, works had not been completed, more than 2 years after the expected completion period and the contractor was not on site.
Ministry of General Education	<p>Secondary Education Infrastructure—Over Expenditure on Infrastructure Supervision: Whereas, the total budget provision for Infrastructure Supervision was K1,044,744, A total of K3,461,375 was spent on infrastructure development related administrative costs such as monitoring, inspection, verification of certificates and audits among others, resulting in over expenditure of K2,416,631 above the budgeted amount. The over spent amount was from funds for payment of certified works under infrastructure. As at 31st December 2016, the ministry had 118 outstanding certificates in amounts totalling K330,042,816 for the period from September 2015 to December 2016</p>	2,416,631	The overspending on infrastructure development related administrative costs was unauthorized.
Ministry of Fisheries and Livestock	<p>Infrastructure Development: In the Estimates of Revenue and Expenditure for the financial year 2016, a budget provision of K6,518,384 was made to cater for infrastructure development such as construction and/ or rehabilitation of dip tanks, livestock breeding centres, artificial insemination centres, office blocks, and milk collection centres. A total of K2,980,963 were paid to twenty-four (24) contractors for various infrastructure development projects.</p>	2,980,963	Scrutiny of records and physical inspection of nine selected projects in March 2017 found only one was completed and handed over;

			The rest (8) were incomplete, delayed, had outstanding works, had defects, and/or had no contractor on site.
	Infrastructure Development The audit identified 15 projects on which expenditure of K1,992,031 was made, which were eligible to be audited.	1,992,031	Document review and physical inspections during March to July 2017 revealed weaknesses in project management (incl. failure to complete projects on time, poor workmanship, and non-adherence to contract terms).
Ministry of Agriculture	Accounting and Other Irregularities—Infrastructure Development: An examination in January to March 2017 of accounting and other records maintained at the ministry HQ revealed that during November 2014 to June 2016, the ministry awarded 11 contracts in totalling K3,487,752 for various infrastructure projects. As at 31st May 2017, the contractors had made claims in amounts totalling K3,487,752 out of which payments in amounts totalling K2,610,345 were made leaving a balance of K877,407.	2,610,345	All the installations paid for were incomplete, poorly constructed with defects, and/or had no contractor on site.
Office of the President— Central Province	Construction of Meteorological Office: In September 2014, an amount of K150,000 was released by government to the Provincial Administration for the construction of an office block for the metrological department in Serenje. In 2016, the Provincial Administration engaged LM Agencies Limited to construct an office block at the contract sum of K150,030 and the duration of 16 weeks. By December 2016, a total of K61,369 had been paid to the contractor. Construction of Broken Hill Cultural Village: In 2013, the Ministry of Tourism released K150,000 for the construction of a cultural village in Kabwe. An examination of records and enquiries made revealed that the whole amount funded was spent on the project.	61,369	Physical inspection of the project and enquiries made in March 2017 revealed a lack of Terms of Engagement, and stalled project works.
		150,000	However, an inspection of the project in August 2017 revealed that the work had stalled and remained incomplete.
Total	All activities and issues	213,267,934	Construction or infrastructure related anomalies, irregularities, misconduct, etc. equivalent of US\$22.5 million were observed in the 2016 financial year.

Notes: Construction project works that had stalled because the contractor was owed an overdue amount of money in respect of an outstanding certificate, which had not been settled as at 31 August 2017, were not considered to be acts of misconduct or irregularities on the part of the contractor or procuring entity, and thus have not been included in this table.

Source: Authors' construction based on OAG (2017).