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Role of the construction sector and key bottlenecks to supply response in Tanzania

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Abstract: The construction sector is a key enabler for social and economic development worldwide. In Tanzania, the sector growth rate is well above the general economy and has maintained positive growth in response to the country's investments in commercial and residential buildings and infrastructure projects. Despite the promising growth, the sector encounters bottlenecks and challenges in the areas of access to land, construction permits, skills, and availability of materials and equipment that hinder the potential of the sector as a contributor for achieving the vision of reaching middle-income country status. The structure of the sector, underlying policies, challenges, and recommendations are at the centre of discussion in this paper.

Keywords: construction, contractors, land, price, skills, Tanzania contractors

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1 Introduction

From simple tools and temporary shelters to the need for more permanent structures that would complete the transition from a nomadic lifestyle to settlements, we can say that construction is as old as humans. Industrialization made materials available on a great scale and improved the manufacturing techniques that made it possible to cope with urbanization. By transforming the environment through, for example, housing, roads, bridges, water, health, and power infrastructure, the construction sector is a key enabler for social and economic development worldwide.

In the last decade, Tanzania has experienced relatively high economic growth, averaging 6 to 7 per cent a year (World Bank 2018b). The construction sector has played a key role in this growth. Figure 1 shows the gross domestic product (GDP) in percentage growth rates and the annual growth of the industry and construction sector. Despite the deceleration of the economy in 2013, the industry has since seen growth rates above of those of the general economy.

Figure 1: Gross domestic product by kind of economic activity—percentage growth rates, 2007–17

Note: Constant 2007 prices.

Source: Authors' calculations based on data from NBS (2018).

While the industrial and construction sector has generally performed well over the years, within this sector it is the mining and quarrying and the construction activities that are leading the growth. Figure 2 presents the annual growth rates of these two activities as well as the manufacturing sector. As can be seen, while the three activities have experienced positive growth rates, the mining and quarrying and construction activities feature greater levels of growth. In fact, since around

2010, Tanzania has witnessed further natural gas exploration, which may explain the steeper line of growth rates for mining and quarrying activities in recent years.

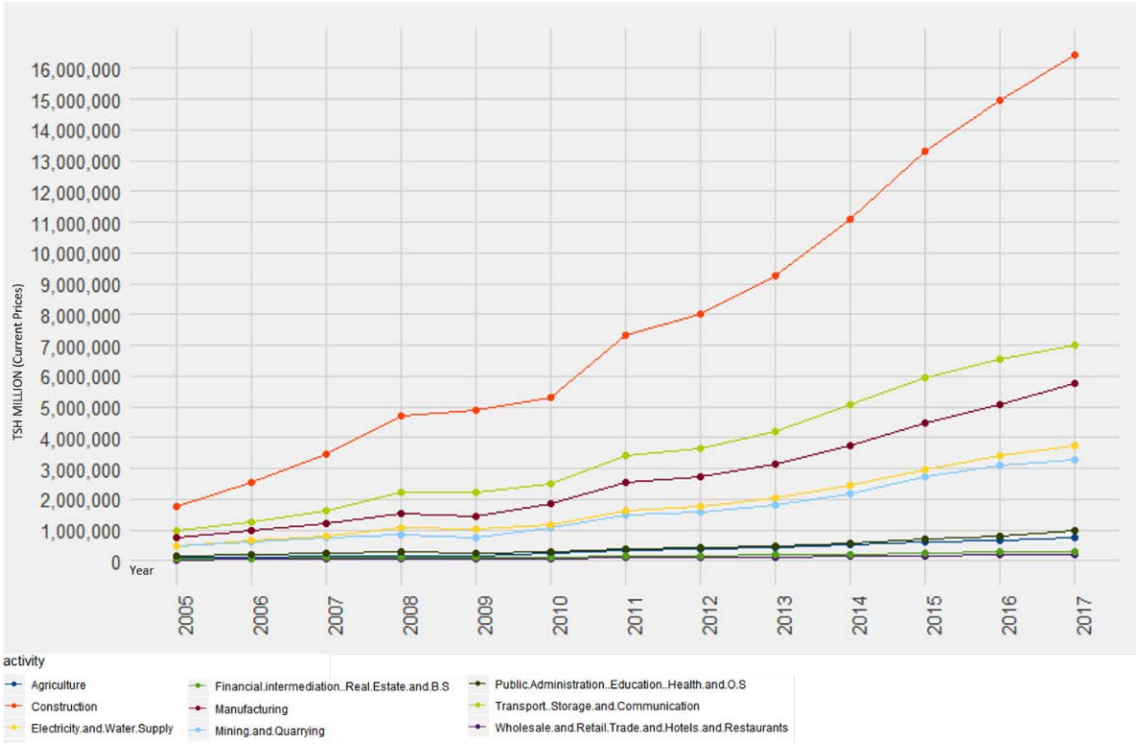
Figure 2: Gross domestic product by selected activities within industry and construction—percentage growth rates, 2007–17

Note: Constant 2007 prices.

Source: Authors' calculations based on data from NBS (2018).

Tanzania is on the path from being a low-income to a middle-income country (MIC). Investment in fixed assets has grown strongly and has boosted economic growth. Between 2005 and 2016, the country experienced gross fixed capital formation (GFCF) rates in the range of 25 to 34 per cent of GDP. While all the activities that form the GFCF have experienced a sustained increase in value, construction is the sector that contributes the largest share (see Figure 3).

Figure 3: Gross fixed capital formation by kind of economic activity at current prices, 2005–17



Source: Authors' calculations based on data from NBS (2018).

NBS (2018) attributes the country's growth in the construction sector to an increase in construction activities, mainly the construction of commercial and residential buildings and ongoing infrastructure projects. These include the Standard Gauge Railway (SGR), expansion of Mwanza airport, construction of bridges at TAZARA and the Ubungo intersection in Dar es Salaam, construction of the Manyoni to Tabora road, the Songosongo natural gas project, which involved the construction of a 512-kilometre pipeline from Mtwara to Dar es Salaam, the Madimba Processing Centre, and the infrastructure for Phase 1 of the Dar es Salaam Rapid Transit Bus.

Despite promising growth, a number of constraints have hindered the performance of the sector. NBS (2013) and Clyde & Co (2013), among others, identify the following challenges:

- inadequate capacity of local contractors and consultants;
- inadequate and erratic work opportunities;
- inefficient procurement systems;
- occasional financial mismanagement in public/private sectors;
- poor working environments;
- low-technological equipment;
- lack of skills;
- inadequate capital;
- unfavourable donor conditions; and
- application of inappropriate delivery practices.

Leeds (2016) sets out the four main challenges facing the construction sector. These are: poor productivity and productivity which is a result of easy entry and stiff competition; poor project performance; a skilled labour shortage; and sustainability concerns. These, along with the concerns that have traditionally impacted the sector on the continent, such as constantly rising project costs,

corruption issues, lack of skilled labour, on-site safety, and capital supply constraints (Bonface 2015), hinder the successful development of the sector.

In this paper we will explain the structure of the construction sector and analyse its main actors and the key drivers of development. The information presented was collected through interviews with relevant stakeholders, desk review, and publicly available information mainly from the Tanzania National Bureau of Statistics (NBS).

2 Structure of the construction sector

The Tanzanian construction sector is made up of the Ministry of Works, Transport and Communication and its agencies, consultative body, regulatory boards and clients, suppliers of construction materials and equipment, consulting firms, construction enterprises, private firms, and professional associations.

2.1 The Ministry of Works, Transport and Communication (MoWCT)

The ministry is responsible for policy formulation, planning, overseeing, and overall coordination of the transport and communications infrastructure. The institutions under the MoWTC that deal directly with the construction sector include:

a) Agencies:

   i) The Tanzania Building Agency (TBA), responsible for the maintenance and development of government buildings.

   ii) The Tanzania National Roads Agency (TANROADS) and the Tanzania Rural and Urban Roads Agency (TARURA). These agencies are responsible for the maintenance and development of the road network. TANROADS manages the trunk and regional network. Since July 2017, TARURA has dealt with the district urban and rural road network previously managed by the local government authorities (LGAs).

   iii) The Tanzania Electrical, Mechanical and Service Agency (TEMESA). TEMESA is responsible for providing efficient and effective electrical, mechanical, and electronic services, reliable and safe ferry transport services, and the hiring of equipment to government institutions and the public at large.

b) Boards and Councils:

   i) The Roads Fund board (RFB), established by The Road Tolls (Amendment, No. 2) Act 1998[1] (RFB, 2018) started operations in 2000 with the mandate of advising the roads minister on new sources for road and fuel tolls, the adjustment of the rates of existing roads and fuel tolls, and on regulations for the collection of road and fuel tolls for the purpose of ensuring an adequate and stable flow of funds to road operations. The RFB is also the main source of funding for the maintenance of the road network in Tanzania.

[1] The Act was revised in 2006 and is now referred as the Road and Fuel Tolls Act, CAP 220 (Revised 2006).

ii) The National Construction Council (NCC) is a consultative body responsible for promoting and providing strategic leadership for growth, development, and expansion of the construction sector, with an emphasis on the development of local capacity.

iii) There are three bodies that are separately responsible for regulating the activities of the actors in the construction sector. The Contractors' Registration Board (CRB) registers, regulates, and develops the capacity of contractors, while the Engineers' Registration Board (ERB) and the Architects' and Quantity Surveyors' Registration Board (AQRB), in addition to their administrative activities, also oversee the conduct of their members and the consulting firms in the sector.

c) The Public Procurement Regulatory Authority (PPRA) ensures that the procuring entities and LGAs adhere to the provisions of the Public Procurement Act 2011 and its 2013 Regulations 2013.

There are also a number of associations which represent consultants and contractors, including the Tanzania Institute of Quantity Surveyors (TIQS), Architects' Association of Tanzania (AAT), Institute of Engineers Tanzania (IET), Association of Civil Engineering Consultants of Tanzania (ACET), the Tanzania Civil Engineering Contractors' Association (TACECA), the Contractors' Association of Tanzania (CATA), and the Association of Citizen Contractors of Tanzania (ACCT). These associations collectively protect the interests of their members and promote their activities.

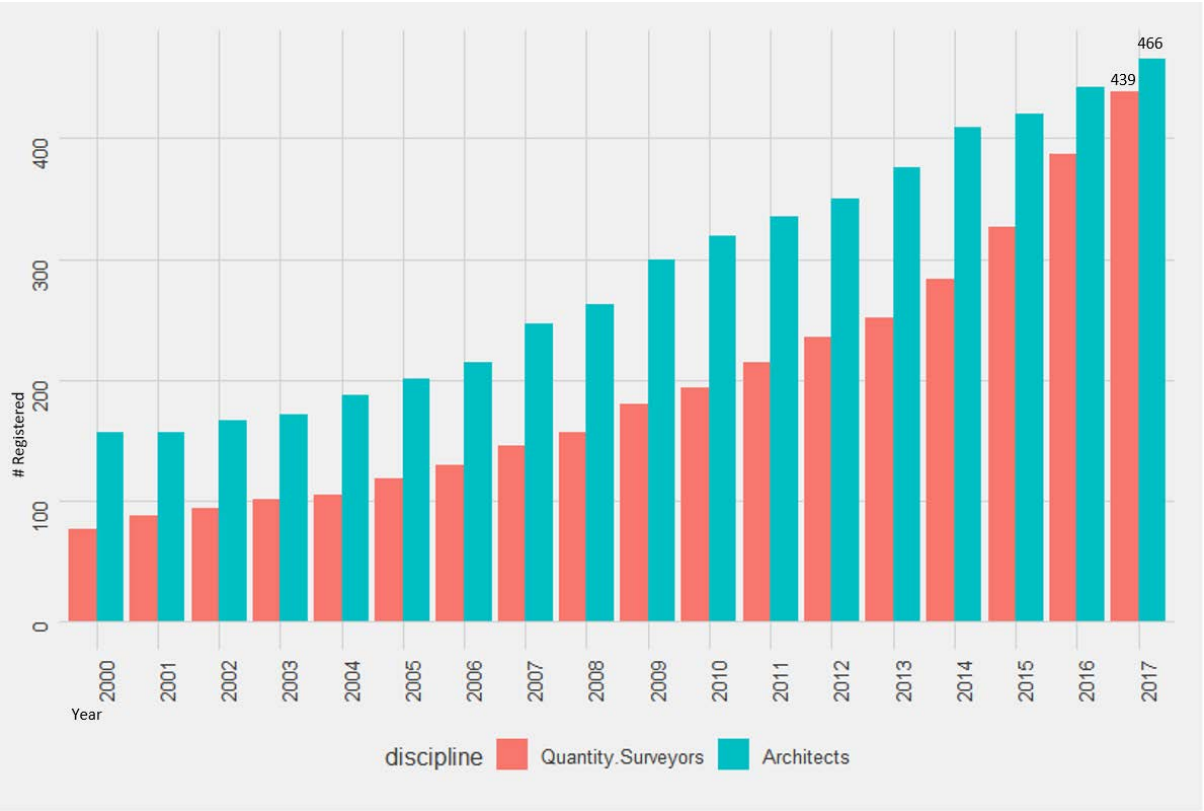
Architects and Quantity Surveyors Registration Board (AQRB)

The AQRB, established by the Architects and Quantity Surveyors (Registration) Act No 16 of 1997,[2] is responsible for registering and regulating the activities of architects, quantity surveyors, allied disciplines, and consulting firms. As at December 2017, the AQRB had 466 architects and allied disciplines on its register. Almost 90 per cent of those registered were local architects, 6.8 per cent were foreign architects, and the rest were landscape architects, interior designers, and architectural technologists. Similarly, during 2017, the Board registered a total of 439 quantity surveyors and allied disciplines: 402 local and two foreign quantity surveyors, 15 building surveyors, and 20 construction managers. The AQRB currently has 236 architectural firms, 124 quantity surveying firms, one building surveying firm, and one interior design firm on its register.

While both disciplines have increased their numbers since 2000, quantity surveying has done so at a faster rate. In 2000, the number of registered quantity surveyors was half the number of registered architects. These figures have been similar in recent years but do not take account of the graduation register, which has 198 graduate architects and 247 graduates of quantity surveying and allied disciplines (Figure 4).

[2] Repealed and replaced by Act No 4 of 2010.

Figure 4: Trend of registration of architects, quantity surveyors, and allied disciplines, 2000–17

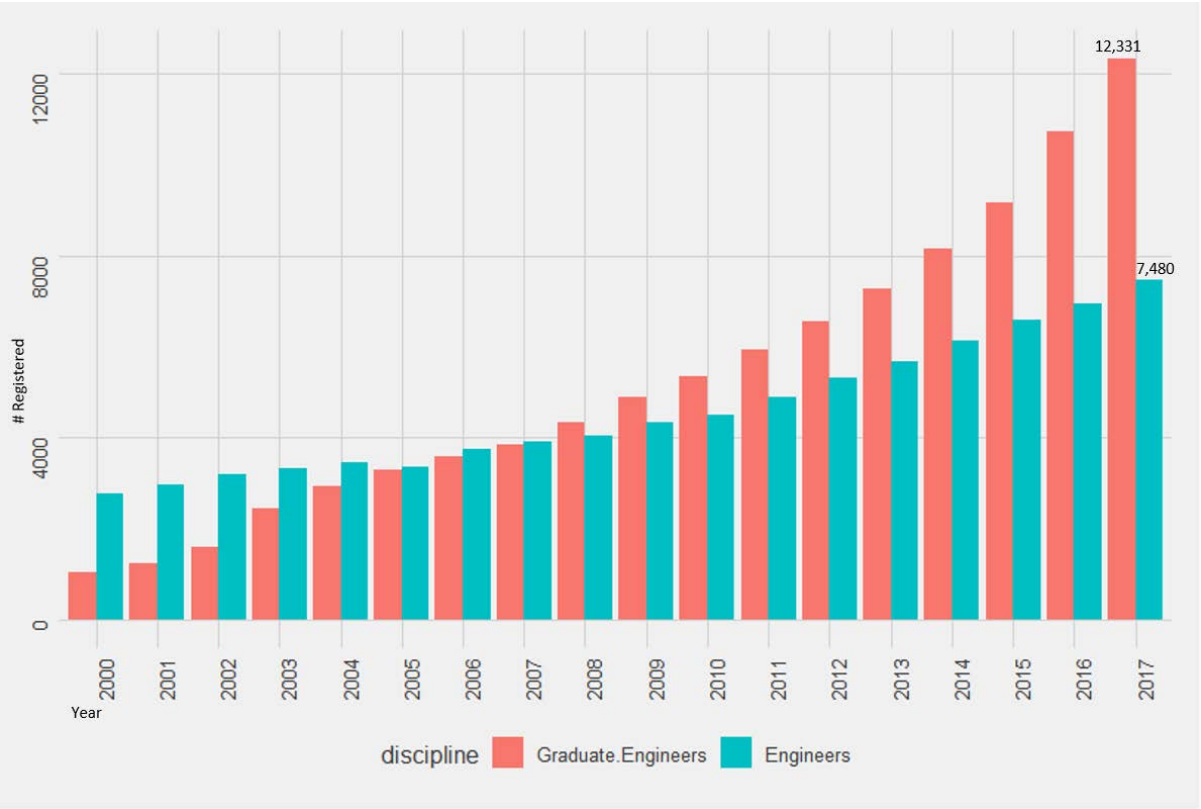


Source: Authors' calculations based on data collected at the offices of the AQRB.

Engineers Registration Board (ERB)

The ERB is a statutory body established under the Engineers Registration Act No. 15 of 1997. The Board is responsible for the registration and regulation of engineering activities and the conduct of engineers and engineering consulting firms. At the end of December 2017, the Board had on its register 20,135 engineers in the categories of graduate engineers, graduate incorporated engineers, incorporated engineers, professional engineers, temporary professional engineers, and consulting engineers. The majority of registered engineers were graduates, who represented over 63 per cent of all registered engineers. There has been a rising trend of registration of engineers for the past ten years (Figure 5).

Figure 5: Trend of engineers' registration, 2000–17



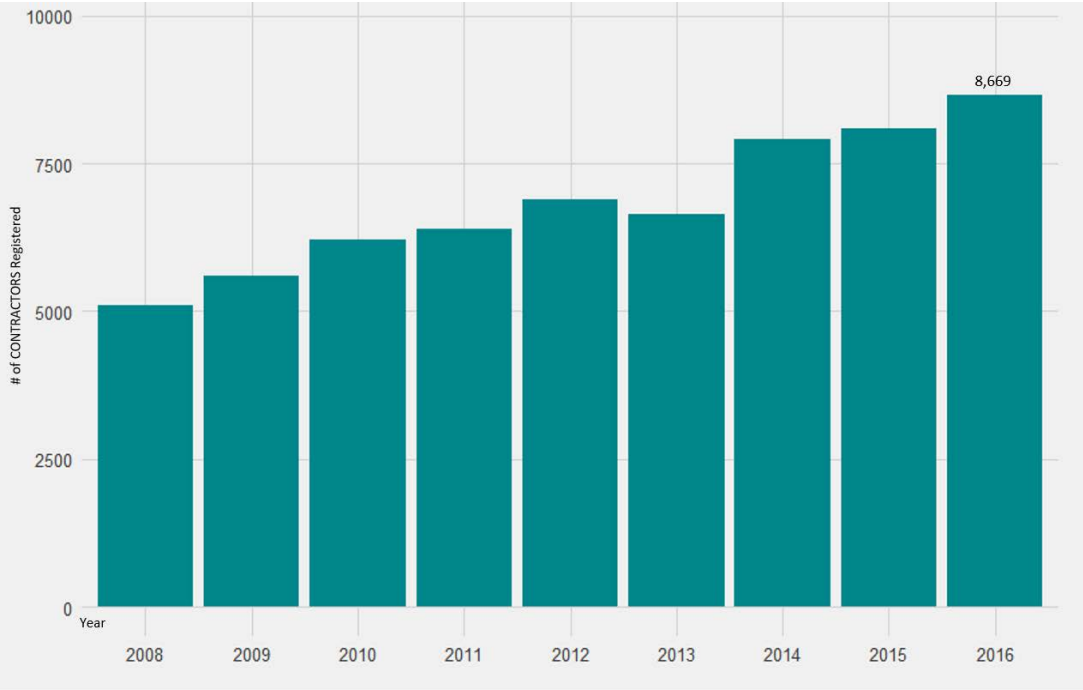
Source: Authors' calculations based on data collected at the offices of the ERB.

During the same period, the ERB had on its register 314 engineering consulting firms, the majority of which (71 per cent) were local and 29 per cent were foreign. Statistics from the ERB reveal that between 2013 and 2015, foreign consulting firms executed 165 projects against 3,217 projects undertaken by local firms. While local firms had more projects, the figures also reveal that foreign firms got high-value projects. Foreign contractors were awarded less than 5 per cent of the total number of projects in those three years at a total value of TZS 8,285.5 billion (US$3.6 million), while the local contractors' projects had a value of TZS 5,781.05 billion (US$2.5 million).

The Contractors Registration Board (CRB)

The CRB was established under CRB Act No.16 of 1997 and its amendments of 2009. Similar to the above-mentioned boards, it is responsible for the registration, regulation, and development of contractors. The Board registers five types of contractors: building, civil works, mechanical, electrical, and specialist contractors. These contractors are further categorized into local and foreign contractors, a classification that depends only on the nationalities of the shareholders of the company. Collectively, these are classified into seven classes (with I being the highest class), which cater for building, civil works, and electrical and mechanical contractors. Specialist contractors are restricted to classes I to III. Foreign contractors are restricted to classes I and II for all types of works except specialist works where foreign contractors can be in classes I to III. Over the past nine years, the number of registered contractors has increased from 5,125 to 8,669 (Figure 6), an increase of 69 per cent.

Figure 6: Trend of registration of contractors, 2008–16



Source: Authors' calculations based on data collected from the offices of the CRB.

In Table 1 we observe the distribution of registered contractors by category and class. The general distribution of contractors by size reveals that the great majority of registered contractors are concentrated in classes IV to VII (small contractors), accounting for 84 per cent of the total, with Class VII alone accounting for 34 per cent of the total. The rest are divided between class I (large contractors), accounting for 5.3 per cent, and Classes II to III (medium contractors), accounting for 10.6 per cent. This supports the work of the Tanzania NBS (NBS, 2013), which shows that the Tanzanian construction sector takes the form of a pyramid structure. In this structure most of the weight is closer to the ground, with a few large firms at the top and many small and medium firms at the bottom. Building and civil contractors represent about four-fifths of the total number of contractors, accounting for 42 and 37.9 per cent, respectively.

Table 1: Distribution of contractors by categories and class as of December 2016

Type	Class I			Class II	Class III	Class IV	Class V	Class VII	Class VII	Total
	Foreign	Local	Total							
Building	52	70	122	53	57	251	756	760	1,643	**3,642**
Civil	33	34	67	18	56	230	636	1,175	1,106	**3,288**
Electrical	24	23	47	9	11	59	77	108	333	**644**
Mechanical	12	7	19	1	4	14	36	45	57	**176**
Specialist										
Building	6	9	15	8	9					**32**
Civil	25	12	37	38	185					**260**
Electrical	26	41	67	95	156					**318**
Mechanical	34	52	86	66	157					**309**
Total	**212**	**248**	**460**	**288**	**635**	**554**	**1,505**	**2,088**	**3,139**	**8,669**

Source: Authors' calculations based on CRB (2017).

The class in which a contractor is registered is important for determining the maximum value of any single contract that this firm can access. Foreign contractors account for only 2.4 per cent of the total number of contractors but represent almost half of the contractors in class I (46 per cent). Local contractors are concentrated in class VII, which accounts for 36.2 per cent of the total number registered. Table 2 presents the values of work allowed for each class of contractor. Class I contractors are allowed to undertake works of unlimited value, while the rest are restricted to certain thresholds per contract. The involvement of local contractors in work opportunities has been low as they execute many projects of low value, leaving the large share to foreign contractors. Similar to the case with the foreign consulting firms, statistics from the CRB reveal that, in terms of the number of projects and value, between 2011 and 2017 foreign contractors executed 1,019 projects with a value of TZS 17,085.29 billion (US$7.43 million) and local contractors executed 17,344 projects with a value of TZS 8,239.03 billion (US$3.58 million). Assuming these figures represent the total of all projects, it seems that foreign contractors carry out about 5.5 per cent of the contracts but get 67 per cent of the available funds.

To reverse this trend, the Public Procurement Act, 2011, its 2013 Regulations, and 2016 amendments made provisions for preferring, and exclusively preferring local individual contractors or firms registered as local contractors. Sections 54 and 55 of the Public Procurement Act provide for national preferences and exclusive preference for local persons or firms.[3] A procuring entity can therefore grant a margin of preference of up to 10 per cent to local firms or associations between local and foreign firms where the contracts for works, consultancy, or non-consultancy services are to be awarded on the basis of international tendering or selection, or national competitive tendering or selection in which foreign firms participate. Similarly, an exclusive preference scheme for local persons or firms applies to procurement not exceeding a value of TZS 10,000 million (US$4,348) for works, and TZS 2,000 million (US$870) for goods, consultancy, or non-consultancy services where financial resources are exclusively provided by a Tanzanian public body.

[3] Regulations 30 to 43 of the Public Procurement Regulations prescribe how to realize these two and other preference schemes.

Table 2: Class limit for any single contract (in million TZS)

Type	Class	Class limit (mil. TZS)	Type	Class	Class limit (mil. TZS)
Civil	One	Unlimited	Specialist building	One	Unlimited
	Two	8,000		Two	800
	Three	4,000		Three	300
	Four	2,000			
	Five	1,100	Specialist civil	One	Unlimited
	Six	500		Two	800
	Seven	200		Three	300
Building	One	Unlimited			
	Two	5,000			
	Three	3,000	Specialist mechanical	One	Unlimited
	Four	1,800		Two	800
	Five	900		Three	300
	Six	400			
	Seven	200			
Mechanical	One	Unlimited	Specialist electrical	One	Unlimited
	Two	3,000		Two	800
	Three	1,500		Three	300
	Four	900			
	Five	450			
	Six	250			
	Seven	150			
Electrical	One	Unlimited			
	Two	3,000			
	Three	1,500			
	Four	900			
	Five	450			
	Six	250			
	Seven	150			

Source: Reproduced from the Contractors Registration (Amendments) By-Laws, 2017 (United Republic of Tanzania 2017).

The number of contractors in Tanzania has been increasing in recent years (Figure 3). This has led to stiff competition and many other challenges as firms compete for fewer available resources. These challenges have been extensively studied (Materu 2001; Baitani and Mullungu 2007; Khoza 2007; Musingi 2007) and include: a lack of finance and financial support; shortage of construction equipment; shortage of skilled labour, inadequate management skills, unfavourable regulatory environment, and high cost of doing business. Moreover, Muhegi and Malongo (2004) add that stiff competition, high equipment hire rates, and a lack of qualified staff are problems that the contractors have been facing for quite some time in Tanzania. According to the recent study by Mwombeki (2017), firms mention that delayed payment; lack of capital to finance the project; lack of business and financial management skills; inadequate equipment and plant in the construction sector; and corruption during procurement and project execution are the main challenges contractors currently face. Interviews with contractors, clients, and consultants confirm the challenges found by the previous studies. Table 3 summarizes the most-cited challenges.

Table 3: Contractors' challenges

S/N	Challenge	Remarks
1	Inadequate management skills	*Most local contractors cannot adequately manage projects, but, foreign firms engage them as subcontractors and their performance is acceptable.*
2	High equipment hire rates	*Many companies hire equipment and/or plant but rates are very high for local contractors to afford.*
3	Stiff competition	*There are more than 8,000 registered contractors in Tanzania who struggle for few work opportunities.*
4	Low financial base	*Local contractors cannot afford to tender for projects that require high levels of bid security and annual turnover because of their financial base.*
5	Lack of capital	*Local contractors lack the capital to acquire the necessary equipment and facilities for the project.*
6	Late payment	*Some clients do not honour interim payment certificate as per contract.*

Source: Authors' compilation from interviews with contractors, clients, and consultants carried out in 2018.

2.2 Clients

Clients in the construction sector always come and go, particularly those from the private sector. Clients in the public sector are agencies, ministries, LGAs, and parastatal organizations such as the Ministry of Education; Ministry of Health; Ministry of Water; Ministry of Works, Transport and Communication; Municipal Councils; and District Councils.

Every client who intends to erect a structure for use by the public must ensure there are adequate resources to accomplish the project in terms of finance and technical personnel. However, that has not always been the case particularly with LGA clients. Kikwasi (2011a) identifies the main challenges with LGA contract works as being a lack of sufficient funds to complete the project and inadequate capacity to manage the contracts. As well as identifying these challenges, Musingi (2007) finds additional challenges, namely inefficient utilization of resources due to an inadequate number of contractors in their locality and low-quality works. Similarly, NBS (2013) states that the inadequate capacity in the public sector is due to a lack of appropriate technical and managerial skills, understaffing, inadequate working facilities, poor remuneration, and bureaucracy. In a more recent study, Malongo (2015) finds that the contractors' problems perceived by clients are contractors not using qualified staff, poor knowledge of tendering procedures, lack of financial and project management skills, and lack of equipment. These challenges and many others contribute to the poor performance of projects and the sector at large.

3 Behaviour of construction prices

According to the Centre for Affordable Housing Finance in Africa (CAHF 2017), building a generic 55m^2 house in Dar es Salaam, Tanzania is cheaper than in 14 main African cities. At US$26,750 dollars, the cost of such a house in the urbanized Dar es Salaam is about half of what a person in Kampala, Uganda has to pay and 2.36 times cheaper than building the same house in Nairobi, Kenya. However, it is estimated that the country has a deficit of 3 million housing units

and that demand increases by about 200,000 units annually (CAHF 2017). According to CAHF (2015, 2016, 2017), the cost of building the cheapest house in Tanzania fell from US$20,992 in 2015 to US$17,874 in 2017.

Some of this reduction in cost can be attributed to the increased supply and lower price of cement associated with recent investments in cement factories, in particular, the Tanga Cement Company Ltd and Dangote Cement Plc. According to data from the National Construction Council (NCC, 2016) price index for cement has been relatively stable since 2005. However, the index price for labour has increased steadily since 2005. In fact, the labour price index increased from 6,879.40 in January 2010 to 22,358.06 units in January 2016.

Studying the NCC (2016) data, we observe that other important materials for the construction sector, such as iron sheets and steel pipes, have seen relative stability in the past decade. However, important components, such as fuel and diesel, have fluctuated or, as in the case of hardwood in 2013 and later in 2016, have experienced big jumps.

3.1 Investment shocks in the construction sector

The majority of construction contracts have been affected by the fall of the Tanzania shilling against the US dollar. Implementation of some of these contracts depends on the importation of materials and equipment, which drain the stock of the foreign currency in the country. As the exchange rate escalates, this increases government and private investors' expenditure on projects. The instability of the local currency has led to most large projects being awarded wholly or partly in foreign currency. Contracts with durations of two years and more attract the use of a price adjustment formula which uses indices to compensate contractors for changes in the price of labour, materials, and equipment. If there is a drastic increase in the indices, the cost of construction increases, leading to suspension or delay of the project. The current practice has been to state a limit of variation of price in the contract. Investors in public–private projects are likely to withdraw or bargain for a longer term of investments upon increases in construction costs.

Currently, the Tanzanian government is implementing large infrastructure projects such as the Standard Gauge Railway (SGR), construction of bridges at TAZARA and the Ubungo intersection in Dar es Salaam, and the deepening of ports at Dar es Salaam and Mtwara regions. These projects expend a large part of the country's foreign currency reserves and thus put the local currency at risk of depreciating. Similarly, most of these projects have clauses that allow the use of a price adjustment formula, which uses both local and foreign indices to compensate contractors in the event of price changes.

4 Key bottlenecks to supply response

In Section 2, we mentioned some of the challenges that contractors and consultants face in the sector. In this section, we will address in depth the most important constraints to sector supply response: access to land, construction permits, skills, and availability of materials and equipment**.**

4.1 Land issues in Tanzania

Tanzania has embarked on an industrial economy course which puts pressure on land governance. The Land Act 1999 provides for three categories of land: general, village, and reserved:

- *General land*: all public land which is not reserved land or village land and includes unoccupied or unused village land.

- *Village land*: as defined in the Village Land Act, 1999, is an area declared to be village land under and in accordance with Section 7 of the Act and includes any transfer or land transferred to a village.

- *Reserved land:* land reserved, designated, or set aside under the provisions of listed laws (Land Act 1999: Section.6); these include: environmental protection areas, such as national parks, forest reserves and wildlife reserves, including marine parks, and areas intended and set aside for spatial planning and future infrastructure.

General land is the category that is expected to be utilized by the construction sector for development. Land acquisition and registration is still a major problem in Tanzania. Kironde (2009) assessed land governance in the country and concluded that there were major challenges in registering land and improving land information systems, urban land management, and the management of public land, expropriation, and dispute resolution. Similarly, Mugabi (2013) highlights the challenges in land ownership in rural areas, which include: conflicts over land especially between farmers and livestock keepers; persistent land disputes resulting from the rapid expansion of towns encroaching on surrounding farming areas; tenure conflicts between customary and granted land rights; alienation of the people through accumulation of land by big national and multinational companies, leaving small-scale producers landless; absence of adequate and coordinated land information; and land insecurity among small landholder farmers, especially women.

An interview with an official from the Ministry of Lands, Housing and Human Settlement Developments reveals the following challenges associated with planning:

- Lack of master plans for LGAs. Out of 133 LGAs, only ten have prepared master plans and 18 have plans in progress;

- Inadequate staff in the land sector—only 35 per cent of LGAs are staffed in this area;

- Informal settlement accounting for 60 per cent of housing;

- Regularization; and

- Slow registering of villages—only 10 per cent of the 12,500 villages are registered.

Tanzania's performance on issues related to land is not promising. A recent study by the World Bank (2018a) ranked Tanzania 142 out of 190 in the registering property category, which examines the steps, time, and cost involved in registering property, based on a standardized case of an entrepreneur who wants to purchase land and a building that is already registered and free of title dispute.

4.2 Issuance of construction permits in Tanzania

The World Bank's (2018a) Doing Business (DB collects information on the procedures an entrepreneur needs to follow and the time and cost to complete those, in order to operate a business. The DB report considers 'dealing with construction permits' as one of the criteria for doing business. Obtaining a construction permit involves a number of steps including land location, land rent clearance, applying and obtaining building permits, and construction inspections

and certification. The DB Tanzania report (World Bank 2018a) details 24 procedures for getting construction permits, including obtaining location plans, registration with regulatory boards, and inspection by LGA officers. According to the World Bank, Tanzania has fallen in its ranking for processing and issuing construction permits–from 126 in 2015 and 136 in 2016 to a low of 156 in 2017, out of 190 countries. The Tanzania Private Sector Foundation (TPSF 2014) states that in Mwanza, the municipality issuing a construction permit takes up to 131 days to do so. Ninety of these days are spent at the approval meeting, whch requires councillors and officials to approve each application to provide a building permit. This is similar to the figures reported by the World Bank (2018a), which showed that it took 184 days to obtain a permit, out of which 90 days were taken up with approvals by councillors.

The TPSF (2014) has identified the following challenges in issuing construction permits in Tanzania:

- The wide distances (physical separation) between the key departments and offices responsible for scrutinizing and processing building/construction permits;
- Inadequate collaboration between the Tanzania Investment Centre (TIC) and LGAs;
- A one-size-fits-all approach to processing and issuing construction permits. The processing and requirements of construction permits are the same regardless of the type or size of project;
- Lack of awareness among applicants about procedures and requirements, including methods for charging fees for scrutinizing and issuing construction permits;
- Unclear rules of the environmental management officers in scrutinizing and processing construction permits; and
- A lack of by-laws to support and/or facilitate processing/issuing construction permits for specific projects.

Aiming to alleviate these challenges, the TPSF (2014) has recommended the following short- and long-term measures to improve processing of construction permits:

- The processing and issuing of construction permits should be left to the technical staff of LGAs;
- Councils need to engage private sector professional firms to do the inspection instead of waiting for council officers to visit sites at every stage of construction;
- Differentiate size of investment projects in processing and issuing permits;
- Each council should prepare a simple one-page leaflet freely available to the public, outlining key steps, issues scrutinized/checked, average costs, and number of days or time required to accomplish a procedure;
- Create a one-stop centre in each LGA for the processing and issuing of construction permits;
- LGAs to be supported in using ICT in the processing and issuing of construction permits;
- Review legislation, regulations, and preparation of by-laws to enhance processing and issuing of permits.

An interview with an official from the permit-issuing section of one of five municipalities in Dar es Salaam revealed that the process for obtaining a permit has recently been shortened. He added that the Government of Tanzania has directed municipalities to ensure that the planning and construction committees make decisions on issuing permits within one month. This has reduced the duration of processing permits from 90 to 30 days. The official also disclosed that most of the challenges related to issuing construction permits have since been addressed, but challenges remain

on the users' side as some applicants are not aware of urban regulations, and some clients construct structures that are different to approved designs/plans, which brings problems in later stages of the process.

4.3 Skilled labour

WEF (2017) has identified the technical and management skills of the labour force as one of the challenges for Tanzania to address if it is to reach middle-income country (MIC) status by 2025. Despite the government's efforts in expanding access to education, by 2014 only 15.79 per cent of the population aged 15 or more had some level of secondary education and 1.3 per cent had university education (NBS 2014). In fact, 72 per cent of the population of Tanzania had only seven years of education in 2014. Tanzania ranks 106 out of 130 countries in the Global Human Capital Index, which measures how well countries are developing their human capital according to four categories: capacity, deployment, development, and know-how (WEF 2017). Breaking down the index, Tanzania ranks second-to-last (129th) when measuring the share of people employed in occupations that require tertiary education out of the total employed (GHCR 2017).

The Five Year Development Plan II (FYDP II) (2016/17–2020/21) (URT, 2016) recognizes the challenges of skills in Tanzania. One of the key actions of the plan is to target higher levels of foreign direct investment (FDI) and other private sector financial flows to improve skill levels in the labour force through better internship programmes. The skill challenges the country faces also affect the construction sector. A recent report by Lema (2017) finds a shortage of skills in the construction sector. Lema further explains that the internationally recommended ratio is 1:5:25 for engineers, technicians, and artisans respectively. However, the current ratio in Tanzania is 1:0.2:2.6, reflecting the country's 10,000 construction professionals, 2,000 technicians, and 26,000 artisans, which is far from the expected figures of 10,000, 50,000, and 250,000 respectively. The shortage of architects and quantity surveyors was also noted by Mcha (2010), who established that only 10 per cent of LGAs had architects and quantity surveyor professionals as part of their staff. Kikwasi (2011b) evaluated construction skills at management level and found that telecommunication, materials, and water resource engineers were available only by special arrangement.

Interviews with contractors, clients, and consultants reveal skill shortages in various areas (Table 4). The most cited are: inadequate exposure of graduates to professional skills, lack of technicians, and lack of formal training for artisans. The two regulatory boards, ERB and AQRB, have internship programmes for graduates in engineering, architecture, and quantity surveying and allied disciplines. The ERB supervises the Structured Engineers' Apprenticeship Programme (SEAP) which is funded by the Government of Tanzania for three years, and the AQRB supervises the Enhanced Articled Pupillage Programme (EAPP) for two years, which is jointly funded by the Government of Tanzania and the AQRB. Due to limited financial resources, the two programmes only admit a small share of graduates.

Table 4: Construction skills shortages

S/N	Skills challenges	Remarks
1	Inadequate exposure	*There are many graduates with certificates but who have no skills and lack exposure to perform duties related to their professions*.
2	Technicians	*There is a lack of technicians in engineering and architecture as most of the technical colleges that used to train technicians have been upgraded to universities.*
3	Materials engineers	*It is difficult to get engineers who specialize in materials engineering or have the necessary skills in construction materials*.
4	Railway lines, mining, oil and gas, airport and dam construction	*Tanzania is spending most of its development funds in the construction of standard gauge railway line, oil and gas and mining, which demand specialist skills. There are no skills at all at middle management level and no technicians, particularly in the mining and oil and gas sectors.*
5	Project managers	*There are very few professionals with the necessary skills and experience to take up the role of project manager.*
6	Engineers	*Some contractors fail to register companies because they cannot find engineers to employ.*
7	Foreign experts	*Some contractors are allowed to engage foreign experts because there are no such skills in Tanzania.*
8	Artisans	*Most artisans lack formal training, as well as knowledge in construction theories and drawings.*

Source: Authors' compilation from interviews with contractors, clients, and consultants carried out in 2018.

The manpower in the construction sector is far below that expected. An extract from regulatory bodies (Table 5) indicates that the number of registered professionals and technicians is still low compared to potential employers. For instance, there are only 6,657 engineers and 439 quantity surveyors who are expected to serve all potential employers. On the other hand, there are only 727 technicians available for consulting firms and contractors. This supports the findings of Lema (2017) that there is a significant gap in the skill demand–supply in Tanzania. Interviews with regulatory officials reveal the following efforts to address the challenge of an inadequate number of technicians in the sector:

- The Government of Tanzania has extended study loans to students in technical colleges instead of to university students only;
- The government has been advised to revive old technical schools to impart technical skills to students in secondary school;
- The government has been advised to encourage the Vocational Education Training Authority (VETA) to take on the role of training technicians; and
- The government is to restrict upgrading of technical colleges to universities.

Table 5: Comparison of registered professionals, technicians, and potential employers

S/N	Potential employees		Potential employers	
	Specialization	Number	Organization	Number
1	Consulting engineer	531	Contractors	8,814
2	Professional engineer	6,657	LGAs	133
3	Q/Surveyors	439	Consulting firms	674
4	Architects	466	Agencies and ministries	29
5	Technicians	727	Private employers	various

Source: Authors' calculations based on data collected from the offices of the AQRB, CRB, and ERB, and from CLGF (2017).

4.4 Construction materials and equipment

The manufacturing and supply of local construction materials, such as cement, reinforcement steel, paints, ready-mixed concrete, and roofing materials, have been on the rise in Tanzania. The country has five big cement factories: Twiga Cement Factory, Tanga Cement Company Ltd, Tanzania Portland Cement Company Ltd, Mbeya Cement Company Ltd, and Dangote Cement Plc. The fairly recent increase in the number of big cement players in the local market seems to be responsible for the country's stable cement prices. In 2017, a 50kg bag of cement was sold at US$4.5 in Tanzania, which is almost half the price in neighbouring Kenya and Uganda where it is US$8 and US$8.5, respectively (CAHF, 2017).

While there are big companies supplying other construction materials locally, the country is a net importer of construction materials and machinery (Deloitte 2016), mainly from China, which accounts for more than a third of the total imports (34 per cent), followed by India and South Africa with 14 and 5 per cent, respectively. The challenge of locally available and imported building materials in Tanzania is that of quality. Most of the construction materials on the market, both manufactured and imported, are expected to be of substandard quality.

Companies that hire equipment and/or plant machinery in Tanzania include: EFFCO Solutions (T) Limited, Kays Logistics Company Ltd, Torya Machinery Ltd, Armani Investment Limited, and CMTL Logistics. In addition, Mantrac Tanzania Ltd is the sole authorized dealer of CAT construction equipment in Tanzania. It is evident that the availability of construction equipment has been improving, with more companies investing in the hiring and supply of new and used construction equipment. However, contractors are constrained by inadequate capital to acquire such equipment and/or plant. Muhegi and Malongo (2004) mention that contractors face several challenges related to equipment and machinery when budgeting for and delivering projects. For example, there is a limited/small capital base and, usually, not readily available equipment or high hire rates.

Interviews with contractors, clients, and consultants undertaken in 2018 reveal challenges associated with construction materials and equipment (see Table 6). The challenges related to construction materials are high cost and low quality of imported materials and unavailability of locally produced materials. Similarly, challenges associated with equipment and/or plant are a lack of capital for acquisition, quality, and high cost of hiring.

Table 6: Challenges associated with construction materials and equipment

S/N	Challenge	Remarks
1	Local materials	*Locally produced materials such as aggregates, sand, and gravel are not readily available in regions other than Dar es Salaam.*
2	Imported materials	*Most materials are imported and there are few well established suppliers in Tanzania, which makes construction materials expensive.*
3	Quality of materials	*The advancement of technology has brought about a variety of materials with no guarantee of quality*.
4	Unavailability of construction materials	*Imported materials for specific projects such as railway line construction, mining, oil and gas are not readily available.*
5	Equipment and/or plant hire rates	*Most plant hire companies are based in Dar es Salaam, they are not readily available in the regions and hire rates are higher than in Dar es Salaam by almost 40 per cent.*
6	Equipment owning	*Most firms lack the capital to purchase the basic equipment needed for construction.*
7	Unavailability of equipment	*Construction equipment is not readily available.*

Source: Authors' compilation from Interviews with contractors, clients, and consultants carried out in 2018.

5 Conclusion and policy recommendations

The construction sector is responsible for creating the necessary infrastructure to support most of Tanzania's development and economic activities. The key bottlenecks for the development of the construction sector emanate from land acquisition, construction permits, skills, and quality/availability of materials and equipment. Obtaining land for development is still a major challenge, as most of the challenges listed in the works of Kironde (2009) and Mugabi (2013) still exist. Most of the land is unplanned, attracting informal settlements and necessitating regularization. Construction permits still take a long time to issue, but the government has directed LGAs to reduce the time for processing these by shortening the approval period from 90 to 30 days. In addition, the government has set up a task force to prepare building codes. Construction skills in Tanzania, as in many other countries, are still in short supply. The findings of Lema (2017) and Kikwasi (2011b) still hold true. There are insufficient engineers, architects, and quantity surveyors and related disciplines to meet demand. Likewise, the sector has an acute shortage of technicians and qualified artisans. The availability and quality of construction materials is also an area of concern. The sector depends on imported materials, which are expensive but with no guarantee of quality. Construction equipment/plant have also emerged as a challenge, as owning them requires capital and hire rates are high for local contractors to afford. Contractors, who constitute a major part of the construction sector, and the sector at large, have been persistently facing challenges. The challenges of inadequate management skills, stiff competition, and the high cost of hiring equipment, identified in this study have also been identified by Materu (2001), Khoza (2007), Muhegi and Malongo (2004), and Mwombeki (2017).

From the above evidence, the proposed institutional and policy reforms necessary for the development of the sector relate to skills shortages, raw materials, contractors' challenges, construction permits, and access to land.

5.1 Raw materials and construction equipment/plant

Tanzania's dependence on imports of building materials and equipment poses a threat, as big investments are currently ongoing and others are planned to achieve the objective of making Tanzania a middle-income country. The fifth-term government has embarked on implementation of the FYDP II's first objective of industrialization, with the broad aims of: becoming a semi-industrialized nation by 2025; developing sustainable productive and export capacities; becoming a regional production, trade, and logistics hub; and promoting industrial skills. One of the priority sectors is building and construction. Institutions charged with the implementation of the plan should prioritize investments in construction materials. The poor quality of local and imported materials has been noted. The Tanzania Bureau of Standards (TBS) is mandated to undertake quality control measures for products of all descriptions and to promote standardization in the sector and in commerce. The TBS is to devise a mechanism, such as the Confederation of Tanzanian Insdustries (CTI) recommendation of creating an anti-counterfeit task force and a public–private advisory committee on counterfeits, to ensure that locally produced and imported materials are of acceptable quality.

There are various equipment plant hire companies in Tanzania. The main challenge has been less that of availability and more that of unregulated hire charges. The government should form or identify an agency that will register and regulate the activities of plant hire companies.

5.2 Skills shortage

The available statistics reveal a shortage of skills, and the construction sector is among those affected by lack of exposure to graduates and inadequate technicians. One of the targets of the FYDP II is to improve skill levels in the labour force through better internship programmes. The ERB and AQRB regulatory boards have internship programmes which expose graduates to various features of construction projects. These programmes are constrained by financial resources. The government should allocate financial resources to such programmes as part of implementing the plan. To increase the number of technicians and enhance the skills of artisans, the government should facilitate and promote technical schools and technical colleges to offer technical education, restrict upgrading of technical colleges to universities, and recognize and regulate the skills of artisans.

In addition, it will be important to direct resources to more science- and mathematics-oriented subjects. According to a study conducted by the Government of Tanzania, in 2014 up to 80 per cent of the firms interviewed (which includes all sectors) stated that the occupations that were and are expected to continue to be in demand are based on science and mathematics subjects. However, in 2013 about 24 to 30 per cent of the government funding through the Higher Education Student's Loan Board (HESLB) was directed to science-related programmes, which is not surprising as the admission of students to higher education institutions in engineering, medical, natural sciences, and ICT accounted for only 20.5 per cent of the admissions (TRC, 2014). Funding for science-oriented institutions, student loan schemes, and awareness campaigns about the skills needed in the next decade, among others, should be areas of focus for the government if it is to close the skills gap and move to a middle-income, semi-industrialized country. A further priority should be to support the development of a highly skilled labour force outside Dar es Salaam in intermediate cities that already offer some infrastructure and levels of development that will contribute to early gains. Some LGAs far from the coastal region in Tanzania have expressed a problem in recruiting locally qualified staff.

5.3 Access to land and construction permits

The fifth-term government embraces an e-government system. The constraints that are currently experienced in land governance and permit processing could be minimized by using ICT. The ministry responsible and LGAs should subscribe to e-government systems and ICT in the processing of permits and land governance. Similarly, the ministries responsible should expedite the preparation of a Building Act and its regulations which will guide all building construction activities in the country.

5.4 Contractors' challenges

The CRB organizes and conducts annual consultative meetings that identify challenges and make recommendations. The government and sector stakeholders are aware of these challenges. As contractors form a major part of the construction sector, stakeholders and the government should endeavour to address these challenges as follows:

- Inadequate business and management skills: CRB should conduct skills needs assessments and engage experts in the area to train contractors on a yearly basis;

- Delayed payment to contractors: Contractors should make proper use of clauses in the conditions of contracts and/or provisions of the Public Procurement Act 2011 and its regulations to deal with clients who delay their payments; and

- The Public Procurement Regulatory Authority should ensure all procuring entities abide by sections 54 and 55 of the Act and related regulations when engaging in procurement of works. This in turn will develop the capacity of local contractors and address issues of management skills, capital, and equipment where joint ventures, associations, or partnering apply.

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