

Diagnostic view of road projects in Malawi

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In sub-Saharan Africa, road is the dominant mode of transportation. As such, government and developmental agencies in the region usually invest in road projects significantly. However, the delivery of road projects that are supposed to act as the catalyst for socioeconomic development is fast becoming an uphill task in Malawi. A number of problems have been reported in the media. This development led to a preliminary diagnostic study that was aimed at examining the barriers that are hindering the successful execution of road projects in Malawi in 2012. The investigation that was conducted among engineers who are employed by the agency responsible for road projects in Malawi and civil engineering contractors used a self-administered questionnaire for data collection. Salient findings suggest that delayed payment by clients severely marginalises contractor performance and delivered projects are seldom defect free. Considering Malawi's heavy dependence on roads as a means of transportation, it is crucial that these barriers be addressed without delay.

1. Introduction

Malawi is a landlocked country in southern Africa that depends on road and rail for handling freight and passenger traffic (CIA Factsheet, 2013). Data available from the Roads Authority (RA) in Malawi show that 70% of internal freight and 99% of passenger traffic is handled by and heavily relies on roads. It is for this reason that the 2006 Malawi growth and development strategy (GoM, 2006c) put transport infrastructure as a key priority. As such, road projects are aimed at accelerating economic growth in Malawi.

The RA that was created in 2006 for the construction, rehabilitation and maintenance of the entire designated road network in Malawi has cited major constraints hindering its delivery of projects. Such constraints include limited local contracting capacity to undertake large-scale projects, inadequate construction equipment, fluctuating prices of imported construction materials, lack of well trained human resources and payment delays (Ministry of Transport and Public Infrastructure (MOTPI), 2010, 2011). With these constraints and others not mentioned here, road construction projects are often delivered late, over budget and below the expected quality.

Accordingly, the expectations of the client and other beneficiaries are hardly met. In order to deliver road projects successfully in Malawi, it appears that certain steps must be taken to address the constraints that the industry is facing by learning from their past mistakes. As it is important to prevent the repetition of past mistakes, a study was commissioned to look into the identified issues. The overall objective of this

paper is therefore based on 'the need to identify and understand the challenges that are contributing towards delays or abandonment of road projects in Malawi'.

Although descriptive and preliminary in nature, it is important to embark on this study as the Malawian economy depends largely on road infrastructure for the transportation of all its goods. For example, since the closure of the Beira railway line due to the washing away of the rail embankment at Chiromo Bridge and a bad stretch of 77 km of the Nacala port railway line, roads have become the most important means of transport for both goods and passengers in Malawi (MOTPI, 2011). The government of Malawi policy direction supports improved transportation, which will contribute to reduced lead times on exports, decreased cost of domestic trucking, lower cost of cross-border trade with neighbouring countries, and improved mobility and connectivity for the benefit of rural communities (GoM, 2006c). Moreover, when the major dependence on roads is taken into consideration, it is very crucial that construction, rehabilitation and maintenance works are carried out within stated time, budget, quality and other considerations.

1.1 Roads in Malawi: an overview

Established in 1891, the British protectorate of Nyasaland became the independent nation of Malawi in 1964. As indicated in Figure 1, Malawi shares border boundaries with Tanzania, Zambia and Mozambique. Thus, it is located in southern Africa, east of Zambia, and west and north of Mozambique. It has two major cities: Blantyre and Lilongwe

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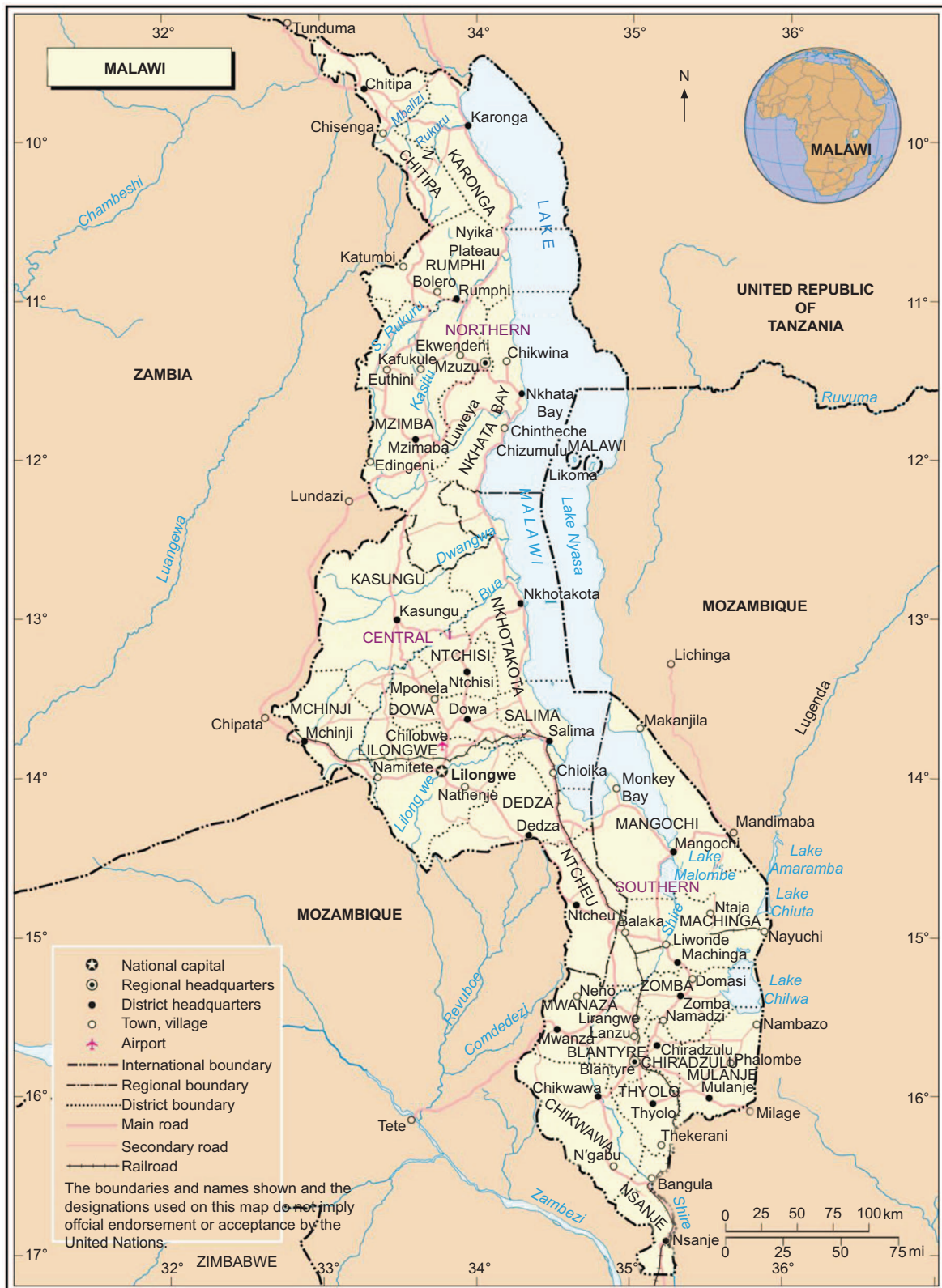


Figure 1. Geographical map of Malawi (source: <https://en.wikipedia.org/wiki/File:Un-malawi.png>)

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of which the latter is the capital. According to the CIA Factsheet (2013), landlocked Malawi ranks among the world's most densely populated and least developed countries. The economy is predominately agricultural with about 80% of the population living in rural areas.

In particular, Malawi has a total road network of 15 451 km that comprises 4038 km of paved roads representing 26% of the total roads network in Malawi (RA, 2009). Table 1 shows the classified road network of Malawi. Studies carried out by MOTPI (2010) identified an additional 9478 km of undesignated road network that serve the rural communities. In terms of management, roads in Malawi are the responsibility of the RA through the enactment of an Act of Parliament (Act No. 5 of 2006; GoM, 2006a). As the allocation of financial resources to the road sector failed to match the maintenance requirements due to economic challenges, service delivery on road infrastructure development and management has deteriorated rapidly from the 1990s onwards.

This development led to road sector reforms that were implemented by the road maintenance initiative in 1995 (MOTPI, 2010). The body was mandated by the government of Malawi effectively to address the development, management and funding of road infrastructure. The body was therefore required to sustain road network investments through a targeted approach to revenue generation from road users; and to establish an agency outside public service to manage the network and account for the resources against tangible achievements. In 1997, the government of Malawi implemented the recommendations of the road maintenance initiative study by establishing the National Roads Authority in 1998 under an Act of Parliament as an autonomous body with the Ministry of Transport and Public Infrastructure as an implementation agency. The National Roads Authority Act was repealed in 2006. This resulted in the creation of two separate entities, the Roads Fund Administration under Act

No. 4 of 2006 (GoM, 2006a) and the RA under Act No. 5 of 2006 (GoM, 2006b). The Roads Fund Administration was given the responsibility of raising funds for the construction, maintenance and rehabilitation of public roads and administering the funds. Table 2 shows income and expenditure figures for road construction and maintenance from 2001 to 2010.

2. Barriers working against the execution of road projects in Malawi

The financial strength of a firm plays an important role in the success of a project. Gunham and Ardit (2005) state that construction firms that are financially sound are able to take higher risks with prospects of higher returns, and enjoy higher credibility and reputation among clients and suppliers. In a study of 13 219 construction projects that were executed between 2004 and 2009 in southern Africa, Valentin and Vorster (2012) established that cash flow management is a critical element. Although timely and accurate financial information is vital for construction firms, various business owners underestimate how much money will be needed, not only to start a business, but also to sustain it as it struggles to gain financial strength. Generally, the smaller the tangible working capital as a percentage of annual turnover, the higher the probability of failure, especially if there is no credit facility from banks (Valentin and Vorster, 2012). Another contributing factor to the cash flow problems is the manner in which a contractor finances its long-term assets as this can severely impair the ability of a firm to continue with its operations (Davidson and Maguire, 2005).

In specific terms, the 2009 RA annual report mentions that financial restrictions remain the dominant constraint facing local contractors in Malawi because of limited access. Chilipunde (2010) (citing Kayanula and Quartey, 2000) reported that access to finance remains a dominant constraint to small- and medium-sized enterprises as they have limited access to capital in Malawi. The financial constraints faced by

Class	Pavement type		Mileage	
	Paved: km	Unpaved: km	Total: km	% Share
Main	2809	548	3357	22
Secondary	407	2718	3125	20
Tertiary	44	4077	4121	27
District	8	3492	3500	23
Urban	770	578	1348	9
Total	4038	11 413	15 451	100

Table 1. Designated road network in Malawi (source: RA (2009: p. 25))

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	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010
Income: Mk billion									
Fuel levy	1.34	1.48	1.53	1.82	2.31	2.41	2.19	3.82	7.84
Grants	2.95	2.47	2.09	2.30	3.97	4.06	9.77	14.24	18.53
Total income:									
Mk billion	4.29	3.95	3.62	5.12	6.28	6.47	11.96	18.06	26.37
US\$ million	55.9	40.5	33.2	43.1	46.2	46.1	85.1	129.0	188.4
Expenditure: Mk billion									
Operations	1.19	1.46	1.53	1.40	2.15	2.58	2.35	4.50	6.94
Utilisation of grants	3.12	2.48	2.10	2.30	4.16	4.00	8.33	10.82	18.57
Administration	0.07	0.11	0.20	0.20	0.13	0.15	0.17	0.19	0.86
Depreciation	0.01	0.02	0.03	0.03	0.03	0.03	0.05	0.26	0.00
Grants to MOTPI	0.03	0.02	0.02	0.02	0.03	0.02	0.01	0.00	0.00
Public works programme	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00
Total expenditure:									
Mk billion	4.42	4.09	3.88	3.95	6.50	6.94	10.91	15.77	26.37
US\$ million	57.6	42.0	35.6	33.33	47.8	49.4	77.6	112.6	188.4

Table 2. Income and expenditure on roads (2001–2010) (source: MOTPI (2010: p. 9))

contractors could lead to their inability to invest in equipment and the necessary human resources (RA, 2009).

In addition, as a result of advancement in technology, clients' demands are becoming complex and this is putting pressure on available skills in the construction industry. Unfortunately, the situation in sub-Saharan Africa shows an acute shortage of qualified employees, although there is an abundant supply of unskilled labour in most African countries (Muya *et al.*, 2006). In a study that analysed the craft skills requirements of Zambia, Muya *et al.* (2006) found that there is an acute shortage of skilled craftsmen in the industry, and construction firms are not investing in the training of craftsmen due to high employee turnover as firms do not have property rights over human capital. In a similar study in Tanzania, Kikwasi (2011) analysed the employment procedures of several construction firms. The study revealed that during the initial phase of construction, 67% of employers neither made enquiries regarding the training background nor tested the competence of skilled workers before engaging them. In Malawi, the decision to abolish diploma programmes in the engineering discipline from the University of Malawi has deprived the construction industry of engineering technicians who are very crucial to the construction industry (RA, 2007). Another challenge that the construction industry is facing pertains to management competencies as more and more individuals set up construction firms without the prerequisite experience and management skills. The lack of managerial know-how and

talent has placed a significant constraint on most small- and medium-sized enterprises, which form a large proportion of the construction firms in Malawi (Kayanula and Quartey (2000) cited by Chilipunde (2010)).

The lack of capacity during project implementation has significant implications for project delivery as projects are exposed to possible cost and time overruns. Several studies have been conducted in various countries to establish the extent of construction delays (Mahamid, 2011). The major impacts of delays in construction are time overruns, cost overruns, disputes, total abandonment and litigation (Pourrostan and Ismail, 2011). Mahamid (2011) (citing Al-Kharashi and Skirtmore (2009)) argues that the effects of time delays in government-financed infrastructure include confusion regarding public development plans, disturbance of the budget execution plan for the government agency involved, and public inconvenience resulting from the delay of the project. From the contractor's viewpoint, delays are simply an additional liability as the construction period becomes longer; the longer the period the higher are the overheads costs and expenses, and the entire contractor's working capital may become trapped in one project (Mahamid, 2011).

Similarly, the attainment of project quality objectives can become a daunting task in a developing country. Kikwasi (2011) (citing Nguluma (2005)) reports that one of the reasons for poor quality is limited opportunity for skilled labour to access formal training, thus studies carried out in several

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countries have revealed that most of the skilled labour force learned their trade on the job or were trained by a relative. The high illiteracy level in sub-Saharan Africa has also made formal training difficult for most skilled tradesmen. In addition, Kikwasi (2011) argues that the quality of work delivered depends mainly on the procurement of appropriate skills for supervision purposes. Kikwasi (2011) (citing Rwelamila (2002)) contends that poor quality of constructed work and low levels of productivity are among a number of problems affecting project performance in southern Africa. The acceptance of lowest tender price does have negative repercussions concerning the achievement of social objectives. As an illustration, if the tender price is very low the successful bidder may be led to cut costs by cheating on materials and taking other shortcuts that can affect the quality of the product (Hawkins and Wells, 2006). Regionally in sub-Saharan Africa, a study by the Construction Industry Development Board (CIDB, 2011) in South Africa highlighted the following as the major barriers to achieving quality.

- Design-related factors: inadequate details and inadequate specifications, and poor design coordination.
- Procurement-related factors: including emphasis on time and budget, shortened project periods, lack of prequalification, competitive bidding and awarding contracts purely on price.
- Construction-related factors: this includes skills shortages and insufficient workforce training, lack of management commitment and lack of strict quality control.

Furthermore, the CIDB (2011) contends that a high level of corruption is equally a major barrier to quality in South African construction. The prevalence of corruption throughout the procurement and project life cycle, from the identification of the project through to monitoring and enforcement, operation and maintenance is another factor that contributes to poor quality of work. Hawkins and Wells (2006) argue that corruption and fear of corruption is a major inhibitor to improved contractual and social performance. The anti-corruption group, Transparency International (TI, 2005), mentions in its global report that an estimated 105 investments in infrastructure are lost to corruption. The role played by other stakeholders in the construction industry has an impact on the quality of works produced. Emuze and Smallwood (2011) observed that there is an acute shortage of skills in most South African municipalities and this has given rise to a number of problems, including those listed here.

- The inability to manage service providers, resulting in poor-quality solutions, under- or over-pricing, over-payment and under-delivery, including projects being abandoned.
- New infrastructure failing due to lack of technical capacity in local communities.

- Operations and maintenance not taking place resulting in huge losses, poor quality and intermittent or complete failure of services.

Based on the above-mentioned points, projects are often exposed to cost growth. Project cost overruns are caused by rising costs largely due to inflation, inadequate analysis and inadequate information (Creedy *et al.*, 2010). Inflation and currency fluctuations have a serious impact on the cost of construction especially if the type of project involves importation of construction materials. Forecasting inflation in African countries is very difficult and makes planning very difficult as procurement methods, timing of purchasing decisions, collective bargaining agreements with local unions and overall cash flow management have to be adjusted in the light of anticipated changes in the rate of inflation (Gunham and Ardit, 2005). A comparison between inflation and contractor failure suggests that the rate at which the cost of goods and services increases directly influences the likelihood of a contractor failure, although the direct impact is somehow mitigated by the inclusion of escalation and confirmed cost increases (Valentin and Vorster, 2012). Cycles of higher inflation frustrate contractor ability to estimate input costs correctly, especially on long tenure lump sum contracts (Valentin and Vorster, 2012).

In a study carried out on major highway projects in Zambia, Kaliba *et al.* (2009) established that there is erratic funding on projects, and as a result claims owing to delayed payments, interest and standing time by contractors formed a significant part of the final total project cost, while political and other influences could increase the scope of works on government-funded projects without due regard to budgetary, schedule and other constraints. Kaliba *et al.* (2009) hence stated that 'budget overruns if not controlled, have a potential to adversely affect the completion of projects', therefore stringent management of various risks that can adversely impact on increased project costs is thus paramount.

3. Research method

Construction firms and engineers who participate in road construction and rehabilitation activities with the RA form the target population for the study. The National Construction Industry Council (NCIC) of Malawi provided the list of civil engineering contractors who renewed their annual registration with the council in the 2011/2012 financial year. The sample strata consisted of civil engineers working for the RA and civil engineering contractors that are active in the database of the RA in Malawi. Seventy-two general contractors (GCs) and 35 civil engineers were surveyed using a self-administered questionnaire. However, only 42 GCs completed the survey, equating to a 58% response rate, and 25 civil engineers working for the RA also participated in the study, equating to

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a 71% response rate. Hence, of the 107 questionnaires that were distributed among the GCs and engineers, 67 were duly completed and returned, yielding a response rate of 65% overall.

The 67 responses that were received were included in the analysis of the data. This suggests that the field work is quantitative in nature. The GCs were selected based on their registration with the NCIC of Malawi in the civil engineering category of Malawi kwacha (Mk)100 million, Mk200 million, Mk500 million and unlimited (1 UK pound is equivalent to Mk585.876 (05/04/2013)). The selected list was also cross-checked with the RA database to ascertain that the GCs have carried out road construction and rehabilitation works in the last 5 years. The questionnaires were then administered through the regional offices of the RA in all three regions of Malawi, as these offices are in constant contact with most of the contractors on a regular basis.

The purposively sampled respondents were surveyed from June to August 2012. The questionnaire mainly consisted of closed-ended questions and a few open-ended questions. The questions that were asked pertain to the extent that certain factors affect the performance of contractors during project implementation; the extent that certain factors contribute to the failure to achieve quality standards during project implementation; factors that contribute to cost growth in projects; and factors that contribute to the lack of community ownership during project implementation. These closed-ended questions were based on a five-point Likert scale. Beside the closed-ended questions, the respondents were able to provide general comments related to the barriers and necessary interventions that could improve the delivery of road projects in Malawi.

4. Findings and discussion

Descriptive statistics in the form of percentage responses and mean scores were computed and used to present the findings. The GCs were requested to state their registration category with the NCIC, and the results are as shown in Table 3. The table indicates the registration categories in millions of Mk. It is notable that 29% of respondents are in the unlimited category and 26% are in the Mk500 million categories. This implies that over 55% of the sampled contractors are eligible to undertake large and complex road projects because the criteria assume that they fully understand the working environment in the construction industry.

The GCs were then requested to state their average annual construction work turnover (in millions of Mk) in the last 5 years as indicated in Table 4. It is notable that 24% of respondents have annual turnover above Mk500 million, 14% have a turnover of between Mk300 and Mk500 million, whereas the rest were between Mk50 and Mk300 million. This signifies that most of the respondents are active with construction work throughout the year. However, only 12% of the GCs have road construction experience of over 20 years, with 9% having 15–20 years. Most of the GCs have 5–10 years of experience (31%) and 10–15 years of experience (33%). The high percentage of experience between 5–10 years and 10–15 years can be attributed to the reforms, which took place in the late 1990s when the RA (then National Roads Authority) was created in 1998. The effect of the creation of the RA was the use of private consultants and contractors for delivery of services as opposed to the previous usage of the force-account method of working.

The civil engineers working for the RA were also requested to state their position according to the organisation's organogram. The results show that 68% (17) of them were middle managers with job titles such as regional engineer, senior engineer and project engineer, and 32% (eight) were technical officers (technician engineers). This suggests that all the engineers have direct involvement in managing projects under their jurisdiction in the RA, and it can thus be concluded that they are familiar with the road construction industry in Malawi. In terms of working experience within the RA, it is notable that 13 engineers (52%) have spent between 10 and 15 years in the organisation. It can be explained that this group has worked for the RA since it was created in 1998, whereas the other group were employed as the organisation was expanding its business and through replacement of personnel who left the organisation. It can therefore be concluded that most of the engineers have considerable experience in road construction activities and are fully conversant with the current working environment in the industry.

A further analysis of the background of the respondents shows that 40 GCs and 23 engineers were men, and had over 10 years of industry experience. However, it was observed that the academic qualifications of the engineers working for the RA were higher than those of the GCs. It is notable that only the RA has people with relevant academic qualifications, with 36% having diplomas, 56% having degrees and 8% having post-graduate degrees. Similarly for GCs, their level of academic

Range: Mk	100 million	200 million	500 million	Unlimited
Response: %	36	10	26	29

Table 3. Contractor registration with the NCIC

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Range: Mk	50–100 million	100–200 million	200–300 million	300–500 million	> 500 million
Response: %	29	14	19	14	24

Table 4. Annual turnover of contractors in Malawi kwacha

qualifications also varied, but most of them have a diploma (26%), degree (33%) and/or post-graduate degree (21%). It was assumed that those with high school certificates (14%) and tradesmen (5%) have extensive experience in the construction industry. It can therefore be concluded that based on the academic qualifications, the respondents were well conversant with the industry and fully understood the contents of the questionnaire. After completing the section that addresses demographic information, the respondents were able to express their views pertaining to issues that were identified in the literature. The next section presents the related findings.

4.1 Contractors' project-related difficulties

The respondents were requested to indicate on a scale of 1 (minor) to 5 (major), the extent to which the given factors affect the performance of contractors during project implementation as indicated in Table 5. From the table, it is notable that in terms of the mean, two mean scores (MSs) are > 4.00, which indicates that delayed payments by the RA and GCs' cash flow problems are deemed to be a near major difficulty.

It is also notable that lack of access to credit facilities, lack of professional management skills by employees of GCs, delayed

instructions from the consultant, unavailability of plant and equipment on the market and shortage of skilled labour force in the market constitute major problems faced by contractors, although the extent of the issues may vary from one firm to the other. The last three factors, namely, bureaucracy in government agencies, inclement weather and incomplete contract documentation, can be deemed to have either a near minor or a minor impact. Furthermore, it can be seen that the GCs perceive delayed payment to be the biggest problem they are presently facing, with a mean score of 4.36, while the engineers perceive GC cash-flow problems to be the biggest problem with a mean score of 4.48.

4.2 Failure to achieve quality expectations in projects

Table 6 shows the recorded perceptions that pertain to a question that requested the participants to indicate on a scale of 1 (minor) to 5 (major), the extent to which the given factors contribute towards the failure to achieve quality standards during project implementation. From the table, it is notable that in terms of the mean, only one MS is > 4.00 ≤ 5.00, which indicates that the usage of the lowest tender method of contract procurement is deemed to have between a near major and major impact. It is also notable that five of the 10 MSs are

Factor	Contractors		Engineers		Summary	
	MS	Rank	MS	Rank	MS	Rank
Delayed payments by the client	4.36	1	3.96	3	4.16	1
Contractor's cash-flow problems	3.69	3	4.48	1	4.09	2
Lack of access to credit facilities	3.80	2	4.0	2	3.90	3
Lack of professional management skills by contractor staff	3.13	6	3.72	4	3.42	4
Delayed instructions from the consultant	3.19	5	3.20	6	3.20	5
Unavailability of plant and equipment on the market	3.26	4	3.08	7	3.17	6
Shortage of skilled labour force on the market	2.90	8	3.20	6	3.05	7
Bureaucracy from government agencies	2.95	7	2.67	8	2.81	8
Inclement weather	2.21	9	2.36	10	2.29	9
Incomplete contract documentation	2.02	10	2.43	9	2.23	10

Table 5. Factors affecting performance of contractors

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Factor	Contractors		Engineers		Summary	
	MS	Rank	MS	Rank	MS	Rank
Usage of lowest price tender method of contract procurement	4.41	1	3.58	5	4.00	1
Inadequate supervision by consultant	3.34	3	4.08	1	3.71	2
Shortage of skilled labour force on the market	3.40	2	3.96	2	3.68	3
No quality management systems by contractors	3.10	5	3.92	3	3.51	4
Lack of technical skills by consultant	2.85	6	3.64	4	3.25	5
Scarcity of required materials (gravel/quarry stone)	2.83	7	3.28	6	3.06	6
High levels of corruption	3.32	4	2.48	9	2.90	7
Shortened contract durations	2.71	8	2.56	8	2.64	8
Non-standardised specifications	2.20	9	2.58	7	2.39	9
Mistakes and discrepancies in contract document	1.95	10	2.24	10	2.10	10

Table 6. Factors leading to failure to achieve quality expectations

$> 3.00 \leq 4.00$, which indicates that inadequate supervision by consultants shortage of a skilled labour force in the market, no quality management systems in GC organisations, lack of technical skills by consultants and scarcity of required materials (gravel/quarry stone) are deemed to have between some impact and a near major impact.

Finally, the factors ranked seventh to tenth have MS values ≤ 2.90 , which indicates that high levels of corruption, shortened contract durations, non-standardised specifications and mistakes and discrepancies in the contract document are deemed to have a less significant impact. In addition, it can be observed that contractors perceive use of the 'lowest bidder' rule during contract procurement to be the biggest factor that contributes to the failure to achieve quality standards, with a mean score of 4.41, whereas the engineers perceive inadequate supervision by the consultant to be the biggest factor. However, both GCs and the engineers perceive that mistakes and discrepancies in contract documents contribute marginally to the failure to achieve quality standards.

4.3 Project experiences of cost growths during implementation

The respondents were requested to indicate on a scale of 1 (minor) to 5 (major), the extent to which the given factors contribute towards cost increases in contracts during project implementation. It is notable from Table 7 that in terms of the mean, three MS values are $> 4.10 \leq 5.00$, which indicates that in terms of the factors contributing to cost increases in contracts,

rising costs of construction materials, unavailability of foreign exchange in Malawi and the high rate of inflation can be deemed to have between a near major and a major effect.

It is also notable that six of the factors have MS values $> 3.13 \leq 4.11$, which indicates that under-estimation of cost of works at project inception, delayed payments by the client, scarcity of construction materials, high transportation costs, incomplete designs at project commencement and changes in scope of works can be deemed to have between some impact and a near major influence. Furthermore, it can be seen that the GCs perceive unavailability of foreign exchange to be the biggest factor influencing cost increases in contracts, whereas the engineers perceive high inflation rates to be the biggest factor. However, both contractors and the engineers perceive that high labour wages have a minor effect concerning the manifestation of the problem.

4.4 Absence of community ownership of projects

The respondents were requested to indicate on a scale of 1 (minor) to 5 (major), the extent to which the given factors contribute towards the lack of community ownership during project implementation. As indicated in Table 8, in terms of the mean, six of the MS values are $> 3.12 \leq 3.4$, which indicates that lack of initial community input at design stage, lack of timely intervention by the local authorities, delayed payments of compensation, delayed assessment of compensation, poor consultations with the host community and under-evaluation of properties to be compensated can be deemed to

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Factor	Contractors		Engineers		Summary	
	MS	Rank	MS	Rank	MS	Rank
Rising costs of construction materials	4.29	2	4.00	2	4.15	1
Unavailability of foreign exchange	4.36	1	3.91	3	4.14	2
High inflation rates	4.07	3	4.14	1	4.11	3
Under-estimation of cost of works at project inception	4.05	4	3.68	5	3.87	4
Delayed payments by the client	4.02	5	3.40	7	3.71	5
Scarcity of construction materials	3.50	6	3.56	6	3.53	6
High transportation costs	3.45	7	3.29	9	3.37	7
Incomplete designs at project commencement	2.90	9	3.76	4	3.33	8
Changes in scope of works	2.93	8	3.32	8	3.13	9
High labour wages	2.21	10	1.84	10	2.03	10

Table 7. Factors contributing to cost growths during project implementation

have some effects on the manifestation of the lack of community ownership during project implementation.

It is also notable that no formal channels of communication, disputes related to employment of local people, negative environmental impacts on the community and negative social impacts brought about by the GCs can be deemed to have minor effects in general. In addition, it was observe that the

GCs perceive delayed assessment of compensation to be a major cause of the lack of community ownership during project implementation with a mean score of 3.62, whereas the engineers perceive lack of timely intervention by the local authorities to be a vital factor. However, both GCs and the engineers perceive that GC-related negative social impacts contribute a negligible impact to the lack of community ownership during project implementation.

Factor	Contractors		Engineers		Summary	
	MS	Rank	MS	Rank	MS	Rank
Lack of initial community input at design stage	3.60	2	3.36	3	3.48	1
Lack of timely intervention by the local authorities	3.49	4	3.46	1	3.48	1
Delayed payments of compensation	3.58	3	3.36	3	3.47	3
Delayed assessment of compensation	3.62	1	3.20	6	3.41	4
No consultation with the community by contractor on site	2.98	6	3.40	2	3.19	5
Under-evaluation of properties to be compensated	3.23	5	3.00	7	3.12	6
No formal channels of communication	2.69	7	3.24	5	2.97	7
Disputes relating to employment of local people	2.59	8	2.48	9	2.54	8
Negative environmental impacts on the community	2.37	9	2.50	8	2.44	9
Negative social impacts brought by the contractor	2.22	10	2.38	10	2.30	10

Table 8. Factors leading to absence of community ownership of projects

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As mentioned earlier, the GCs and engineers were given the opportunity to offer unrestricted comments related to the barriers and possible interventions in the subject area. Barriers mentioned by the respondents were not limited to the lack of skilled experts and technicians in the road construction sector, under-estimation of the cost of road works, award of contracts to less competent GCs with political connections, and the general lack of payment certainty for work done. Notable interventions proffered include, among others, the following items.

- Emphasis should be on technical evaluation as opposed to financial evaluation of tenders.
- Client to pay contractors on time and access to credit facilities for contractors should be promoted.
- Stakeholders should be involved during the planning, design and implementation of projects as currently the RA is not doing that.
- Usage of lowest priced tender method should be avoided in order to have good quality work.
- Corruption should be looked at seriously, some incompetent contractors are awarded contracts through corruption, which is contributing to poor quality and delay in projects.
- Proper cost estimates that take into account the volatile economic nature of the country and maximum use of local technical experts should be encouraged.
- More work should be given to local contractors so that they can gain enough experience and have the capacity to handle large contracts.
- The RA should explore the possibility of engaging the same consultant for design and supervision of works.
- General awareness (civic education) especially in the local community (who are normally ignored) at all stages of project implementation should be engendered.
- The NCIC should critically scrutinise contractors before upgrading them to higher categories as some contractors lack the capacity to handle contracts in the category within which they are registered.

For the road construction sector, it is likely that policies and reforms related to management and finance will be the primary drivers that can add value to the process. Already national construction councils (in Tanzania, Malawi and Zambia) are adding value through promotional activities and direct actions that tend to remove constraints that local firms face in bidding for, winning contracts, and executing projects (Brushett and Seth, 2005). The identified issues in this particular study corroborate the observation of Champion *et al.* (2008) in terms of global issues that are affecting public works and municipal engineering. Shortage of professional skills in the industry (skilled artisans and technicians are in demand in Malawi), sustainable management and provision (this is where Malawi seems to be struggling) of infrastructure, and the impact of

climate change have continued to influence policy decisions in the sector (Champion *et al.*, 2008).

5. Concluding remarks

The study examined the barriers that are working against road project delivery and their influence thereof. The investigation that was conducted among civil engineering GCs and public sector engineers that are involved in road construction projects in Malawi provided the required insights. In terms of implication, the primary data confirmed that hurdles exist in terms of project execution in the road sector in Malawi. The lack of financial capacity among GCs due to a number of reasons leads to their inability to execute projects. Such reasons are not unconnected to delayed payments from clients, lack of access to credit facilities and the lack of professional management skills.

Thus, the major problem facing GCs are finance related due to delayed payments by the client, which in turn affect their cash flow negatively. The problems of the GCs are further compounded by the lack of credit facilities that can bridge the gap created by delayed payments. The second problem facing GCs is human resources related. It was observed (from the data) that both the GC and the consultant are lacking well trained and skilled human resources to manage road projects effectively. Likewise, another major problem that leads to the non-achievement of quality standards is the procurement methods that tend to favour lowest priced bidders. If the lowest priced bidder had made a price-related mistake, the GC will invariably try to take shortcuts during implementation to recover such expenses. This invariably compromises quality. The second quality-related problem can be attributed to lack of well trained and skilled human resources. It should, however, be borne in mind that despite the rampant corruption that is prevalent in Africa according to Transparency International (TI), the respondents did not consider corruption as a major problem preventing the achievement of expected quality standards. However, corruption was cited when considering the award of road construction contracts to less qualified GCs. This suggests that corruption may be less involved in project execution anomalies, in which the contractor and consultant and sometimes even the engineer may collude to falsify technical results, which may have an impact on the final quality of the product.

In terms of economic factors, it can be deduced that external factors have a huge impact on project outcome: the final cost of the project. Rising costs of construction materials, unavailability of foreign exchange in Malawi since 2010 and high inflation rates are the major causes of cost growths during project implementation. Internal project factors causing cost growth during project implementation can be attributed to poor project administration concerning the under-estimation of the cost of works at project inception, incomplete designs at

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project start-up, scarcity of prescribed construction materials (without identifying alternative materials) and major project scope changes. To sum up, it can be argued that stakeholder management is the major problem that leads to the absence of community ownership of projects as local communities are not adequately consulted during project inception and implementation. Delayed assessment of properties, under-evaluation of properties and delayed payment of agreed compensation have led to project apathy in host communities.

As a result, desirable interventions should target timely payments for work done by GCs, while GCs that are focused on quality should be awarded road contracts. Formal and informal training and education should also be used to bridge the skills-related gaps, especially among artisans. Doing this will improve capacity in both client and contracting organisations. The improved capacity would enable clients to pay GCs on time and GCs can be appointed based on technical abilities as opposed to lowest tender prices. However, there are gaps in this study due to time and costs limitations. In particular, other key project stakeholders in the road construction industry were not included for logistical reasons. These include the supervising consultants and the other stakeholders (local council officials, politicians and the general public), who are the direct beneficiaries of the projects. Therefore, future studies should be directed towards how each of the key stakeholders individually perceives the barriers in the implementation of road projects in Malawi. Doing a case study on an individual project would be an ideal beginning.

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