


Evidence-based Employment Scenarios

Constructing Future Growth Opportunities: The Potential of the Civil Engineering and Construction Works Sector

S. Lowitt

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HSRC Human Sciences Research Council

employment growth & development initiative

innovative employment strategies

CONSTRUCTING FUTURE GROWTH OPPORTUNITIES:

THE POTENTIAL OF THE CIVIL ENGINEERING AND CONSTRUCTION WORKS SECTOR

Sandra Lowitt

Research Associate

Employment Growth & Development Initiative

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Produced by: Sandra Lowitt

Contact: Dr Miriam Altman
Executive Director, EGDI
E-mail: maltman@hsrc.ac.za
Tel: +27 12 302 2402

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This is a discussion document and is presented as a precursor to a fuller study on the civil engineering and construction works sector in South Africa. The main driver behind these papers is to answer the question: **"could South Africa do something different to stabilise and intensify the contribution of the civil engineering and construction works sectors to national growth and employment?"** The answer to the question appears to be yes – an intensive, well-supported export strategy could not only ameliorate a substantial portion of the variability of employment and contribution to gross domestic product (GDP) of the sector, but such a strategy could also increase the size of the sector over time.

The paper centres on three key arguments. The first argument is that the construction sector is an important driver of GDP and employment growth. The sector is labour intensive and has high multiplier effects. These multipliers, which are the second highest in the economy (after manufacturing), relate to the high level of interconnectedness between the construction sector and other sectors in the economy, such as the capital equipment, finance, Information and Communications Technology (ICT), timber, cement, steel, bitumen, plastic and furniture sectors. Due to the positive direct and indirect benefits that flow from robust demand for construction services, countries often look outside their domestic markets to maintain or grow the contribution of the sector to the economy. In developed countries, new construction demand has slowed as deindustrialisation occurs and companies in these markets seek contracts abroad to maintain the scale of their operations. In developing countries, where markets are not yet mature but small and variable due to fiscal constraints, government often supports local companies to contract internationally so as to increase employment, earn foreign exchange and increase merchandise exports.

The second argument is that the construction sector in general, and the civil engineering and construction works sectors in particular, are historically highly volatile sectors. The broad construction sector moves in tandem with the local business cycle, while the civil engineering and construction works sectors are most influenced by government and parastatal spending. Local firms tend to deal with low domestic demand volumes by reducing employment. A long period of depressed demand for civil engineering and construction works services between 1980 and 2002 decimated the skills capacity of the local industry. As such, capacity to service the accelerated infrastructure investment programme of the government, which began in 2002, has resulted in a severe skills shortage, particularly with respect to engineers and artisans. To service domestic demand in the face of these skills shortages, massive skills development programmes have been put in place and short-term stop-gap measures implemented, including joint ventures between local and international construction firms and direct skills importation via increased work permit quotas.

The third argument presented in the paper is that, given the volatility of the construction sector and the substantial investment in skills currently being undertaken, it would make sense to prepare for a situation in future where domestic demand is no longer accelerating and is insufficient to utilise the skills resources currently being developed fully. Rather than creating an environment where this

decline in domestic demand leads to a contraction of employment in the construction sector and a failure to maintain the skills base, as occurred in the 1980s and 1990s, it is argued that developing an intensive export strategy for the sector will allow the sector to maintain its direct and indirect employment levels, as well as output levels in sectors which supply inputs to the sector. At this time we are proposing a more conservative maintenance strategy for a 'post-boom' period, but the argument could easily be extended to be a 'future growth scenario'.

The paper shows that South African firms have been exporting civil engineering and construction works services for the past 50 years. Exports have been driven by low levels of domestic demand, risk diversification strategies, relative rates of profitability and the following of key clients overseas. The key driver for these exports appears to be low levels of domestic demand, although some of the larger companies have adopted strong international diversification strategies, which see them maintaining export values even when domestic demand is high. We suggest in our discussion that not all civil engineering and construction works projects undertaken abroad are equivalent. Differences based on geographic region and sub-sector impact the quality and quantity of inputs sourced from the domestic economy to fulfil these contracts. Because most firms are undertaking exports to maintain profit levels and more effectively utilise existing resources, their export activities do not always occur in sub-sectors or geographic regions which are optimal for the national economy in terms of sourcing less highly skilled labour and material inputs from local markets. It is argued that not only could export volumes and values be increased in periods of low domestic demand, but also that the benefit of these exports to the local economy could be maximised if exports occurred in optimal export markets.

We then briefly turn our attention to the current obstacles, constraints and threats to the growing civil engineering and construction works exports sector. Five categories of obstacles are covered. These include issues related to market access and national treatment as covered in the General Agreement on Trade in Services (GATS); institutional and government support offered to exporting companies; access to finance, guarantee schemes and accessing international contracts advertised by international organisations; sectoral capacity development within South Africa; and finally the growing threat of other developing countries which have recently begun to compete in the export market.

Required interventions to address these obstacles are not covered in detail in this paper and are held over for the final paper; however, the centrality and importance of sectoral capacity development are highlighted. The reason for highlighting this potential intervention is premised on the argument that South Africa is currently importing a large amount of highly skilled professionals in this sector, either directly via work permits or indirectly via joint ventures. It is argued that it is crucial to leverage this importation of skills to increase the capacity of the sector in the long run rather than to merely view this importation as a stop-gap measure to fill the current skills gap.

Our final section reiterates the medium-term strategic nature of the argument presented. It is hard in the current climate of strong domestic demand and skills shortages to excite parties about the opportunities to expand internationally and the

need to address future predictable constraints well in advance of such a growth strategy. It is for this reason that we argue for a maintenance strategy that seeks to position the sector to maintain its output and employment levels once the current boom in demand begins to slow down rather than a more expansionary growth strategy. However, adopting a maintenance strategy provides a strong foundation for a more expansionary growth strategy in the future. We stress that it is necessary to gear up for such a strategic response well in advance of these activities actually occurring, not only because of the time frames involved in addressing these complex constraints, but very importantly, with respect to leveraging current boom conditions to create a platform for increased international competitiveness in the future.

1. Introduction

The status of the construction sector as a driver of economic growth in South Africa appears highly variable over time. In the honeymoon period immediately following the 1994 election and publication of the Reconstruction and Development Programme (RDP), the construction sector was viewed as having a major role to play, not only in terms of its final outputs, but also in terms of its economic contribution to employment and GDP. By the time the Accelerated and Shared Growth Initiative – South Africa (Asgi-SA) was published in 2006, the construction sector did not appear as a priority sector within the sector strategies component of the document, and the infrastructure programme dealt only with final infrastructure outputs and not the requirements of the construction sector to achieve these goals. Unsurprisingly, by 2006 and 2007 the industry was back in the limelight – this time in relation to concerns about the sector's ability to meet accelerated demand.

Variability, volatility, irregularity and fluctuation are well-known phenomena in the South African construction industry. The sector's contribution to GDP has fluctuated from 1.5% to 7%, its employment volumes have swayed from 250,000 to over 800,000 and its capacity utilisation has seesawed between 40% and 110%. While individual firms have developed survival strategies to deal with this inherent volatility, the national economy exhibits less flexibility. This begs the question: **could we not be doing something different from a national economy perspective to stabilise and intensify the contribution of this sector to growth and employment?**

The question is *interesting* from two perspectives. First, it deals with optimising the employment and output levels of one of the economy's largest single sectors – the construction sector itself. Secondly, it deals with optimising the employment and output levels of the input sectors which supply the construction sector. Given that the linkages between the construction sector and other input industries are some of the highest in the economy (after manufacturing), optimising and stabilising construction growth has substantial effects for a broad spectrum of related sectors, resulting in large multiplier effects.

Besides being *interesting*, the question is also highly *relevant right now*. At present, the construction sector, most notably the civil engineering and construction works sub-sectors, are experiencing a historic acceleration in demand. Given that these sectors were decimated by two decades of low levels of domestic demand in the 1980s and 1990s, the ability of the sector and its upstream suppliers to 'ramp up' is cause for concern. One of the key supply constraints appears to be skills, both in the construction sector and in upstream industries. Substantial effort in the past 12 months has been focused on systems and interventions to develop the necessary engineering, artisanal and management skills required to meet this demand. However, the length of the skills development pipeline and the duration of the domestic construction/infrastructure boom may result in the outputs of this skills development investment reaching the market place *after* demand has peaked. In this scenario, effectively utilising these skills, or even retaining these skills in the country may become an issue.

From an employment and output perspective we argue that now is the right time to reconsider our view of the construction sector. Strategically the sector can be a strong and sustainable driver of local economic growth and employment. A large and robust work force of engineers and artisans could be created locally and remain within the country. Achieving this will require focused activities to ameliorate the high level of volatility inherent in the sector. This paper hypothesises that increasing South Africa's construction sector **exports** as a strategy to dampen the negative effects of volatile domestic demand will support a larger and more sustainable direct and indirect contribution of the construction sector to South Africa's economic growth and employment – and will ensure that the current investment in construction-related skills development does not turn out to be an over-investment in this skills set once the current boom stabilises.

This idea is neither new nor innovative. Internationally the construction sector exports market is well developed and numerous developed and *developing* countries partake in these activities. Domestically all of the top five local construction companies run international order books of varying sizes and driven by varying motivations. What *is* absent in South Africa is a definite government view on the benefits of such activities to the domestic economy, and a policy of growth and support measures to ensure that such benefits are maximised.

This discussion paper is a precursor to a fuller study which will attempt to quantify the potential of the construction export sector for South Africa and the requirements necessary to achieve this potential. In this paper we present our work to date in a summarised fashion, consider the experiences of other countries who have followed this route and raise a variety of concerns regarding the domestic market, the external environment and the institutional requirements necessary to navigate this potential course successfully. The purpose of the paper is to provoke discussion on how we view the construction sector and how changing this perspective may lead to an increased contribution of the sector to GDP growth and employment in a sustainable manner.

2. Construction sector dynamics in developed and developing countries

The international literature related to the role of the construction sector and its exports within a national economy is enormously interesting as it applies to this paper. As will be demonstrated below, South Africa's current construction export activity fits none of the existing explanatory models or theories pertaining to such activities, leaving great scope in terms of future policy and implementation conceptualisation.

A substantial body of literature describes the dynamics of the construction sector in developed countries. While individual country studies abound, it is the cross-country, long-term studies which are most revealing. Two seminal studies have been completed. In 2001, Bon and Pietroforte analysed the construction sectors of Japan, the US, Finland and Italy between 1945 and 2000. In 2003, Pietroforte and Gregori undertook an equivalent study of Australia, Canada, Denmark, France, Germany, the Netherlands, Japan and the US between 1970 and 1980. Both studies had similar findings in terms of three key market dynamics.

First, both studies found that construction sectors "ranked very highly in terms of backward linkage indicators and output multipliers" (Bon, p.7, Pietroforte p.17). In both studies it was found that "only manufacturing sectors tend to rank higher". Across all the countries, the authors find that output multipliers range from 1.7 to 2.7[1]. These benchmark figures illustrate the high level of interconnectedness between construction and the rest of the economy in developed nations and is the point of departure in arguing the importance of maintaining a robust construction sector even in periods of low or variable domestic demand. The sector's forward linkages, by comparison, are weak and rank on average second lowest of all types of economic activity in terms of forward linkage multipliers and indicators. This is unsurprising, since the majority of construction goods and services are included in *final* demand, with few intermediate goods being produced by the sector.

The second finding of these two seminal works (and other individual country studies) is that the contribution of the construction sector to GDP and national income in developed countries has followed a bell-shaped curve, stabilising at a contribution of 10% to 12% of GDP and 5% to 6% of national income since World War II. The changing nature of this contribution is related to "structural changes affecting the manufacturing sector" (Bon, 2001 p.19). Essentially, the argument is that with the decline of agriculture and deindustrialisation, the amount of new construction demanded in mature economies begins to decline compared to the demand for new

[1] The calculation of multipliers is a highly complex issue and is dealt with in detail in the final paper. For the purposes of this paper, the output multiplier should be interpreted as the knock-on effects of a US$1 increase in the final demand of construction services. Therefore, an output multiplier of 1.7 to 2.7 means that for every US$1 increase in final demand for construction services there will be a US$1.7 to US$2.7 increase in gross output across the economy – this includes all the direct and indirect inputs required from the economy to supply the additional final demand.

construction while the manufacturing sector is growing. This bell-shaped curve of new construction demand rising and falling in tandem with industrialisation and deindustrialisation leads to the third finding of this research.

The third finding identified in the studies is that in developed, mature nations where services take the place of manufacturing as the core economic driver, new construction activity is substituted by 'maintenance and repair' construction. Maintenance and repair construction relates to construction activities attached to the upgrading or reusing of existing infrastructure, which has become obsolete in the face of the growth of services and decline in manufacturing. As such, in developed countries, new construction is on a downward slope in its life cycle, while maintenance and repair construction is on a sharp upward curve in its ascendancy as a sunrise industry. These two activities vary substantially in their input, technology and skills requirements, and their outputs are also fundamentally different. Coming to terms with understanding these issues is the current focus of researchers in this area.

From these three verifiable and consistent trends emerges the economic rationale for the growth in new construction exports by developed countries over the past three decades. As domestic markets for new construction become saturated, governments seek to bolster domestic repair and maintenance construction demand with international new construction demand so as to maintain the overall size of the domestic construction industry and the linkages it has forged upstream. If the benchmark output multipliers are in the range of 1.7 to 2.7 then this argument becomes crystal clear – a US$1-million decrease in overall final construction demand in a mature developed country will result in a US$1.7-million to US$2.7-million decrease in overall demand for goods and services in that economy. Under these circumstances, undertaking remedial action to ensure that lower domestic demand is supplemented by international demand becomes an obvious course of action.

While the economic logic of developed countries' expansion into global construction services exports can be traced directly to the maturity of their domestic markets and the shift towards maintenance and repair construction, the same logic cannot be applied to explain the growth of developing countries' increases in construction exports. We now turn our attention to the phenomena of construction exports emanating from developing countries whose domestic construction markets have not yet reached maturity.

Trade in construction services in developing countries is less well researched and understood than in developed countries. The existing international literature on the topic can be divided into two distinct categories – research related to the gains from trade liberalisation (driven by the UN, WTO and OECD[2]) and individual country case studies which consider the impact of construction exports on the domestic economies of developing nations.

[2] The United Nations, the World Trade Organisation and the Organisation for Economic Co-operation and Development.

The gains from trade in services literature argues that developing countries should liberalise their services sectors (including construction), but that the gains they will enjoy will arise not from increased exports but from improved local efficiency due to increased competition and the transfer of technology and skills via the importation of services from developed countries. These benefits are seen as long-term gains, with potential short-term negative adjustment costs to the domestic economy. Gains from services liberalisation are estimated to exceed those from the liberalisation of goods markets by a factor of up to 5, with most gains being welfare gains resulting from improved production, better and more varied product choice, higher quality and lower prices (OECD, 2003). These assertions have been queried in relation to the construction sector.

The counter-argument centres on the development of the domestic construction industry in the face of construction imports and the degree of skills and technology transfer that actually occurs. Opponents of the gains from liberalisation argument suggest that if large international players are the only source of sophisticated construction provision in developing countries, whose local firms lack the know-how to deliver such large projects, then the result of importing these services will be the continuation of an under-developed local construction capability. Only if local firms partner with international players and meaningful skills and technology transfer occur will the gains from construction trade actually accrue to the developing nation. Substantial research on technology and skills transfer from developed country construction companies to their less developed counterparts reveals a worrying trend.

Several authors show that in the 1950s and 1960s, substantial skills and technology transfers did indeed occur in this sector. However, by the 1980s and 1990s, construction companies from developed nations became substantially more reticent about such transfer. The change in attitude arose from two market changes. First, in the 1950s and 1960s, construction exports were an insignificant portion of most developed country construction companies' activities. By the 1980s and 1990s, these exports became a very important source of activity, given market saturation and maturity in developed countries, which manifested itself in low levels of domestic demand. As servicing international demand became more important to developed nations' construction companies they were less keen to see developing countries creating their own improved and increased capacity which would over time push them out of the market. The second reason for the change in attitude related to the growing trend of developing countries exporting construction services to other developing countries. This phenomenon, led by the Koreans and Chinese, suggested to developed nations that transferring skills to developing countries amounted to transferring skills to competitors.

The majority view appears to be that international construction exporting firms have moved through three phases in their behaviour towards skills and technology transfer to developing nations. Initially in the 1950s and 1960s such transfers did occur. Later in the 1970s and 1980s, lip service was paid to the notion of meaningful transfer. By the 1990s this had deteriorated to international firms taking active measures to avoid skills and technology transfers when working in developing countries. If, as appears to be the case, foreign contractors do not adopt strategies which support the goals of their host countries in terms of construction industry development, then the *a priori*

gains from trade liberalisation in construction for developing countries is moot. Several authors who support this view do, importantly, note that this market outcome can be ameliorated if systemic efforts are put in place to ensure mutually beneficial outcomes for the host country and the international contractor.

The trade liberalisation argument is not particularly relevant to South Africa, first because the local industry is highly sophisticated and developed and can compete with most developed nations' construction sectors, and secondly because the local industry is already highly liberalised. Of greater interest to South Africa is the international literature which studies developing nations who have successfully entered the construction export market.

Unsurprisingly, this second category of developing country literature has a different focus from the liberalisation literature. In this body of work the research focuses on the gains from increased *exports* of construction services, with a generally cautious view of the gains and costs associated with increasing construction services imports. Collectively the literature shows that the majority of developing countries adopting a services export strategy do so because they believe (1) increased exports are important to grow the local economy, especially if domestic markets are small and variable, (2) increased exports of services are likely to create substantial employment as most services exports are based on a comparative advantage in labour-intensive sectors, (3) foreign income will be earned, (4) complementary merchandise exports will increase on the back of increased services exports and (5) services exports are a viable way of diversifying a country's export basket, given that some services exports are not capital intensive and can be undertaken even if domestic savings rates are low.

The majority of research in this area is based on developing Asian countries, most notably Korea and China, who account for the greatest volume and value of international construction contracts awarded to developing countries. These two case studies reveal some interesting lessons and cautions for South Africa.

The Korean construction industry grew on the back of substantial American support, first with reconstruction efforts after the Korean War and then with the reconstruction of Vietnam. Substantial and meaningful technology, skills and business model transfer from the Americans to the Korean construction industry, together with the creation of large multi-national corporations sponsored by the state, positioned Korea to be the first developing nation to enter the construction export market seriously in the early 1970s. Korea's export advantage lay in its abundant labour force and low wages – not only for unskilled workers, but also for skilled artisans and engineers. However, Korea's capacities lay in buildings and basic infrastructure projects; the country was less competitive with respect to professional services and the advanced technology required for sophisticated civil engineering and utilities projects. Initially the Korean export drive was highly geographically focused in the Middle East. In 1980, 92% of all Korea's export contracts came from the Middle East. Its market share was considerable, and Korean firms accounted for 25% of all foreign contracts from that region throughout the 1980s. Korean firms exported domestic labour to the Middle East to complete these projects. At its peak, 200,000 Korean construction labourers were working abroad. Although the construction firms

were paid in foreign currency, the Korean government promulgated laws which forced 80% of workers' wages to be paid in Korea in the local currency. As such, construction exports earned, and freed up, considerable foreign exchange for the government. Between 1979 and 1985, construction foreign exchange earnings accounted for 50% of all foreign exchange earnings by Korea. The profitability of these contracts was extremely low (averaging just 2%), but this was strategically inconsequential to the Koreans at the time as their most pressing domestic issues revolved around their balance of payments constraints.

A total lack of profitability on international contracts is also a dominant feature of Chinese construction exports. The majority of Chinese construction firms who export are state owned. The firms are issued aggressive targets in terms of revenue and foreign employment. Profit targets are not issued. In the 2001 to 2005 five-year plan issued to exporting construction firms, revenue goals were a 14% increase per annum for five years and overseas employment goals a 6% per annum increase so as to reach 600,000 Chinese construction workers employed abroad by 2005. All research into Chinese construction exports suggests that the main drivers of Chinese authorities in supporting construction exports are a political economy agenda, job creation and, more importantly, the sale of complementary merchandise exports, especially machinery, equipment and building materials. Between 1993 and 2001, China exported US$10-billion worth of machinery, equipment and building materials to satisfy the procurement needs of offshore construction projects won by Chinese contractors.

The 1970s, 1980s and early 1990s were definitely the heyday of Korea and China's construction export activities. By the 1990s the outlook was becoming bleaker. Four factors account for the changing fortunes of these countries' construction exports.

First, both Korea and China's initial construction export successes were based on low labour costs and basic infrastructure and building markets predominantly situated in the Middle East. Both countries have subsequently found that international demand is shifting away from basic infrastructure and building towards more sophisticated projects that require higher levels of technology and professional skills, which neither country are particularly well suited to address. Secondly, both countries have experienced rising labour costs, which have eroded their comparative advantage and decreased their competitiveness. The third negative impact on Korea and China's export activities came from the slow-down of demand in the Middle East for basic infrastructure and building imports. Both countries were highly invested in this market and had failed to meaningfully diversify geographically. The final weakness in the Korean/Chinese export strategy of the 1970s and 1980s was their failure to increase the depth and sophistication of their service offering. By the 1990s, both countries found a substantial weakness in their ability to bundle complete solutions for foreign contracts and began losing contracts to developed nations whose firms offered one-stop shop servicing, most notably in the field of project financing.

The lack of sustainability of the Chinese and Korean construction export strategy led researchers at the end of the 1990s to survey trends in developing Asian countries who export construction services and to identify what general changes were occurring to deal with the constraints which had emerged. Rafferty (1998), who wrote a seminal

paper on this topic, argued that "the globalisation and deregulation of markets necessitated by fiscal, technological and managerial constraints have forced developing nations who wish to continue to export construction services to hasten and even leapfrog their capacity". From this he identified three notable trends that have occurred over the last decade: (1) increased private sector participation in major infrastructure projects; (2) increased vertical integration in the packaging of construction projects; and (3) increased foreign participation in the domestic industry via joint ventures and other contractual arrangements.

Other influential thinkers in this area have taken Rafferty's ideas further. They argue that developing countries who wish to export construction services can no longer rely on comparative advantages based on low wages, but need to undertake a "deliberate process" of "continuous improvement" at home to improve the viability and competitiveness of domestic companies so that they can operate in the export market. The point emphasised by these authors is that Rafferty's three trends cannot merely be a market-based response in developing countries but require deliberate policies and interventions.

This overview of construction sector dynamics in developed and developing nations raises a host of interesting issues which we will now consider as we analyse South Africa's construction sector performance, both domestically and internationally. In our analysis we will focus on civil engineering and construction works rather than the entire construction sector, which also includes building works (commercial and residential). The motivation for this is that traditionally the majority of construction exports relate to civil engineering and construction work activities, while building work is most often undertaken by local firms.

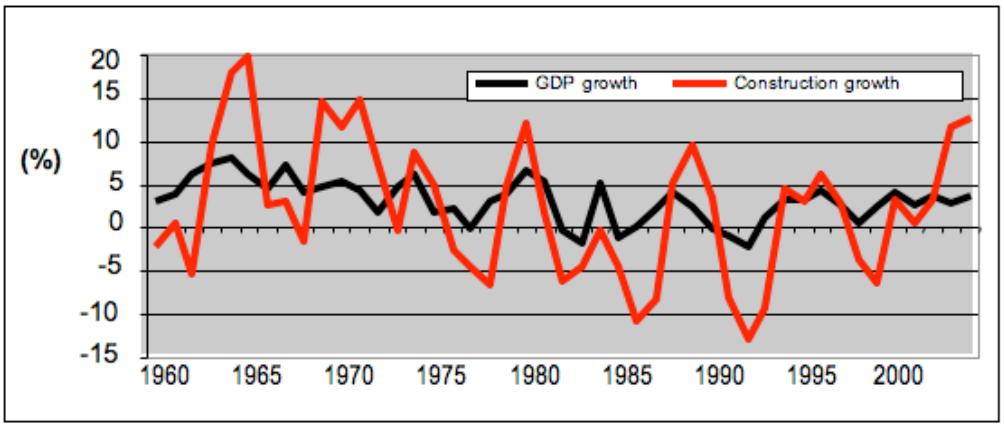
3. Domestic demand

Civil engineering and construction works include all activities related to heavy construction such as highways, bridges, tunnels, railways, airfields, harbours, dams, industrial facilities, pipelines, electricity facilities and township establishment. Activities such as these are statistically captured in gross fixed capital formation time series and often referred to as social and economic infrastructure. The private sector is an important participant in gross fixed capital formation, but public sector spending (either directly by the three spheres of government or by parastatals) is by far the crucial driver of the demand for social and economic infrastructure and hence civil engineering and construction work demand.

Growth drivers for this sector include general economic performance such as GDP growth, interest rates, inflation rates, access to investment financing and business confidence levels, as well as the most important driver – public sector spending. Fiscal policy in most developing nations is pro-cyclical rather than counter-cyclical. Therefore, the double trend of non-expansionary fiscal policy and decreasing GDP during periods of economic slowdown and the reverse in periods of strong economic growth create large variations in the construction sector in general and the civil engineering and construction works sector in particular.

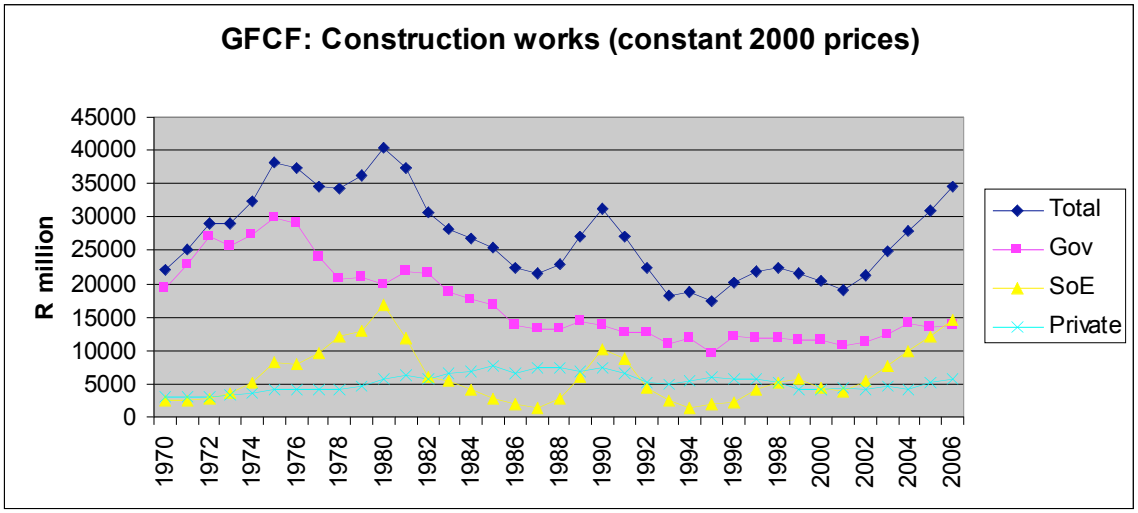
Figures 1 and 2 clearly illustrate this variability. Figure 1 shows that the total construction industry moves in tandem with the business cycle. Figure 2 shows that civil engineering and construction works are driven by general government and parastatal spending, with private sector investment not playing a substantial role in variability.

Figure 1 – GDP and construction sector growth: South Africa (% change)



Source: South African Federation of Civil Engineering Contractors (SAFCEC), Municipal Infrastructure Grant (MIG) Presentation, 2007

Figure 2 – Gross fixed capital formation in construction works: South Africa (constant 2000 prices)



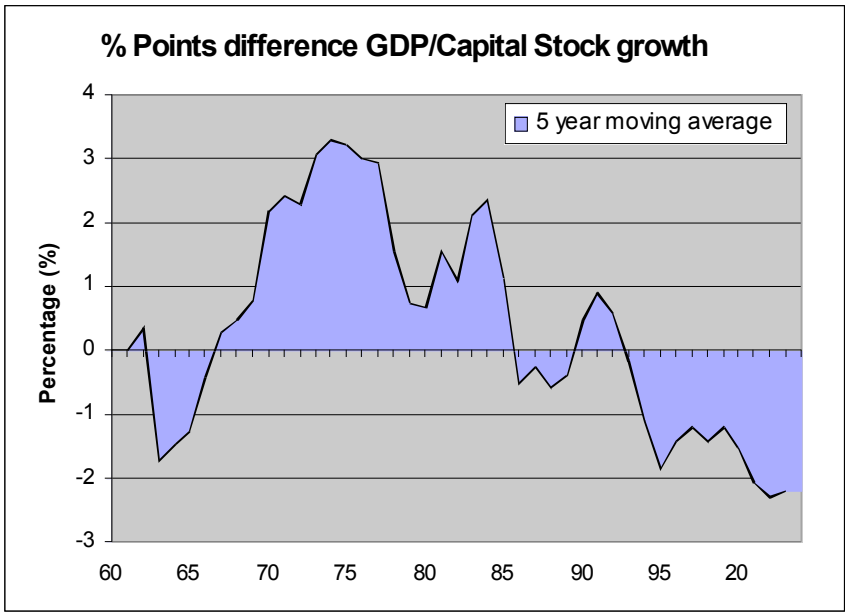
Source: South African Reserve Bank (SARB), online data services

Driven by a strong domestic economy which was buoyed by high resource prices and a strong military and infrastructure investment programme, the 1970s saw massive infrastructure investment by the old *apartheid* regime. This surge of activity led to the highest ratio of gross fixed capital investment to GDP in the country's history, peaking at 29.68% in 1976. With most developed nations averaging an equivalent ratio of 23% – and most developing nations a mere 15% – the 1970s were indeed a golden

period for the civil engineering and construction works sector in South Africa. Bar a minor surge between 1988 and 1990, the industry suffered subdued levels of demand throughout the next two decades, with the ratio of gross fixed capital formation to GDP falling to a 50-year low of 14.69% in 1993.

Demand for the sector's services following the 1994 election remained weak, as business confidence was slow in rising and government spending substantially curtailed under the Growth, Employment and Redistribution (GEAR) policy. During this period, investment levels fell to such a degree that infrastructure growth failed to keep pace with current economic growth. This is shown in Figure 3 where the percentage growth rate of GDP is divided by the percentage growth rate of capital stock over a five-year period to show how capital stock is growing as GDP grows. Figure 3 shows that capital stock growth since 1994 has failed to keep pace with economic growth, let alone begun to address the infrastructural backlogs inherited from the previous government.

Figure 3 – GDP/capital stock growth: South Africa



Source: SAFCEC, MIG Presentation, 2007

In 2002, the fortunes of the sector began to change. Within the private sector, five years of low inflation, reduced interest rates, growing business confidence and stable domestic growth provided an environment for renewed investment. Within the public sector, the gains from the period of austerity under GEAR allowed government to pursue an expansionary fiscal policy. High on the government's agenda was the provision of economic infrastructure to address energy, communications and transport inefficiencies, and social infrastructure to address inherited backlogs. The government declared its intention to increase gross fixed capital formation from 15% to 25% by 2014, and by 2004 the Medium-Term Expenditure Framework (MTEF)

was already showing the translation of these intentions into tangible budgets and projects on the ground.

Table 1 – MTEF 2004 - 2010 (nominal R-million)

	R-million	R-million	R-million	Total previous MTEF	R-million	R-million	R-million	Total current MTEF	% change
	2004/05	**2005/06**	**2006/07**		**2007/08**	**2008/09**	**2009/10**		
Water (DWAF, TCTA, Municipal)	4,296	5,627	7,808	17,731	3,895	9,098	9,758	27,251	*54*
Sanitation (DWAF, Municipal)	1,368	2,297	2,926	6,591	3,028	3,180	3,339	9,547	*45*
Electricity (Eskom, DWAF)	8,110	11,782	16,272	36,164	17,223	23,100	30,983	71,306	*97*
Housing	4,474	4,843	6,822	16,139	8,238	9,853	11,531	29,622	*84*
Education (school buildings)	2,148	2,453	3,127	7,728	3,393	3,984	4,183	11,560	*50*
Health (hospitals, clinics)	2,222	3,059	4,175	9,456	4,699	5,468	6,086	16,253	*72*
Roads (SANRAL, provincial, municipal)	10,998	13,299	15,743	40,040	18,740	20,806	22,618	62,164	*55*
Rail (SARCC, Gautrain, Spoornet)	2,147	4,959	12,900	20,006	15,973	15,857	14,258	46,088	*130*
Ports (NPA, SAPO)	2,221	2,843	3,667	8,731	7,122	5,623	3,808	16,553	*90*
Sports and Recreation (stadiums)	0	0	0	0	2,700	3,800	1,300	7,800	

Source: National Treasury, MTEF 2004, MTEF 2007

Driven by this accelerated demand for civil engineering and construction works, the sector has grown at close to 10% per annum over the past five years, leading commentators to predict that the sector will double in size in the next five years.

4. Supply of civil engineering and construction works in South Africa

In normal circumstances, any industry would feel challenged when facing growth rates of the magnitude faced by the local civil engineering sector since 2002. When such accelerated growth occurs off a low capacity base which has been decimated systemically over a two-decade period, the challenge is substantially larger. Language found in current sector literature such as "total onslaught on available resources", "tsunami of new contracts" and "fever period" suggests that concerns exist regarding the ability of the industry and its upstream suppliers to meet the aggressive increase in demand for civil engineering services. Several key issues have arisen regarding the overheated environment in which the sector is currently operating. These issues pertain not only to construction companies' capacity to meet demand, but also the capacity of upstream producers to meet the construction industry's demand for inputs.

With respect to the construction industry itself, the issue of greatest concern in meeting accelerated demand is a lack of adequately trained and experienced skilled labour resources – including management, project management, engineers and artisans. Construction companies deal with periods of low demand by laying off workers, retarding salary growth and offering early retirement. With poor demand conditions being perpetuated during the 1980s and 1990s, the skills base available to meet the current boom has all but evaporated. By way of example, in 1975, South African universities were graduating 6,000 engineers per annum. This fell to 1,400 per annum in 2004. Similarly, in 1975 there were 33,000 registered apprentices in the construction sector compared to just 1,400 in 2005. The skills shortage, supported by empirical evidence, has been well acknowledged by government and industry. Moving forward, the skills deficit appears to be on a path where demand will continue to outstrip supply, given the substantial growth in infrastructure investment and the growth trajectory of the domestic economy.

Although estimates of the skills gap vary, the Joint Initiative for Priority Skills Acquisition (JIPSA) figures presented below appear to cover the generally accepted magnitude of the problem.

Table 2 – Artisans skills forecasts

	Best case	Worst case
Supply side		
Current resource volume	134,000	134,000
Current pipelines	7,000	4,000
Annual attrition	9,380	13,400
Net effect by 2012 – current trends	-11,900	-47,000
Net effect by 2012 – with JIPSA initiatives	33,100	-32,000
Resource volume by 2012 – current trends	***122,100***	***87,000***
Resource volume by 2012 – with JIPSA initiatives	***167,100***	***102,000***
Demand side		
State-owned Enterprise increased demand	8,500	8,500
Supplier increased demand	54,000	54,000
Total demand	196,500	196,500
Surplus/deficit		
Surplus/deficit at current trends	***-74,400***	***-109,500***
Surplus/deficit with JIPSA initiatives	***-29,400***	***-94,500***

Assumptions:
- All existing skills are fully utilised.
- Aggregation of data into the broad occupational category may result in distortions.
- Best-case attrition is estimated at 7%.
- Worst-case attrition is estimated at 10%.
Source: JIPSA (March 2007)

Table 3 – Technicians, technologists and engineers skills forecasts

	Technicians		Technologists		Engineers	
	Best case	**Worst case**	**Best case**	**Worst case**	**Best case**	**Worst case**
Supply side						
Current resource volume	28,000	28,000	3,800	3,800	28,000	28,000
Current pipelines	2,500	1,250	430	215	1,500	639
Annual attrition	1,960	2,800	266	380	2,800	4,760
Net effect by 2012 – current trends	-3.100	-13,550	820	-825	-6,500	-20,605
Net effect by 2012 – JIPSA	1,900	-7,300	4,470	-740	-1,500	-16,300
Resource volume by 2012 – current trends	***24,900***	***14,450***	***4,620***	***2,975***	***21,500***	***7,395***
Resource volume by 2012 – JIPSA	***29,900***	***20,700***	***8,270***	***3,060***	***26,500***	***11,700***
Demand side						
State-owned Enterprise increased demand	-	-	4,200	4,200	3,100	3,100
Supplier increased demand	32,300	32,300	650	650	18,200	18,200
Total demand	60,300	60,300	8,650	8,650	49,300	49,300
Surplus/deficit						
Surplus/deficit at current trends	***-35,400***	***-45,850***	***-4,030***	***-5,675***	***-27,800***	***-41,905***
Surplus/deficit with JIPSA initiatives	***-30,400***	***-39,600***	***-380***	***-5,590***	***-22,800***	***-37,600***

Assumptions:
- Current resource volumes are based on ECSA registrations and other research; however, it is not known how many of the registered engineers and technologists are actually working in the South African industry.
- All existing skills are fully utilised.
- Aggregation of data into the broad occupational category may result in distortions.
- Best-case attrition is estimated at 7% for technicians and technologists and 10% for engineers.
- Worst-case attrition is estimated at 10% for technicians and technologists and 17% for engineers.
Source: JIPSA (March 2007)

The skills deficit in this sector has resulted in three responses. First, government and industry have come together to devise a skills development programme which will address these shortages by developing local skills. JIPSA aims to train 50,000 artisans over the next four years and increase graduate output of engineers from 1,400 per annum to 2,500 per annum. Private sector initiatives through in-house training and bursary programmes will add to this output.

The second response to this excess demand for skilled workers relates to retention strategies and rehiring retired professionals. Skilled construction professionals who retired from the industry in the 1990s are being rehired on short-term contracts to see companies through particular projects. In addition to reintroducing skills from the retirement pool, companies are also working hard to retain existing workers who are often canvassed by competing firms. Retention strategies have dominated salary, benefits package and share option inducements, which have seen a market price effect of premiums of up to 30% to 50% being paid to retain or attract qualified labour.

The third response has been to supplement the local resource base with imported skills, acquired either directly via immigration or indirectly via joint venturing with overseas companies on large contracts. The Department of Home Affairs recently confirmed 35,000 quota work permits in 53 skills categories, of which about 12,000 are related to civil engineering and construction skills. With respect to increased joint venture activity, this crucially important accommodation mechanism is considered in more detail below.

A further skills development issue which is often overlooked applies to skills shortages faced by upstream producers of construction sector inputs. Demand for all building and engineering inputs such as carbon steel, cement, timber and bitumen is increasing concurrently with civil and construction works demand. Upstream industries are not only increasing output but also capacity, which similarly requires skills, many of which are in short supply in the labour market.

A second concern regards the supply of inputs. The seriousness of this constraint appears moot. An industry delegation meeting with the Presidency recently reported that input supplies were not a binding constraint, while industry players and some industry associations believe that the supply of cement, structural steel and other consumable inputs to civil engineering are under pressure from the sector's recent accelerated growth. The Baxter contract price adjustment formula (CPAF), which reflects price movements for inputs in the industry (escalation rates), was up to 8.17% in 2006, in excess of the CPIX[3] and overall PPI[4]. This would suggest pressure on supply, although some analysts put the escalations down to "an inevitable correction after the preceding period of industry stagnation" (Aveng, Annual Report, 2006, p.33) and not an indication of shortages. The SA Civil Engineering Association disputes both the Baxter calculation and the notion that shortages will not become an issue. It believes that the Baxter formula is an "underestimation of price escalations as it is calculated without including premiums that will be paid as shortages rise" (SAFEC, 2007, p.16).

A third concern which arises from high demand, company capacity constraints and particularly labour and potential material input constraints is the manner in which contracting occurs in South Africa, particularly when the client is government. The traditional contracting model where the client (government) specifies a project and puts it out to tender for contractors to compete has generally been replaced in more developed countries by a variety of alliance models. In this model, potential contractors are brought into the planning process early on so that they can inform clients about constructability, potential constraints and escalations and other risk factors. This alternative contracting approach is crucial in times of excess demand where budget and time overruns are more likely to occur. An associated concern is the fragmentation of contracts where a single contract is parcelled out in small pieces

[3] Consumer Price Index Excluding Mortgage Costs

[4] Producer Price Index

to a number of contractors. This fragmentation stresses stretched resources even further and often increases costs and decreases efficiency.

Although no overarching policy decisions have been taken regarding these contractual practices, on the ground the parastatals appear to be moving in the direction of alliance contracting and decreased fragmentation. The industry notes a substantial decrease in contract fragmentation and an increasingly large percentage of mega contracts being awarded. These large contracts not only allow for contractor integration earlier on in the design process, but importantly also allow large companies bidding for these contracts to create joint ventures with overseas companies to fulfil the contract terms. This practice appears to be the most common manner in which the high skill constraints mentioned above are being dealt with in the short run. As will be argued later, increased joint venturing in this sector is an important step in the development of local construction companies' capabilities, as skills transfers which occur during these projects can potentially enable firms to leapfrog their development and core capabilities.

5. Employment and linkages

To complete an overview of the civil engineering and construction works sectors we briefly present existing published multipliers and employment data for the sector. This section is a major focus area of the future research agenda, but for the purposes of this paper, establishing a basic picture of the size and trends of the data is sufficient.

Table 4 – Employment in civil engineering and construction, 1994-2006

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SASI data (civil engineering and construction works employment SIC 52, 53)													
High skill	6,415	6,938	7,205	7,872	7,832	7,686	7,764	8,062	8,427	8,543	9,674	9,509	10,470
Skilled	17,230	18,671	19,439	21,305	21,275	20,967	21,277	22,197	23,312	23,739	26,998	26,648	29,451
Semi/unskilled	125,251	130,173	129,972	136,682	131,041	124,088	121,093	121,598	123,059	120,911	132,887	126,947	135,965
Total	148,896	155,782	156,616	165,859	160,148	152,741	150,134	151,857	154,798	153,193	169,559	163,104	175,886
% growth p.a.		*4.62*	*0.54*	*5.90*	*-3.44*	*-4.63*	*-1.71*	*1.15*	*1.94*	*-1.04*	*10.68*	*-3.81*	*7.84*
SAFCEC (civil engineering employment)													
Total		64,424	72,844	82,930	92,906	68,764	66,674	71,066	89,806	93,867	84,318	94,438	107,089
% growth p.a.			*13.07*	*13.85*	*12.03*	*-25.99*	*-3.04*	*6.59*	*26.37*	*4.52*	*-10.17*	*12.00*	*13.40*

Notes: The SASI and SAFCEC data measure different sub-sectors. The SASI data cover SIC 52 and 53, while the SAFCEC data cover only civil engineering. The SASI data are based on StatsSA's Labour Force Survey, while the SAFCEC data are based on company surveys.

Source: Quantec Research online database, SAFCEC Industry Overview 2007, p.19

As expected, total employment in the civil engineering and construction works sectors has grown substantially since the acceleration of demand for these services. Comparing employment levels in 1995 and 2006 shows that employment has grown a phenomenal 12.9% for non-building construction and a massive 67% for civil engineering. If current growth rates are maintained, employment in the sector could double in the next five years.

While direct employment growth in these sectors is substantial, the employment effect of the growing construction sector is even greater when indirect employment creation is taken into account. International studies have shown that civil engineering and construction works projects generally demand up to 1,500 different inputs to deliver a final project. Employment in these industries, which supply inputs to construction companies, thus increases as demand for their products increases. The Industrial Development Corporation (IDC) cites employment creation multipliers of 10.82 for civil engineering and 11.87 for building per R1-million spent. Lewis in 2001 calculated that for every R1-million spent, nine direct jobs and eight indirect jobs are created, although these calculations were for the broader construction industry.

In terms of output multipliers, the IDC and SAFCEC quote a 1.18 multiplier for civil engineering and a 1.2 multiplier for building. These figures have not yet been verified or interrogated; however, they appear to fall below international norms. In developed countries, output multipliers for the construction sector average between 1.7 and 2.7, while in developing countries with strong construction sectors such as Korea and China, the multipliers are 3.0 and 3.2 respectively (Chen, 1998; Wu, 2005). Substantial literature exists explaining how corporate structure and networks influence the magnitude of multipliers. This is an area of research which will be investigated in the final paper.

6. The short- to medium-term scenario

Pulling all the previous sections together, we are able to construct a solid understanding of the South African civil engineering and construction works sector as it relates to on-the-ground activities and international literature.

First it is clear that the domestic industry is not yet mature and the local market for new construction not yet saturated. Backlogs in social infrastructure as well as the demand for new economic infrastructure to support the country's longest post-war expansion support the idea that the sector is still on the rising portion of its bell curve. At present the sector's contribution to GDP of 5.1% in 2006 is in line with developing nations such as Brazil (5.9%), Argentina (5.4%), India (5.7%) and Malaysia (4.5%). It is, however, at the low end of the developed country average of 5% to 7% (which peaked at 12%) and strong construction sector countries such as Korea (13.9%), Japan (10.3%) and Singapore (7.1%)[5]. From a national developmental path perspective, new construction opportunities still exist and the sector is some years off a structural adjustment towards repair and maintenance services as the main driver of demand.

In terms of growth we have established that GDP growth rates, interest rates, inflation rates and access to finance are important drivers for private sector gross fixed capital formation, but that private sector demand is a small percentage of overall demand for these services. The key drivers of demand for construction and civil engineering services are parastatals and general government. As such the government's stance on fiscal policy and the deficit are important drivers of demand. Historically, the construction sector in general and the civil and construction works sector in particular have varied in tandem with the business cycle and this has led to substantial swings in employment, turnover and contribution to GDP. These sectors have large employment multipliers and backward linkages so that contractions or expansions of the industry have substantial effects on employment and output in upstream industries that supply inputs to the sector.

With respect to the sector's recent history, we note that since the early 1980s, demand for this sector's services have been weak. Two decades of low demand has resulted in substantial employment shedding within the sector. The accelerated infrastructure investment programme started in 2002 has therefore resulted in a critical shortage of skills in the sector. While other inputs such as carbon steel and cement may prove to be constraints during the peak 2008/2009 period of infrastructure investment, it is the skills issue, both within the construction sector and within its upstream suppliers, which is seen as the major threat to meeting demand within the sector.

[5] Percentage quoted relates to 2004, UN database.

National government, in collaboration with industry, has created a plan to address this skills shortage and funds have been released to implement a series of programmes to increase throughput and output of particularly engineers and artisans. The skills development pipeline in this industry is long. Short-term accommodatory measures such as the importation of skills via increased work permits and joint venturing with overseas companies have been put in place, but initiatives such as the JIPSA plan clearly foresee the creation of a domestic supply of appropriately skilled workers as a desired outcome, with dependence on imported skills being only a stop-gap measure.

The length and sustainability of the current boom in the civil engineering and construction works boom are debatable. While the current list of projects financed in the MTEF will result in peak demand in 2008/2009, longer-term initiatives, especially those of Transnet and Eskom, will carry strong demand through until at least 2015 or 2018. In addition, the inability of provincial and municipal governments to spend their infrastructure budgets in the short term may result in demand from these spheres of government carrying forward over a longer period of time than originally anticipated. We are not attempting to argue when domestic demand will decrease, nor at what rate of growth demand will decelerate. We are, however, suggesting that at some time in the next 10 to 15 years, the demand for civil engineering and construction works services will be lower than the peak for which the JIPSA initiative is gearing up. As skills creation programmes will take time given the length of the skills development pipeline, it is likely that in the long run the supply of skilled labour in this sector will exceed demand. To avoid a scenario similar to that which occurred in the 1980s and 1990s where skills development all but ground to a halt and local skills emigrated due to salary retardation and a lack of opportunities, we suggest that it is strategically important to consider options which would supplement local demand of civil engineering and construction works.

The international literature has shown that small and viable domestic markets and the need to create sustainable employment are two accepted drivers of why developing countries seek to enter the construction services export market. These two drivers sit well with the long-term potential scenario for South Africa. As such a discussion follows on the potential of construction export activities to grow, as well as what interventions would be required to achieve such growth. A key element of this argument is the quantification of the benefits of such exports to the local economy. This quantification exercise is not yet complete and will be presented in the final report, but for the purposes of this think piece, general qualitative arguments will be put forward based on industry interviews.

7. Construction exports

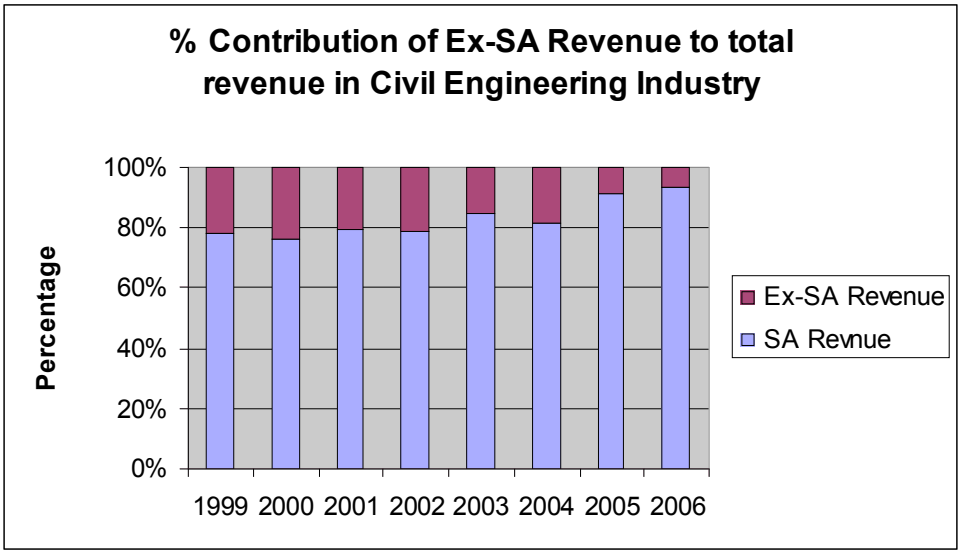
The experience of Korea and China should be foremost in our minds when considering South Africa's construction exports potential. Due to several factors, neither of these developing countries' export plans was sustainable. First, both countries were active only in the lower end of the market and did not exhibit skills in more sophisticated civil engineering and construction works projects. As international demand shifted towards more technically intensive projects, developing countries' export construction companies found themselves pushed out of the market by more developed nation exporters. Secondly, in the case of both China and Korea we see the erosion of their comparative advantage as local wage rates increased. Thirdly, the case studies showed us that the failure of China and Korea to diversify their geographic export markets left them vulnerable to the changing demand patterns in the Middle East. The final lesson from these case studies was that for China and Korea, construction exports were supported by the national government. This is not only important in terms of the support afforded to exporting companies; more importantly, central government support for exports was tied to goals of job creation, foreign exchange earning and creating demand for merchandise exports. In light of this, the profitability of construction exports was not a major driver in either Korea or China.

The South African experience with construction exports is systemically different from that of China, Korea and other developing countries such as India, Singapore and Brazil (these are covered in the full paper). The key differentiator is that construction exports from South Africa are driven by the private sector and are not part of a broad governmental policy. As such, it makes sense to begin by considering the drivers of construction exports in the private sector.

We would expect the first driver of exports to be the state of local demand. As argued earlier, construction works and civil engineering local demand is highly volatile and variable. In periods of low domestic demand we would expect that local companies would seek international contracts to supplement low domestic order books, so as to maintain and effectively utilise their capacity. Data regarding ex-South African revenue[6] in construction works are not collected in official data sources in a disaggregated manner. Only company surveys and company financial statements can be used to show how foreign contracting varies according to local demand. The most comprehensive survey conducted to date was undertaken by SAFCEC for the period 1999 to 2006, the results of which are shown below.

[6] Revenue generated outside of South Africa.

Figure 4 – Percentage contribution of exports to total turnover



Source: SAFCEC Survey 2007

Although the survey covers a relatively short period, it supports the above hypothesis that firms undertake greater exports in times of weak domestic demand (1999 to 2002) than in periods of strong domestic demand. This is shown not only in percentage terms but is verified by lower export contract values and number of foreign contracts in years when domestic demand is high (SAFCEC, 2006).

Although local demand conditions are a key driver for exports, a second driver of export activity is risk diversification, and often these two drivers are considered in combination, resulting in variable outcomes. Variable local demand, changing levels of business confidence, concerns regarding skills availability, input prices and profit margins drive firms to establish revenue streams unrelated to South Africa. The Annual Reports of the big five construction works and civil engineering companies show that companies are taking different views on diversification.

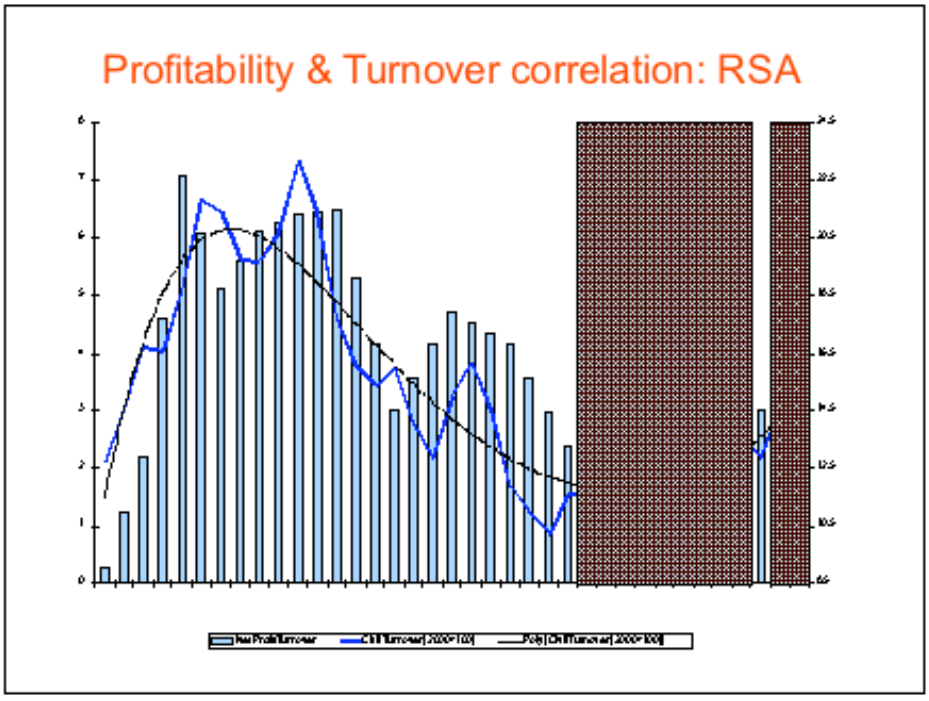
Group 5 and Murray & Roberts lead the pack in their continued commitment to geographic diversification, even in the face of strong domestic growth. Group 5 states that "the company aims to continue to generate one third of its revenue outside of SA" (Group 5 Annual Report, 2006, p.16). Murray & Roberts in its 2006 Annual Report establishes the company as a "global player" and states that it will continue to "direct its attention into the construction economies of South Africa, Southern Africa, the Middle East, South East Asia and Australia (Murray & Roberts, Annual Report, 2006, p.9). At the other extreme, Basil Read has adopted "a strategy to limit cross-border activities due to the increasing workload in South Africa" (Basil Read, Annual Report, 2006, p.17). Concor and Grinaker Lta occupy the middle ground. Grinaker's civil engineering construction division will cease to operate in the rest of Africa after it has completed current work in the region and will "only operate in South Africa and neighbouring territories" (Aveng, Market Overview, 2006) Concor states that as a

company it "has no immediate plans to aggressively pursue cross-border contracts", but that in the field of civil engineering it "eagerly anticipates the coming opportunities and challenges both within and outside our national borders" (Concor, Annual Report, 2006, pp.8-10).

A third driver of construction exports for local companies is existing client activity outside of South Africa. The top five construction companies have all developed strong relationships with key clients over the years in South Africa. As these clients move into foreign markets they often prefer to commission local players to undertake the construction works contracts, and local companies are happy to accept due to the decreased risk of operating with a known client, albeit abroad. This has been especially true in the mining sector where the commodities boom has seen local mining houses more active in the rest of Africa than at any time previously, and in other mining and oil-intensive economies such as Australia and the Middle East.

A fourth driver of construction exports for local firms is relative profitability levels. Looking first at local profit rates in construction works and civil engineering, a long-term pattern is shown in Figure 5 below. From a high in the mid-1970s, the net profit to turnover ratio in the local industry has consistently decreased for two decades, with a recovery upward trend only starting to appear in 2002.

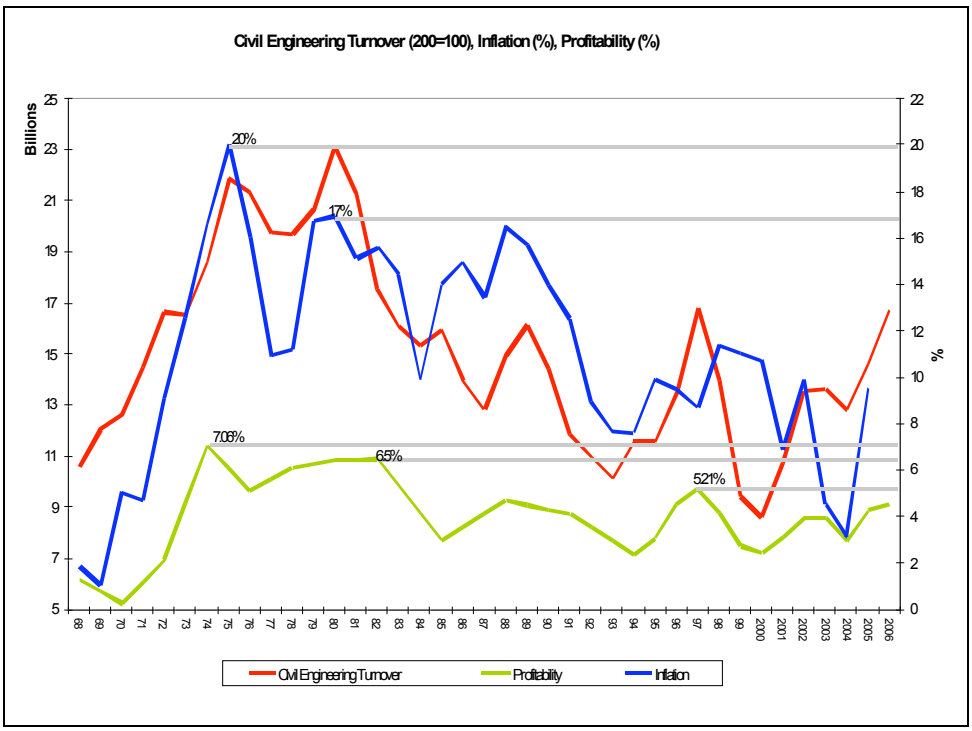
Figure 5 – SA profitability and turnover



Source: SAFCEC, MIG Presentation, 2007

Figure 6 below clearly shows that profitability in this sector has consistently fallen below the inflation rate. In addition, a trend correlation occurs between turnover growth and profitability. However, when expansion in demand is sufficiently strong that competition for inputs increases, margins are traditionally squeezed back down. This is certainly the view of Group 5 and Murray & Roberts, which both anticipate in their Annual Reports that profit margins in the local economy will increasingly come under pressure as input prices increase due to strong demand.

Figure 6 – Civil engineering turnover, profit and inflation



Source: SAFCEC, MIG Presentation, 2007

Both companies believe that in the international markets they have selected to focus on, they will be able to "achieve significantly higher contributions to margins, improving the company's bottom line without increasing volumes" (Group 5, Annual Report, 2006, Global Review). This is an important point, as it suggests that these companies are not looking to increase the volume of external work, but that by maintaining current activity levels at anticipated higher margins than are available in the local market, their export diversification strategy will help these companies to achieve higher returns for investors than if they limited their order book to local contracts only. As mentioned in the literature review, the profit margin driver of South African exporting companies is fundamentally different from the documented and accepted list of export drivers in the vast majority of developing countries.

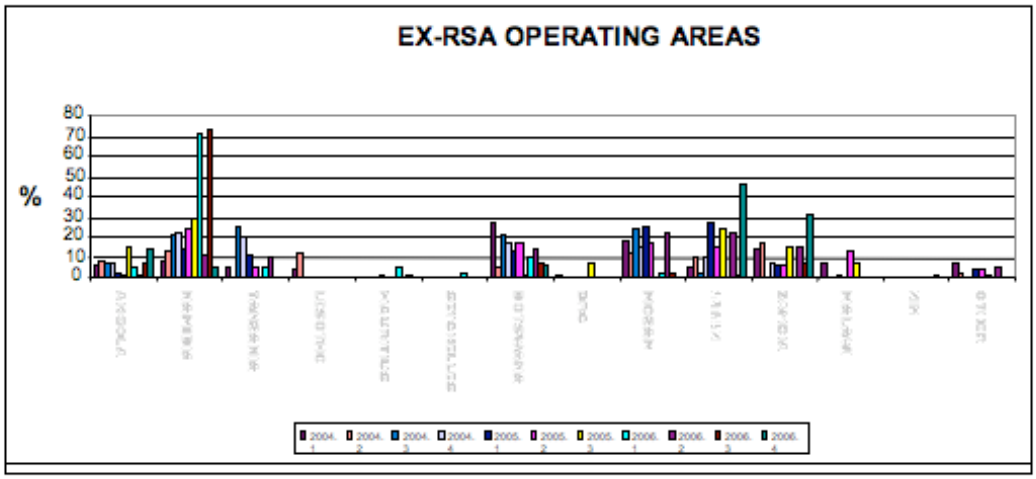
The sustainability of higher international than local margins appears to be in doubt over the long term. It is argued that over time, international profitability is converging as a result of the globalisation of the industry. However, in the foreseeable future,

areas of high profitability continue to be identified by local companies in targeted geographic areas and sub-sectors.

In terms of actual activity on the ground, little disaggregated data exist in official data sources. SAFCEC, however, since 2001, has conducted industry surveys to track local civil engineering and construction works activities abroad.

We begin by considering where exports occur geographically. Figure 7 is based on the SAFCEC survey and suggests that the majority of construction exports by South African companies occur within the region, with Namibia, Botswana, Mozambique, Swaziland and Zambia being key markets.

Figure 7 – Civil engineering and construction works undertaken by local companies outside of South Africa



Source: SAFCEC, State of the Civil Industry, 2007

The Annual Reports of the big five construction companies do not quantify revenue earned in different operating areas in a comparable format (due to complicated and different company structures and reporting formats). They do, however, suggest that operations in Australia and South East Asia, the Middle East and to a lesser extent Eastern Europe are important strategic markets for their companies. The majority of work in Australia and South East Asia appears to be in the offshore oil and gas market as well as in the mining sector, while most work in Eastern Europe is focused on transport infrastructure, especially roads. Work in the Middle East includes substantial building projects, airport development, the construction of key bridges and some township establishment investment. For the top three exporters, the percentage of turnover generated abroad in 2006 was roughly 30%. The composition of this 30% varies according to company strategy. For example, Group 5 reports that its 2006 earnings from abroad originated 40% from East and North Africa, 30% from the Rest of Africa and 30% from the Middle East. Aveng, on the other hand, reports a 50-50 split in revenue earned abroad from "Africa and elsewhere" and "Australasia and the

Pacific". Murray & Roberts and Aveng both own foreign companies operating in Australia and South East Asia, which contribute roughly 7% of company turnover.

Many researchers and commentators define South African construction works and civil engineering services exports into SADC and the rest of Africa as "impressive" (Merrifield, Stern and Teljeur) and attribute this success to appropriate technology, the ability to manage extreme African conditions (heat, dust and dirt) and the mobilisation of labour, material and equipment resources at greater speed and lower cost than their international rivals. However, in 2000, South Africa's exports to these markets were valued at US$663-million, compared to French exports in the same market of US$1.9-billion and US exports of US$1.4-billion. Three reasons account for this lower market share: length of time in the market, access to finance and the willingness of local firms to work in Africa. We will consider these issues in detail in the next section, but for now we seek to understand, based on industry interviews, the perception of local firms regarding export destinations.

Not all overseas contracts are equivalent – either from a company perspective in terms of risk and profitability or from a South African economy-wide perspective in terms of the sourcing of inputs and supply labour. Exporting companies spend considerable time and resources on identifying international markets and their associated risks. The general philosophy gleaned from industry annual reports and interviews suggests that all big five exporters have moved away from short-term parachuting strategies and rather seek to identify sustainable, high-margin markets where there is some compatibility with the company's culture, skills, language and experience and where logistics are manageable. Logistics, safety and contract variability and contract compliance are key elements in the decision to operate abroad.

While we continue to accumulate data to substantiate our argument, at present the qualitative picture which emerges is that South African companies rank their preferred existing export markets in order as: (1) Australia/South East Asia, (2) Middle East, (3) SADC and (4) Rest of Africa. This ranking is based on sustainability, language and culture, contract specification, contract performance, contract predictability and lastly safety and security. Contract specification and performance appear to be the key risk in undertaking contracts in the rest of Africa. Several issues which increase this risk include poorly specified tenders, which make costing and profit management difficult due to variations during the project; high levels of bureaucracy, which is not effectively administered; and a track record of poor payment. In addition, safety and security matters and logistics are higher risks in the Rest of Africa than in any other export market at present.

These market preferences are important in terms of the benefits to the South African economy arising from the export of construction services. Essentially the premise of this paper is that exports could potentially be used to supplement domestic demand to maintain the sector's contribution to GDP and employment and to maintain its backward linkages and the output and employment generated upstream. For this argument to hold, it is necessary to demonstrate the local labour content and local materials content supplied to international contracts.

International contracts vary considerably, but a clear typology exists at a broad level in terms of labour and inputs associated with exports to various regions. As a general rule of thumb, material usually accounts for 45% of the cost of a contract and labour for 10% to 15% of these costs. A general character of various contracts and input usage in different areas where South African companies export is shown in Table 5 below.

Table 5 – Materials and labour input typologies by geographic area

	Materials	High-skilled labour (project management, engineers)	Artisans and less skilled labour	Type of contract
SADC	Most manufactured material inputs sourced from SA, inputs such as sand and aggregate often sourced in host country	Sourced from SA	Artisans sourced from SA, less skilled labour sourced from host country.	Single company, mode 3 or mode 4[7]
Rest of Africa	South of the equator materials most often sourced from SA. Once above the equator it is often cheaper to source materials from the RoW due to transport costs.	Sourced from SA	Artisans sourced from SA, less skilled labour sourced from host country.	Single company, mode 3 or mode 4
Middle East	Not from SA	Sourced from SA	Sourced from Pakistan or Malaysia	Joint venture with host country partners and often other international partners
Australia and South East Asia	Not from SA	Not from SA	Not from SA	Mode 3 company presence.

Notes:
- It has been suggested that input usage will also differ based on sector and not only geographic location. This added dimension would be included in the final version of the paper.

- It has also been suggested that a column for capital equipment be added to Table 5. This is based on the Council for the Exportation of Capital Equipment's assertion that SADC contracts specifically have a positive effect on the demand for local capital goods. This assertion is denied by industry players and will be researched for the final report.

Source: Based on interviews and information on company websites.

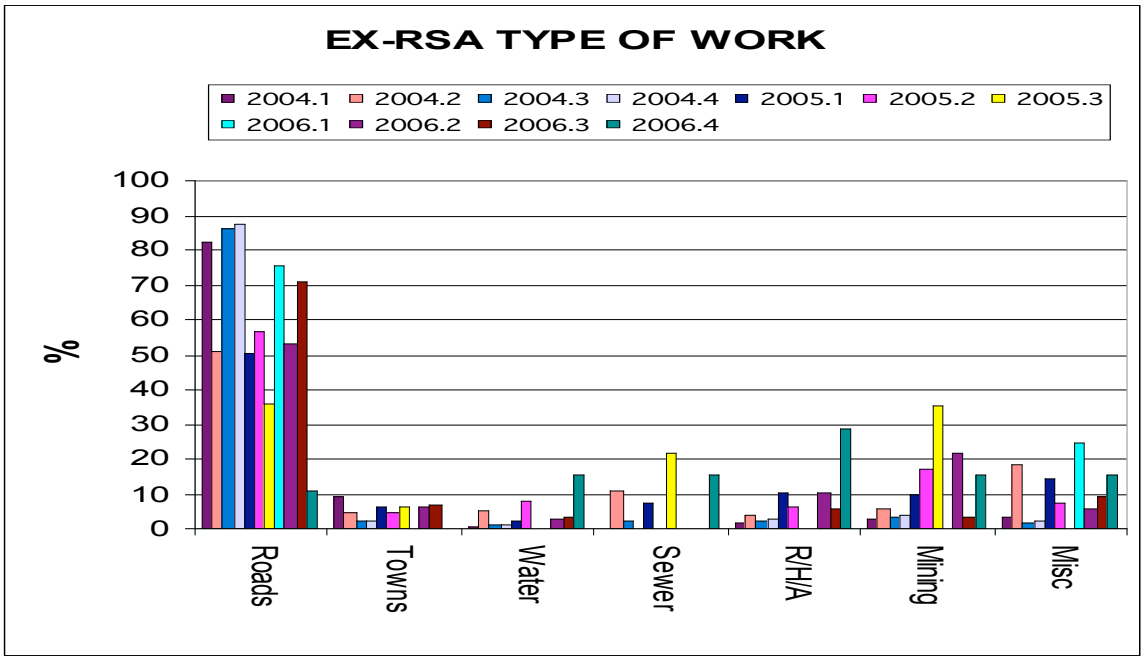
It appears from Table 5 as though from an employment and input perspective, exports to SADC countries and contracts in the Rest of Africa will have a larger

[7] Mode 3 and Mode 4 refer to a standardised method of how services are provided to another country. Mode 3 refers to establishing a commercial presence in a foreign country. Mode 4 refers to natural persons working in a foreign country, e.g. consultants.

beneficial impact on the local economy than contracts in markets further abroad, such as South East Asia, the Middle East and Australia. This list is the inverse of the list of preferred regions to operate in as argued above. This hypothesis, which will be tested empirically in the final report, suggests that if an optimal export strategy from a national economy-wide perspective is to be undertaken, substantial government support will be required to shift current export destination preferences.

Before turning to the strategic implications of the above it is necessary to note the types of activities undertaken by local companies abroad. The SAFCEC survey shows that export activity sits firmly with basic construction works in relation to road building, with some activity also occurring in the mining sector and recently in the construction of railways, ports and airports.

Figure 8 – Type of work undertaken by local firms outside of South Africa



Source: SAFCEC, State of the Civil Industry, 2007

A deeper analysis of this trend is not possible at present, although steps are being undertaken to explain why the majority of civil engineering and construction works exports are in the roads segment of the market.

One explanation could be that this concentration of activity reflects demand conditions in the countries in which local companies are currently operating. An alternative explanation could be that local companies are only winning contracts in this segment because it is the only segment in which they are competitive in terms of costs.

A third explanation could be that South African firms do not have the skills and technical capacity to compete for more sophisticated projects, or that they cannot compete on price with respect to these projects. A final explanation could be that international contracting procedures and financing schemes for high-end civil engineering and construction works projects are often tied to counter-trade deals or other government-to-government deals, leaving South African firms who generally enjoy less direct government support than other exporting firms under-supported to tie up these contracts effectively. Understanding this phenomenon will be crucial in developing a potential export strategy for South Africa.

8. Should the government support an export drive, and if so, what does it need to do?

At the early stages of this project and with limited primary data collection having been completed, our argument at this stage is somewhat circumstantial and lacks quantitative rigour; however, the foundation stones of a defensible strategy have emerged.

First, domestic demand in the civil engineering and construction works sector is highly variable and volatile. In the short to medium term, local demand will remain high and this will be supported by a massive investment in skills accumulation. At some time in the long run it is likely that local demand will be insufficient to maintain full capacity utilisation at the levels experienced during the current boom. In order to maintain this sector's contribution to GDP, its positive backward linkages, its ability to create direct and indirect employment and its ability to maintain its skills base intact, the option of supplementing local demand with external demand makes perfect sense. Construction companies have individually been undertaking such activities for the past 50 years as a method of dealing with variations in domestic demand, and this has resulted in export activities occurring in SADC, the rest of Africa, the Middle East, Australia and South East Asia, and to a lesser extent in Eastern Europe and some North American mining activity.

Current export activity aims to optimise capacity utilisation and return on investment for company shareholders. Current export activity is not undertaken as a national strategic activity aimed at stabilising industry employment or its backward linkages. Flowing from this private sector-driven activity, the preferred export destinations of private sector companies do not coincide with export destinations which would most benefit the local economy. Given that local companies are willing and able to export, and that some exports do occur in geographic areas which have a large impact on the domestic economy, it is possible to argue that the national government could put into place measures which would be mutually beneficial to local construction companies and the national economy. Specifically increasing exports to SADC and the Rest of Africa may be more stimulatory, based on the understanding that greater quantities of labour and material inputs are sourced when accessing these export markets.

We begin by considering the domestic and foreign obstacles to increased exports. The majority of research in this area in South Africa has focused on issues related to market liberalisation and barriers to access in terms of the WTO's GATS negotiations at an international level and SADC negotiations at a regional level. The issues here relate not only to market access, but more importantly in the construction sector to national treatment provisions. While these foreign obstacles are an important issue to resolve if South Africa's construction exports are to increase, four additional issues are equally important. These are institutional support, financing, access to international contracts and sectoral capacity development. To date, these additional issues have been poorly researched within South Africa.

In terms of formal market access, the decisions of countries to make commitments in terms of the four modes of supply[8] specified by the WTO are the first gauge in determining the level of liberalisation in a particular market. Stern and Teljeur (2002) have undertaken a complete analysis of WTO and SADC members' commitments regarding construction services, civil engineering services and architectural services. Essentially their analysis reveals that in terms of construction and engineering services, mode 3 (commercial presence) and mode 4 (natural person employment) are the most common channels by which services are supplied. Mode 3 and mode 4 supply is fully liberalised in the Democratic Republic Congo, Lesotho, Malawi and Zambia, and mode 4 in Egypt. In all other SADC member countries and most other African markets[9], no liberalisation has occurred. Even in instances where supply modes are unbound (liberalised), foreign companies or individuals seeking to access these markets are still required to obtain work permits and operations permits. Anecdotal evidence suggests that these are often difficult to obtain, sometimes taking up to two years to be issued, vulnerable to changing and variable compliance requirements and often requiring some type of unofficial payment to the issuing authorities.

A second constraint faced by local firms attempting to operate abroad relates to financing and export credit reinsurance. Companies bidding for construction contracts abroad are increasingly expected to raise finance for the client at an internationally competitive rate. This is usually done through the private banking sector of the exporting country or via a funding agency set up by the exporting country specifically to provide finance for such projects. Either route of funding is highly dependent on guarantees issued by the exporting country government against the political and commercial risks of working abroad. These guarantees not only provide security for the contracting company but are usually also a precondition for raising project finance. These guarantees, known as official reinsurance, are provided by export credit agencies (ECAs). In South Africa, the ECA is known as the Export Credit Insurance Corporation of South Africa (ECIC) and was established in 2001.

Most ECAs adhere to a minimum financing rate known as the Commercial Interest Reference Rate (CIRR), calculated at 100 basis points above the equivalent US Treasury Bill. The CIRR is in line with the borrowing rates of most international major banks, but many smaller banks cannot provide finance at these levels. As such in many countries, including South Africa, the ECA also provides interest rate subsidies on finance provided to the buyer. At present, ECIC has operated only in Africa and guaranteed a number of building projects as well as certain civil engineering projects. The corporation limits it exposure in some countries and it is believed that these maximum limits are now being reached, suggesting that continued support for projects in these countries will be curtailed. In addition, commentators

[8] The 4 modes of supply include: Mode 1: cross border supply – selling services to a foreign country without being present in that country; Mode 2: consumption abroad – purchasing services in a foreign country; Mode 3: establishing a commercial presence in a foreign country; and Mode 4: presence of a natural person – temporary stay of a service provider in a foreign country.

[9] These include Uganda, Nigeria, Equatorial Guinea, Mali, Rwanda, Sudan, Kenya and Eritrea.

suggest that the total amount of interest support budgeted by the Department of Trade and Industry (**the dti**) for the ECIC is unlikely to increase significantly in the next few years. Although this area has not been well researched in South Africa and will need to be deeply investigated if a strong export strategy is adopted, it appears from looking at the international research that the volume, value and structure of the ECIC's support for civil engineering and construction works projects abroad (and particularly in Africa) are less competitive than its main competitors in Italy, France, Korea, China, Germany, the UK and Austria.

An additional financing constraint relates to local firms' ability to access projects financed through large donor organisations and international banks. The majority of these contract require the successful bidder to either be based in the country of origin of the financier, or that the contractor source the majority of inputs from the donor country. To access these market opportunities, the more aggressive South African construction exporters have established a commercial presence in these donor countries to ensure their eligibility to bid for these contracts.

The third obstacle to increased exports is identified as weak governmental support for local exporting companies. Based on anecdotal information, domestic construction firms believe that the national government does not provide backing for their export activities at the same level as foreign governments support their competitors. Civil engineering and construction works company participation in governmental trade missions is cited as one area where government could increase its support for the industry. A second area of increased potential support would be adding construction sector exports to the formal agenda of trade and co-operation agreements negotiated with SADC and African countries. The last two areas where the industry feels disadvantaged in the export market compared to their competitors who have stronger government support relate to the willingness of government to support local company activities during the procurement process of foreign contracts, and the government's willingness to intervene in relation to safety and security and corruption issues in foreign countries.

The fourth obstacle is sectoral capability and capacity. Within this constraint we are not looking at specific skills constraints but rather at the international competitiveness of the domestic industry to compete with international players in the export market. Both Korea and China's impressive construction export performance in the 1970s and 1980s failed to be sustainable due to a lack of technology, skills and contractual and process development within the local industry. This led commentators to suggest that if developing countries wished to continue to compete in the international export markets, they would need to undertake a deliberate development process at home to increase the technical and business competitiveness of their construction industries. Besides allocating resources to this project and developing institutions designed specifically to encourage this development, commentators also listed joint venturing with international companies as a crucial manner through which skills transfers and the upgrading of local capabilities and capacity could be achieved.

The capabilities of local firms (as opposed to their capacity) seem hard to gauge. The general view is that South African companies are able to compete on sophisticated technology and engineering projects – especially in relation to mining projects and

economic infrastructure projects. Although international isolation cut local companies off from world best practice for a number of years, the three largest players in the economy established representative offices in Europe, North America, Australia and even Israel to access technology and skills. These investments have assured them a competitive edge over local companies which were unable to establish such international access.

In addition, the current shortage of skills in the sector has forced many local firms to buy in international skills via joint venturing. This stop-gap measure may indeed prove to be an important opportunity for local firms to leapfrog their internal capabilities, positioning them well for future export activity.

Finally, a list of additional miscellaneous constraints was identified. These included issues related to logistics and border crossings, tax treatment of profits and salaries, legislation pertaining to equipment auditing procedures and an overarching issue of corruption in the African market.

The list of constraints to growing South Africa's construction works and civil engineering exports is thus substantial. Very few of these constraints can be resolved without government intervention. The possible scope and cost of these interventions will be dealt with in detail in the final paper; however, to conclude this section we can highlight possible areas of required intervention to include:

1. Continued negotiations within SADC and the WTO to ensure improved and more predictable access to foreign markets in terms of mode 3 and 4 supply channels;

2. The expansion and deepening of the operations of the ECIC, especially with respect to countries where demand for guarantees is outstripping supply of such guarantees based on the ECIC's country quota;

3. Improved support from the national government in terms of supporting exporting companies' bids, either directly or indirectly via counter trade or reciprocity agreements;

4. Supporting sectoral development to ensure that local companies have the contracting, technological and engineering capabilities necessary to compete in the international market – possibly via the refocusing of the Construction Industry Development Board of South Africa (CIDB); and finally

5. Dealing with tax and auditing procedures and legislation applied locally.

9. Conclusion

Rather than reasserting the main findings and arguments contained in this paper in the conclusion, we wish to use the conclusion to place the entire paper in context from a perception perspective. The variability of the civil engineering and construction works sector is clearly demonstrated in the sector's perceptions regarding the importance of exports.

Just seven years ago, this sector's representative association and leading corporate players led a delegation to the Minister of Finance to plead for changes to tax regulations, which would support increased exports within this sector. Their argument (for a more lenient tax treatment on salaries paid to workers abroad) was based on the economic benefits to South Africa of increased construction export activity. The document submitted to National Treasury made precisely the arguments detailed in this document regarding the role of the construction sector in terms of direct and indirect employment creation and output multipliers. Seven years later, our requests for meetings, interviews, data and assistance from the industry were almost universally scorned and rejected, as potential interviewees (the same parties who lobbied the Finance Minister) considered our area of enquiry as "poorly conceived" and "irrelevant". The only variable which had changed between 2000 and 2007 was the level of domestic demand.

Herein lies the rub. Neither private sector construction companies nor government bodies have construction exports on their radar screens at present. Rather, all attention is focused towards ensuring that local demand can be met. Corporate order books are full, negating the main driver of private sector export activity. Government, who has never actively sought to grow the construction export market, is focused entirely on accessing services to meet its accelerated domestic infrastructure investment programme. Construction export growth is essentially a 'champion-less' topic in South Africa at present.

This view on export growth in the construction sector is unlikely to change while domestic demand remains strong. At such time as this growth moderates or begins to cycle down, interest in exports will once again be renewed. However, if government and industry fail to apply their minds to removing the systemic constraints to increased export activity prior to the slowing down of domestic demand, they will in all likelihood find themselves unable to address these constraints in a timeous fashion.

The motivation for placing a construction sector export strategy process on the table in the current climate is driven by two arguments. The first argument relates to timing, the second to leveraging current activity.

With respect to the timing argument, we have shown that the constraints facing local companies' exporting construction services are substantial. None of these constraints can be addressed easily in either the short or medium term. Pre-emptive action is required now if in the medium to long term it is believed that domestic demand can be supplemented by external demand as a method of (1) smoothing out the variability

of the local industry in terms of employment and output; (2) retaining local skills within South Africa; and (3) ensuring that current investments in skills and output capacity are not viewed as over-investments or wasted investments 10 or 20 years down the line.

With respect to the leveraging argument, our line of reasoning is simply that many activities being undertaken in the sector at present are driven purely by the need to meet current demand. Many of these activities, however, present opportunities for local construction companies and input suppliers to leapfrog their individual capacities and capabilities so that they could be more competitive in the long run. In other words, if carefully managed, the activities undertaken in the short to medium term to underpin domestic demand can be viewed as an opportunity for firms to leverage these investments and improved government collaboration to ensure that the domestic civil engineering and construction works sectors are better equipped to export successfully in the future. The international literature is explicit in its conclusions that such leveraging and development must be consciously and systemically developed against a long-term plan in order to capture all its benefits. So, for example, has the current flurry of joint ventures signed by local civil engineering companies with developed country partners sufficiently addressed the opportunities of meaningful skills and technology transfer or has it merely been structured to fill a short-term skills gap? If the latter, then a golden opportunity for the meaningful development of the domestic industry has been missed.

A substantial export drive of construction services from South Africa has not been a viable strategy option for the past three decades. In the 1970s and 1980s, sanctions and international condemnation of *apartheid* policies excluded the possibility of a strong export drive, specifically in SADC and the Rest of Africa. In the 1990s, export growth on an intensive level was limited due to the constraints listed above, as well as a lack of domestic capacity. With South Africa's readmission into the global community and the current capacity investments under way, there is no reason why intensive construction exports should not be a viable strategy in the 2020s. All that is necessary to ensure that the country and its firms are geared up for such activity, if and when the need to supplement domestic demand occurs, is for strategic thinking and intervention related to the sector to begin immediately. With time and dedicated application, many of the export constraints listed in the previous section can be resolved or at least their negative impact ameliorated sufficiently to support improved export performance. In addition, a short-term strategic view of current investments and activities as important building blocks for future enhanced competitiveness rather than merely actions to meet immediate demand should place the industry on a stronger footing to engage with the international market in the future.

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