Linkages in Botswana's Diamond Cutting and Polishing Industry

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Making the Most of Commodities Programme (MMCP)

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The MMCP focuses on a diverse range of commodity sectors in a number of African economies, as well as on key infrastructural determinants of effective linkage development. A number of common factors are identified which will increase linkages beneficially and which lend themselves to policy intervention - the role of ownership, the nature and quality of infrastructure, the national system of innovation, spillover of skills to and from the commodities sector, linkages in regional economies and the nature and consistency of policies directed towards the commodities sectors.

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Abstract

The paper aims to investigate whether Botswana is succeeding in developing a viable and sustainable diamond cutting and polishing industry as part of the Government's mineral beneficiation policy. This paper also aims to examine the nature and extent of forward linkages in the cutting and polishing industry and what role the linkage drives are playing in the widening and deepening these linkages. The research questions are addressed through by primary and secondary data collection. The research found that despite the weak economic rationale for the beneficiation policy, in the last 5 years Botswana has succeeded in developing a diamond cutting and polishing industry with significant local linkages. The forward linkages are policy driven and their progress is being hindered by the limited downstream skills amongst locals. Botswana's cutting and polishing industry appears to be viable as secondary data suggests that the manufactures are either breaking-even or making a profit. The sustainability of the cutting and polishing industry hinges on viable rough diamond supply to the manufacturing firms. Significant prospecting activities, the expansion of mines and the current strategy by the biggest producer to optimize revenue (by only mining diamonds when demand exists) could increase the life diamond mining past the Government's current forecast of two decades.

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Executive Summary

Background

Botswana has been one of the most successful economies in Africa and its rapid growth has hinged upon its abundant diamond resources which generate nearly half of fiscal revenues. Botswana is the largest supplier of gemstone diamonds, supplying about a quarter of world's gemstone diamonds by value. However, unless a major diamond deposit is discovered the government expects diamond mining to cease existing in the country in the next two decades as a result of resource depletion (Government of Botswana, 2007:6). Diamond prospecting activity in Botswana is significant and the possibility of finding a significant resource is high. Furthermore, the current expansion of the most profitable mine and Debswana's, the main producing company, current strategy to optimize revenues by only mining diamonds in line with demand will extend the life of diamond mining by another decade. To make the most of existing deposits and to prepare the country for 'life after diamond mining', the government has an ambitious plan to turn the country into a diamond centre with downstream capabilities that will add more value to diamonds and that can continue to benefit the economy when diamonds are no longer mined in Botswana. The first and most important part of this plan is to create an economically viable diamond cutting and polishing industry. Once this has been achieved the government plans to go further down the diamond value chain by creating jewellery manufacturing and diamond trading industries. As part of this plan the government also aims to develop ancillary businesses to supply the downstream industry with goods and services.

To achieve its ambitious plan, in 2005 the government signed an agreement with the country's biggest diamond producing company, DeBeers, which is also the most powerful player in the global diamond industry, to help Botswana develop a viable cutting and polishing industry. DeBeers mines diamonds in Botswana through a 50% government, 50% DeBeers joint venture with the government, known as Debswana. Prior to this agreement only three cutting and polishing factories were operating in Botswana, there was no local rough diamond sales to these factories and their rough diamond were supplied by the Diamond Trading Company (DTC) International as well as the open market. However, as a result of this agreement there are now sixteen cutting and polishing factories which are being allocated with rough diamonds locally which are supplied through the DTC/DeBeers marketing channel. There are also a number of ancillary businesses operating in Botswana's nascent cutting and polishing industry. The government and DeBeers also started a joint venture known as DTC Botswana which is responsible for sorting and valuing Debswana's production and for the local sales and marketing of rough diamonds allocated by DTC International to the sixteen cutting and polishing factories. Lastly, the government has established a Diamond Hub and Diamond Office which is responsible for implementing the government's ambitious plan to turn Botswana into a diamond centre.

Objectives and research questions

It has been 5 years since the agreement between DeBeers and the government was signed and the nature and extent to which linkages are taking place in the cutting and polishing industry is still unknown. This research aims to fill this research gap by addressing the following questions:

1. To what extent is Botswana succeeding in creating a viable and sustainable cutting and polishing industry?
2. To what extent have linkages been developed into the cutting and polishing links in the Botswana's diamond value chain?
3. What is the role of policy, ownership, National System of Innovation (NSI), skills, infrastructure and regional factors in enhancing or constraining the depth and breadth of linkages in Botswana's cutting and polishing industry?

Methodology and data sources

Primary data and secondary data were used to address the research questions. Primary data was collected through interviews with the cutting and polishing factories, their suppliers and support institutions. Secondary data is in the form of industry reports, academic papers and newspapers stories.

Main findings

In the last five years Botswana has made progress in establishing a cutting and polishing industry. There are linkages in the industry and there is a high degree of localisation in the linkages. Wage bill estimates show that consumption linkages resulting from employment in the cutting and polishing industry are more valuable in the cutting and polishing firms then the supply chain, about US$48 million per annum and represent 45 percent of the manufacturers' wage bill, and have a greater proportion of local value added in the supply chain that in the cutting and polishing firms, with 46 percent or US$4 million from the supply chain's wage bill accruing to locals. The most significant local linkages taking place are through local employment directly in the sixteen cutting and polishing factories. The industry's supply chain is still being developed and to date Botswana has managed to attract major suppliers, particularly suppliers of knowledge intensive services to open offices in Botswana's diamond hub.

The research found that (a) forward linkages from diamond mining are policy driven (b) in general the firms seem to respect government's vision and to admire some of government policies and commitment to the industry, but (c) government officials are much more doubting of the firms' commitment and Botswana's operating environment than the firms (d) in terms of the MMCP drivers, two are critical as is shown in Table 7.1– government policy is driving the presence of linkages and their progress is held up by skills (e) with some exceptions, like Botswana's operating environment, government and industry perceptions are often quite similar.

Table 7.1: Summary of linkage drivers

Driver	Not Important	Moderately Important	Quite Important	Very Important	Dominating Importance
Ownership					
Infrastructure					
NSI					
Regional Factors					
Skills					
Commodity Sector Policy					

Source: Authors research

Policy recommendations

- Policy needs to address the creation of skills in the industry to aid the development and localisation of linkages.
- The government needs a clear policy on the creation of skills for the cutting and polishing industry, particularly industry-specific skills. The government also needs to speed-up the implementation of current policy aimed at starting education and training programs which will create industry-specific skills for the cutting and polishing industry.
- With regards to the firm-specific skills, the government needs to set clear targets for skills transfers in the cutting and polishing industry and implement the registration of training programs in the 13 firms that have not yet accredited their training programmes with Botswana's training authority.
- The government also needs to collect data, perhaps through the training authority, on the number of locals being trained and the types of skills they are being trained within the cutting and polishing factories.
- The current policy on the reporting of diamond exports in the national accounts needs to change. Polished diamond exports and rough diamonds exports are aggregated and the polished diamond exports included only cover the exports of only 3 of the 16 factories. This coverage needs to increase and this data needs to be reported separately to give a clear picture of the industry's export performance over time.
- The national development policy aims to create links between the diamond hub and the innovation hub; it however needs to be implemented to increase the importance on the NSI as a driver of linkages in the long-term.

Please note: The Pula (P) is the local currency which is roughly 6 Pula to the 1 US Dollar and is used throughout this document it

1. Introduction

Botswana is the largest producer of diamonds by value in the world with diamond revenues contributing half of national fiscal revenues. Diamond revenues have enabled the country's development from one of the poorest countries in the world to a middle-income country. Historically, Botswana's diamonds were largely exported as rough diamonds with minimal value-added taking place in the country. The government is seeking to change this through the current 'beneficiation strategy' in the diamond industry which states that 15 percent worth of the country's rough diamond production should to be cut and polished locally. Since the cutting and polishing industry is more labour-intensive than diamond mining, the government's beneficiation strategy aims to create more jobs in Botswana's diamond industry. Furthermore, since the government expects Botswana's upstream diamond industry to cease in the next two decades in no new major deposits are discovered (Government of Botswana, 2007:6), the government aims to use the cutting and polishing industry to create downstream competencies that can continue to benefit the country when diamonds are no longer mined in Botswana.

Since the beneficiation policy has weak economic rationale and the paper investigates whether Botswana is succeeding in developing a viable and sustainable cutting and polishing industry. Linkages between the cutting and polishing industry and the local economy are crucial for ensuring that Botswana makes the most of its remaining diamonds reserves. Therefore, the paper also investigates the nature and extent of linkages being created in Botswana's cutting and polishing industry. Furthermore, the paper investigates the role that the linkages drivers identified by the Making the Most of Commodities Program have in constraining or aiding the breadth and depth of linkages in Botswana cutting and polishing industry.

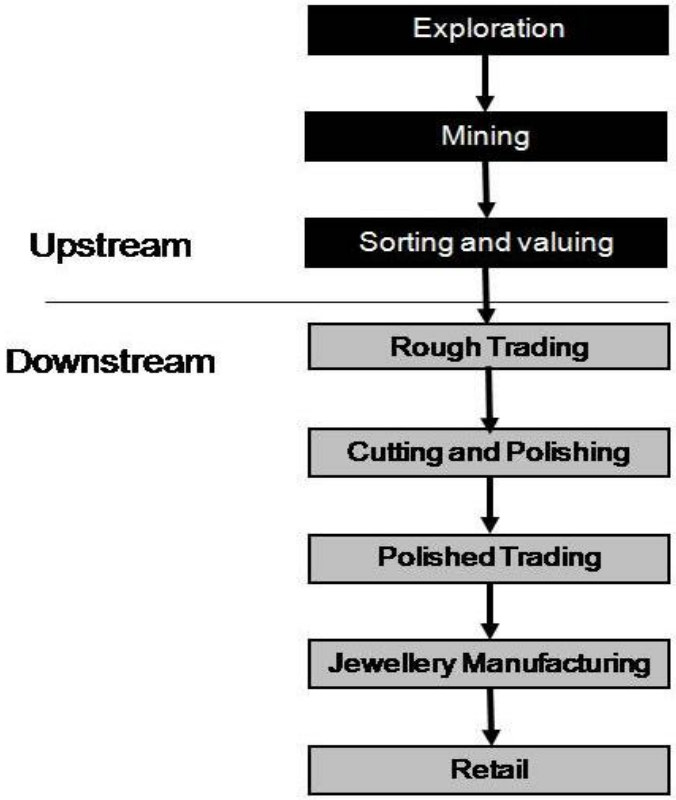
The paper is organized as follows: section 2 provides background on the global diamond value chain and it biggest producers, manufactures and consumers as well the governance of the diamond value chain; section 3 discusses the role of the diamond industry in Botswana and the government's plan to turn the country into a diamond centre; section 4 discusses the key research questions and the methodology used to address the questions; sections 5 details the research findings on the type of linkages created in the cutting and polishing industry by mapping its value chain; discussing how its participants operate; and the local value added bring created in these forward linkages, section 6 discusses the research findings on the role that policy, as well as the roles of ownership, NSI, skills, infrastructure and regional factors in determining the breadth and depth of linkages in the cutting and polishing industry; lastly section 7 provides the research's major conclusions, policy recommendations and research gaps.

2. The Global Diamond Value Chain

The diamond industry's global value chain is commonly known as the diamond pipeline. The value chain begins with exploration which only results in mining if an economically-viable diamond resource is found. Once diamonds have been mined they are sorted (and valued) to separate industrial diamonds from gemstone diamonds. Industrial diamonds are used in industrial equipment including drilling, cutting, grinding, polishing and other industrial applications. This research focuses on

the value chain for gemstone diamonds given the greater potential for value-added in gemstone diamonds. Gemstone diamonds represent about 55 percent[1] of global diamond production (US Geological Services data). Gemstone diamonds are distributed to experts to cut and polish them in preparation for jewellery manufacturing. Polished diamonds are then set into jewellery and diamond jewellery is sold to the final consumer though the global retail industry.

Fig. 2.1: The Diamond Value Chain



Source: Kaiser Associates

The value of a diamond increases significantly as it moves down the value chain as illustrated in figure 2.1 above. If the producer's selling value is taken as 100, by time the same diamond has been sorted, valued, cut and polished, traded and manufactured into jewellery its value in the retail market is more than three times the producers selling value (see table 2.1 below). The biggest value added margins are in the retail segment and the smallest margins are in the cutting and polishing segment of the value chain.

[1] The dividing line between gem qualities and industrial uses has become rather arbitrary. Industry expert Chaim Even-Zohar believes that that 65% of the world's output measured in carats is cuttable today and therefore should not be viewed as industrial types (2007:171). The US Geological Survey sees it differently, and considers 45% of world output still as industrial.

Table 2.1: Value Addition in the Diamond Pipeline

Stage of Global Value Chain	% of original value
Producer Selling Value	100
Sorting and Valuing	115
Cutting and Polishing	127
Polished Dealing	133
Jewellery Manufacturing	166
Retail	320

Source: Even-Zohar (2007)

The next section indentifies the size of the diamond industry and the industry's major players in production, manufacturing and diamond jewellery retail sales.

2.1. Major Players in the Value Chain

Producers

The diamond production figures present here (table 2.2) are compiled by the Kimberley Process data based on the Kimberley Process Certification Scheme (KPSC). The KPSC was established in 2003 and certifies all diamond rough exports and imports in over 70 member countries to confirm that these diamonds are from conflict-free sources. The Kimberley Process is the principal international effort to sever the link between conflicts and diamonds while ensuring that no harm is done to the legitimate diamond industry (Even-Zohar, 2007:912) by assuring consumers that they are not buying diamonds which are funding wars and human rights abuses. In 2008, global diamond production was close to 163 million carats[2] worth about US$12.7 billion. Global production fell in 2009 as many producers suspended production as a result of the financial crisis that started in the fourth quarter of 2008 which resulted in major fall in demand in the diamond value chain. Botswana is the largest producer of gemstone diamonds by value, producing over 32 million carats of diamonds in 2008 worth about US$3,3 billion which represented about a quarter of global production. Botswana is followed by Russia and Canada that produced 19.7 percent and 17 percent of production respectively in 2008. Unlike Botswana, in 2009 Russia did not reduce production during the recession and with the Government choosing to stockpile the production.

[2] A carat is a unit used to measure gemstones, equal to 200 milligrams (0.2 g)

Table 2.2: Producers of Gemstones Diamonds by value (US$, current)

Country	2007		2008		2009	
	US$	*Share*	US$	*Share*	US$	*Share*
Botswana	2,960,144,000	*24.45%*	3,273,001,000	*25.71%*	1,456,454,000	*16.86%*
Russia	2,625,100,500	*21.68%*	2,508,957,130	*19.71%*	2,340,640,600	*27.10%*
Canada	2,657,014,734	*21.95%*	2,254,710,606	*17.71%*	1,474,944,768	*17.08%*
South Africa	1,417,331,400	*11.71%*	1,236,240,109	*9.71%*	855,544,181	*9.91%*
Angola	1,271,955,353	*10.51%*	1,209,789,970	*9.50%*	1,179,209,718	*13.65%*
Namibia	715,434,111	*5.91%*	918,033,931	*7.21%*	408,741,127	*4.73%*
Australia	364,629,604	*3.01%*	326,394,285	*2.56%*	312,708,458	*3.62%*
DRC	364,783,294	*3.01%*	431,833,163	*3.39%*	225,839,908	*2.62%*
Lesotho	2,657,542	*0.02%*	222,680,825	*1.75%*	133,639,202	*1.55%*
Sierra Leone	141,565,685	*1.17%*	98,772,171	*0.78%*	78,423,595	*0.91%*
Guyana	34,399,461	*0.28%*	53,698,456	*0.42%*	14,557,427	*0.17%*
CAR	59,857,871	*0.49%*	47,752,282	*0.38%*	47,086,830	*0.55%*
Zimbabwe	31,400,904	*0.26%*	43,825,425	*0.34%*	20,426,782	*0.24%*
India	4,691,285	*0.04%*	31,190,623	*0.24%*	1,663,091	*0.02%*
Tanzania	28,315,099	*0.23%*	24,083,955	*0.19%*	24,781,885	*0.29%*
Guinea	46,101,145	*0.38%*	18,460,766	*0.14%*	28,975,789	*0.34%*
Liberia	-	-	9,891,785	*0.08%*	11,260,573	*0.13%*
Indonesia	328,146,969	*2.71%*	7,899,876	*0.06%*	819,081	*0.01%*
Brazil	25,807,516	*0.21%*	6,221,579	*0.05%*	830,115	*0.01%*
Ghana	23,202,422	*0.19%*	5,250,000	*0.04%*	6,984,025	*0.08%*
China	1,110,000	*0.01%*	1,370,000	*0.01%*	480,000	*0.01%*
Togo	1,709,644	*0.01%*	927,757	*0.01%*	15,025	*0.00%*
Venezuela	1,192,285	*0.01%*	1,293,116	*0.01%*	-	-
Congo	-	-	-	-	2,190,000	*0.03%*
Total	**12,106,550,822**		**12,732,278,808**		**8,636,216,180**	

Source: Kimberley Process Database

Apart from Australia which was the 7th largest producer in 2008, the next 10 producers were Africa countries South Africa, Angola, Namibia, Democratic Republic of Congo (DRC), Lesotho, Sierra Leone, Guyana, Central African Republic and Zimbabwe. The export figures reported by the Kimberley Process probably underestimate the actual amount of exports coming from some African producers some such as DRC, Sierra Leone and Angola which are well known for smuggling and/or underreporting their diamond exports (Even-Zohar, 2007:69) Furthermore, Zimbabwe's diamond exports are very contentious due to suspected human right abuses by the ruling party, the Zimbabwe African National Front – Patriotic Front (ZANU-PF). Activists say the army killed over 200 artisanal miners in the diamond field when the Government took control of the field (BBC, 2nd November 2009) and the country was put under economic sanctions by the United States (US) since 2003 due to its undemocratic government. Zimbabwe diamond exports were suspended from the Kimberley Process in November 2009 but limited exports were allowed in July 2010. The members of the Kimberley Process have since decided to allow exports from Zimbabwe and they could cause serious reputational problems for the

entire industry. Zimbabwe exports could have significant impact on diamond supply as the country is expected to have large diamonds reserves that may see it produce US$1.7 billion worth of diamonds per year becoming one of the top 6 producers in the industry (BBC, 16th August 2010). Global diamond production is expected to decrease in the next couple of decades due to the depletion of the known reserves as apart from Zimbabwe, no major new reserves have been found to replace the diminishing reserves. Rough diamond supply is currently less than demand (increasing prices for rough diamonds) and this gap is expected to keep widening if no new major reserves are found (Charles Wyndham, presentation made on 10th June 2009).

Manufacturers

The share of countries manufacturing or processing diamonds is largely unrelated to share of countries producing diamonds. This is because diamonds are largely not processed where they are sourced. Polishing diamonds enables them to sparkle by reflecting light through carefully calculated facets or windows. Historically, the major diamond polishing centres were in Belgium and India but the industry as since migrated to Asia as a result of relatively lower wages. Today the major diamond polishing centre is in India. India's share and the share of other centres in global manufacturing is shown in table 2.4 which shows all the major manufactures of polished diamonds from 2006 to 2008, as well the each country's share of global manufacturing. The Asian centres (India and China) mainly manufacture smaller diamonds whilst the traditional centres (Israel, Belgium and the USA) manufacturer bigger diamonds.

Table 2.4: Manufactures of Polished Diamond[3] (US$, current)

	2006		2007		2008	
Country	**US$ Billion**	***Share***	**US$ Billion**	***Share***	**US$ Billion**	***Share***
India	10.84	*58%*	11.59	*58%*	11.6	*59%*
Thailand, China & Others	2.5	*13%*	2.86	*14%*	2.86	*15%*
Israel	2.58	*14%*	2.41	*12%*	2.1	*11%*
Russia	1.2	*6%*	1.1	*6%*	0.95	*5%*
South Africa	0.8	*4%*	0.9	*5%*	0.91	*5%*
USA	0.3	*2%*	0.4	*2%*	0.75	*4%*
Belgium	0.4	*2%*	0.6	*3%*	0.5	*3%*
Botswana[4]	-		-		0.1	*1%*
Total	**18.72**		**19.86**		**19.7**	

Source: Tacy Ltd (excl. Botswana data)

In 2008, the global diamond cutting and polishing industry produced US$19.7 billion worth of polished diamonds. India, the world's biggest diamond cutting and polishing centre manufactured almost 60 percent of the polished diamonds worth US$11.6 billion in 2008. Thailand, China and other producers in Asia (like Thailand) together are the second largest producers of diamonds, producing close to 15 percent of

[3] At polished wholesale prices (pwp)
[4] Botswana share is a DeBeers estimate and manufacturing for 2008 from Botswana's Diamond Hub

polished diamonds worth US$2.86 billion in 2008. Compared to Belgium, Israel still has a significant share in global manufacturing, making it the third largest manufacturer of polished diamonds manufacturing country close to 11 percent of global polished diamonds worth US$2.1 billion in 2008. Russia and South Africa, which are also major diamond producers, are the fourth and fifth largest manufacturers of polished diamonds manufacturing 4.8 and 4.6 percent share of polished diamonds worth US$0.95 billion and US$0.91 billion respectively. The traditional centres, the USA and Belgium are the sixth and seventh largest manufacturers of polished diamonds manufacturing 3.8 and 2.5 percent respectively in 2008. Lastly, according to the Government, the relatively new centre Botswana only manufactured 1 percent of polished diamonds in the same year.

Diamond Jewellery Sales

The final segment of the diamond value chain is in the retail industry with diamond jewellery sales taking place traditionally in jewellery stores and more recently on the internet. Unlike most commodities like coal and oil, diamonds have not obvious and consumers see them as representing love and eternity. Diamonds are mainly used on rings for engagement and wedding bands and they are also used on other jewellery pieces like bracelets and necklaces. Marketing has been very crucial in creating the final demand for diamonds and as discussed in the next section DeBeers single biggest role in the marketing of diamonds. Table 2.5 shows the global retail sales of diamond jewellery from 2004 to 2008 and the share of sales by country. The diamond jewellery retail market was worth US$64.8 billion in 2008. This figure includes the value of the polished diamonds and other materials used in jewellery manufacturing like gold, platinum and silver. The world-wide average diamond content in diamond jewellery (in terms of polished wholesale prices) was 27 percent in 2005 (Even-Zohar, 2007:47). This means the typical jewellery piece contains 27 percent worth of diamonds.

Table 2.5: Retails Sales of Diamond Jewellery (US$, current)

	2006		2007		2008	
Region	**US$ Billion**	**Share**	**US$ Billion**	**Share**	**US$ Billion**	**Share**
Americas	34.01	50%	36.5	50%	31	48%
Japan	10.14	15%	9.5	13%	7.5	12%
Europe	8.25	12%	8.58	12%	8	12%
Asia-Arabia	4.45	6%	6.21	8%	6.3	10%
Asia Pacific	4.36	6%	5	7%	5	8%
Others	7.29	11%	7.29	10%	7	11%
Total	**68.51**		**73.08**		**64.8**	

Source: Tacy Ltd

The Americas are the largest consumers of diamond jewellery and in 2008 they accounted for nearly half of all diamond jewellery retail sales, worth US$31 billion. Europe is the second largest market for diamond jewellery, consuming 12.3 percent of all diamond jewellery retails sales in 2008, worth US$8 billion. Japan is the third

largest markets for diamond jewellery and accounted for 11.6 percent of diamond jewellery retail sales in 2008 worth US$7.5 billion. Asia-Arabia is the fourth largest market of diamond jewellery consuming 9.7 percent of diamond jewellery in 2008 worth US$6.3 billion. Asia Pacific is the fifth largest market for diamond jewellery and accounted for 7.7 percent of diamond jewellery retail sales in 2008 having spent US$5 billion.

The governance of the diamond value chain plays a major role in determining the participants of the downstream value chain. Thus the next section discusses the governance of the diamond value chain focusing on role of DeBeers' in governance of the value chain.

2.2. The Governance of the Diamond Value Chain

The concept of governance is central to the global value chain approach. It explains that some firms in the chain may set and/or enforce the parameters under which others participants in the chain operate (Gereffi, Humphrey and Sturgeon, 2005). Governance has to do with the exercise of power and control in the value chain and impacts on the production process at any point in the value chain. Governance is the inter-firm relationships and institutional mechanisms through which non-market coordination of activities in the chain is achieved. The main driver of non-market coordination in the diamond value chain is DeBeers which is a major producer of diamonds through the ownership of mines in various countries like Botswana, South Africa and Namibia. DeBeers determines the parameters of the production of polished diamonds in the cutting and polishing industry which include the type of polished diamonds produced by its customers, who can produce them (in other words its customers), how they can be marketed, when they can be produced and how many of them can be produced. Thus governance is important in the cutting and polishing industry because the manufacturing firms have to work according to production parameters that are set by another participant in the global value chain.

The founding of DeBeers in 1888 and its single marketing channel in the mid-1930s have had the greatest influence on the modern diamond industry (Sevdermish, Miciak and Levinson, 1998). DeBeers has its main direct ownership in the upstream activities of the value chain. It has little direct control on the downstream part of the value chain. But it has managed to use the distribution of rough diamonds and the marketing of diamonds to control downstream activities in the value chain. Historically, DeBeers was able to control the entire industry from mine to consumer through its dominant position in the upstream industry which, at its peak, saw DeBeers control over 80 percent of the world's rough diamond supply. This extensive degree of control arose as a direct consequence of limited global supplies of diamonds, and their concentration in a region (Southern Africa) in which DeBeers was a near-monopolistic producer. DeBeers established the single marketing-channel for diamonds and managed it through the company's Central Selling Organisation (CSO) to stabilize prices and profits in the entire industry. DeBeers stabilized prices by controlling the supply of rough diamonds released into the downstream industry to maintain equilibrium between supply and demand. To maintain this equilibrium, DeBeers managed and maintained a buffer stock or stockpile of rough diamonds. DeBeers controlled the release of diamonds into the

market by only selling rough diamonds to chosen cutting and polishing companies, known as Sightholders, once a month at selling weeks known as Sights. Thus the distribution of diamonds by the CSO enabled DeBeers to control the type and quantity of diamonds released into the industry thus maintaining prices. This enduring near-monopoly is possibly one of the longest-lived selling cartels in the global economy.

Overall the strategy was highly successful because whilst price fluctuations are accepted as normal in most commodities, this was not generally the case for diamonds (Sevdermish, Miciak and Levinson, 1998:73). Apart from maintaining prices, DeBeers appointed itself as the custodian of the entire industry by conducting consumer research, advertising, promotions and publicity for the industry to position diamonds as a premium high-priced product and thus to generate, and in some cases to limit, the demand for diamond jewellery. DeBeers promoted diamond jewellery sales worldwide by means of its highly regarded advertising programmes which resulted in the one the most famous advertising slogans 'A diamond is forever'.

Since the 1980s, DeBeers market power has been decreasing as a result of various factors including the entry of new producers like Rio Tinto, BHP Billiton, Lev Leviev, and Alrosa as a result of new discoveries in Australia and Russia and the growth of the diamond cutting industry in India (Sevdermish, Miciak and Levinson, 1998:72). DeBeers did make attempts to bring the new producers into its selling cartel but these attempts were largely unsuccessful. In Russia, there were series of conflicts between DeBeers and the new producer and an increasing percentage of Russian diamonds are now sold outside the CSO. In Australia, the termination of Argyle diamond mine's contract with De Beers reduced the latter's presence in the lower end of the market and this breakaway of Argyle from the cartel significantly damaged DeBeers' control over the lower-end market. The Argyle diamonds known as 'Indian Goods' are of a lower quality[5] and are mainly processed in India were the relatively lower costs ensure that they are still profitable to polish. In Canada, De Beers was able to secure 35 percent of the production of Ekati and launched a successful takeover of Winspear but it does not hold a dominant position in Canada (Chang et al, 2002). As a result of the new marketing channels for diamonds independent of DeBeers' marketing channel, DeBeers' market share decreased from 80 percent to about 40 percent of the industry. Today the industry is no longer a monopoly but an oligopoly dominated by a number of major producers. However, even in the new market structure DeBeers still plays a major role in setting rough diamonds prices for the industry.

Realising that it could no longer control supply, DeBeers announced a major shift in strategy by changing its company strategy from a supply-driven to a demand-driven strategy. DeBeers implemented the Supplier of Choice (SOC) sales strategy in 2003 to facilitate the shift to a demand-driven industry. This sales strategy spells out the new criteria that DeBeers uses to select its Sightholders and part of these criteria are designed to shift advertising and marketing responsibilities from DeBeers to the Sightholders. DeBeers now selects its Sightholders based on the following criteria: financial ability, market position, distribution ability, marketing ability and manufacturing ability. As part of the supplier of choice contract the CSO was

[5] These diamonds where previously classified as industrial diamond but a now known as near gems.

renamed the Diamond Trading Company (DTC). The DTC operates in London and as result of pressure on DeBeers from governments in producing countries for beneficiation DTC also operates in South Africa, Canada, Botswana and Namibia. Internationally there are 93 Sightholders licensed to DTC coming down from well over 100 Sightholders before SOC. The DTC Sightholder status is highly valued by the manufacturers because it assures a company with a long-term supply of rough diamonds and DTC diamond assortments represent good value relative to other mining sources.

The SOC biggest impact has been on the Sightholders business strategies. The main characteristics that Sightholders had to possess before the SOC were manufacturing and financial ability but with the addition of the new criteria Sightholders are encouraged to drive consumer demand by creating high value-added brands and increasing marketing and advertising. This has resulted in a shift towards vertical integration in the downstream industry. The Sightholders have embarked on joint ventures or complete acquisitions of jewellery manufacturing and retail companies in order to meet the SOC criteria. At the other end of the value chain, retailers have also shifted towards vertical integration in order to secure diamond suppliers which are expected to decrease in the future if no major new discoveries are made. For example, the major diamond jewellery retailer Tiffany now owns diamond mines and cutting and polishing factories. Thus the entire downstream industry has shifted towards vertical integration.

Despite this shift, DeBeers still determines the type, quantity and prices of rough stones that are available for the cutting and polishing factories that source diamonds from the DeBeers' distribution channel. As a result of vertical integration, the cutting and polishing factory is often also the lead buyer and thus determines the types of polished diamonds which it produces to maximise profit. Thus the cutting and polishing industry is in the process of shifting from an almost exclusive producer-driven value chain to a more complex pattern of chain governance in which buyer-driven and vertically-integrated chains are becoming increasingly important. However, it is not clear whether the value chain will indeed shift completely from a producer-driven to a buyer-driven chain. Whether or not this shift will take place depends on how much control DeBeers is willing to give up in the governance of the downstream value chain. It is unlikely that DeBeers will give up much control in areas like price setting and rough diamond allocations but more likely that it will give up more control in areas like marketing.

Gereffi, Humphrey and Strugeon (2005) developed a theory for determining how global value chains are governed based on the complexity of transactions, the ability to codify transactions and the capabilities of the supply-base. The theory generates five types of global value chain governance: hierarchy, captive, relational, modular and market. If the value chain does make the transition from producer-driven governance to buyer-driven governance and vertically-integrated chains, then linkages in the cutting and polishing firms will be governed by hierarchical relationships. The production process in the cutting and polishing is labour intensive and complex, relying heavily on tacit knowledge which is a company's most valuable intellectual property. Thus the governance structure in the cutting and polishing industry will be driven by the need to exchange tacit knowledge between value chain

activities and the need to manage resources to make it easier for the lead firm to develop and manufacture products in-house through vertical integration.

The diamond value chain is a highly governed value chain and thus the value chain approach is very applicable to this study. Despite the current transition to a buyer-driven chain, DeBeers remains the main driver of the downstream value chain that it supplies through distribution and marketing strategies, enabling it to determine who can participate in the value chain and how they participate. The governance of this value chain could change if in the future the buyers have more power in the governance of the value chain. DeBeers is driving the value chain's change from a supply-driven to a buyer-driven chain through its changing company strategy. The degree the chain will indeed become buyer-driven depends on the amount of power that DeBeers will give to the buyers. In Botswana, DeBeers' marketing and distribution channel is the main driver of the industry and although very little is known about linkages in Botswana's cutting and polishing industry, a lot can be learnt from the governance of the global value chain and its impact on standards in cutting and polishing industry. It is important to understand the governance of the global value chain in order to understand the types of linkages (both existing and feasible future linkages) in cutting and polishing industry.

The next section discusses the diamond industry in Botswana in terms of the economic significance of diamond mining, the impact of resource depletion, the government's ambitious plan to turn the country into a diamond centre, the development of Botswana's cutting and polishing industry and the paper's focus on linkages in the nascent downstream industry.

3. Botswana and the Diamond Industry

Botswana is a landlocked country in Southern Africa with an economic development characterized by the discovery and exploitation of diamonds. Botswana has enjoyed over 40 years of independence, having achieved independence from Britain in 1966 after becoming a British Protectorate in 1885. At independence Botswana had an overwhelmingly poor economy and the largely rural population depended heavily on the agricultural sector. The discovery of diamonds shortly after independence by a geologist working for the DeBeers group of companies and the prudent management of diamond revenues that followed enabled the development of the country. Historically all diamonds were mined by the Debswana Mining Company which is 50-50 joint venture between the government and DeBeers. Debswana operates four diamond mines in Botswana and recently new producers have started independent diamond mines in Botswana.

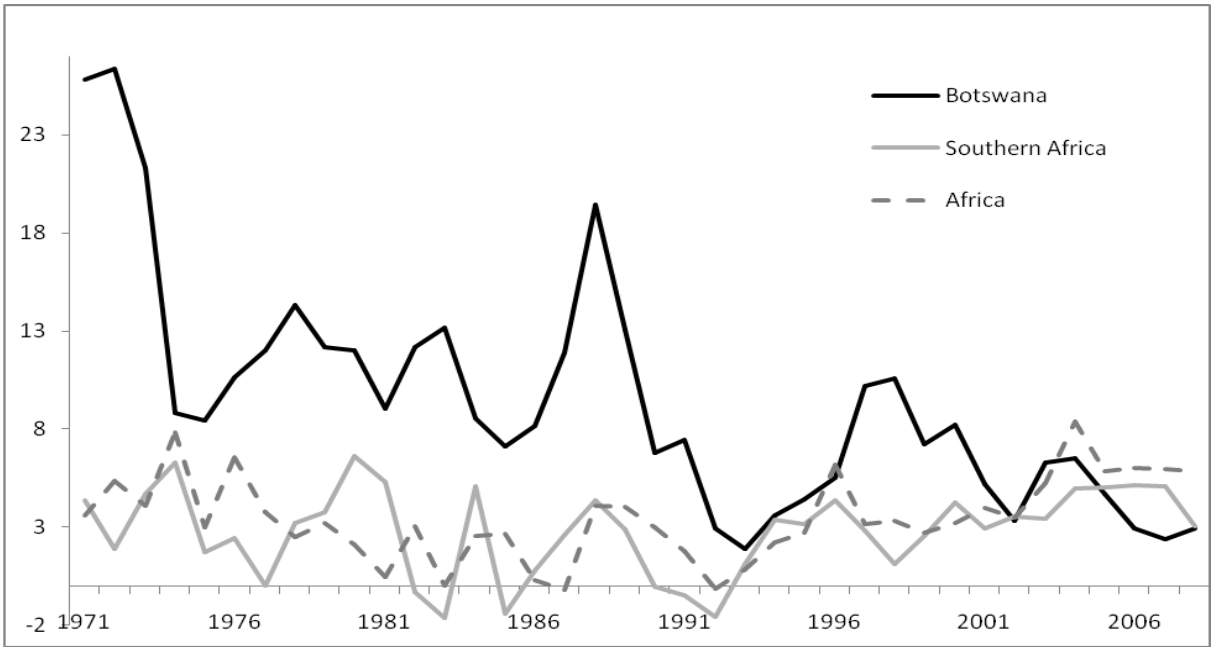
It is commonly accepted that resource-abundant economies tend to grow less rapidly than resource-scarce economies and the phenomenon is often referred to as the "resource curse" (Sachs & Warner, 1995). Botswana represents an exception to the "resource curse"[6] rule by managing to transform mineral wealth from diamonds into economic growth. This is because the discovery of diamonds was bolstered by

[6] A large body of literature exists to explain how Botswana escaped the resource curse, for example Limi (2006) argues the importance of governance in facilitating economic development and Siphambe (2007) argues that policy coherence played a key role in channelling mineral revenues into economic growth.

political stability, mature democratic processes, good policies and strong institutions that underpinned effective economic management for over four decades (World Trade Organization, 2010:96). Diamond revenues financed key infrastructure development, building roads, schools and hospitals and providing an extensive welfare system to the country's population of about 1.9 million of which more than half is urbanized. Botswana impressive natural resource management and growth record has seen it dubbed as an 'Africa success story'.

Figure 3.1 shows how Botswana's gross domestic product (GDP) grew from 1971 to 2008 compared with the African and Southern African average growth rate in the same period. Botswana enjoyed positive GDP growth for the entire period and performed much better than the African and Southern African average GDP growth. Botswana GDP growth was most impressive in the 1970s and 1980s but started slowing down in the early 1990s. In the early 2000s Botswana started growing slower than the average African GDP growth rate mainly as a result of the maturity of the diamond industry together with improved average GDP growth in Africa.

Fig 3.1: Gross Domestic Product (GDP) growth in Botswana, Southern Africa and Africa



Source: Data from the World Bank Country Statistics for Botswana and United Nations Aggregates Database for Southern Africa and Africa, chart by author

Despite the currently lower rate it is important to emphasise that in the period of 1960 to 2005 Botswana was one of the fastest growing countries being one of only 13 countries that had a consistent growth rate in excess of 7% per annum for more than 20 years (World Bank, 2008:26). Botswana grew on the back of diamond mining with a clear partnership with DeBeers that looking at GDP growth was successful but was not altogether successful looking at employment because employment has remained low although living standards rose. To show this Table 3.1 shows Botswana Gross Domestic Product (GDP) per capita and unemployment for selected years. In 1965 Botswana GDP per capita was only US$77 and the unemployment data for the same year is not available. By 1985 GDP per capita had risen to US$960 and unemployment was 26 percent of the total labour force. In 1995 per capita GDP

had increased even further to US$3080 but unemployment had only decreased to 22 percent. In 2005 per capita GDP has further increased to US$5716 but unemployment has risen to 32 percent. This suggests that development spill-overs from diamond mining are significant for per capita GDP but not employment.

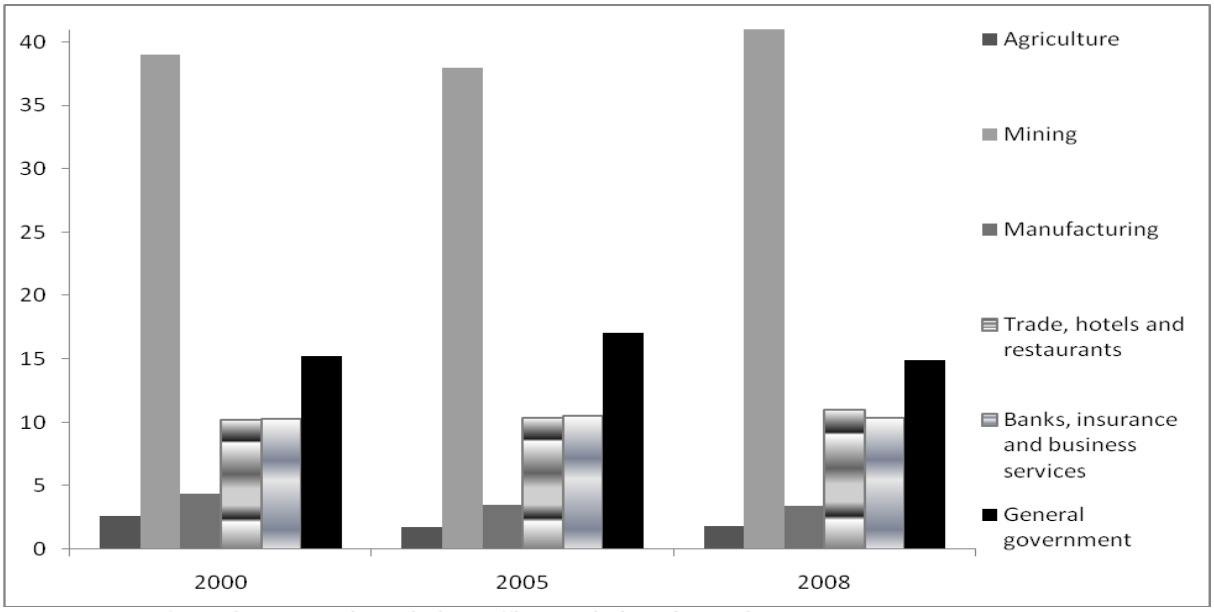
Table 3.1: Gross Domestic Product (GDP) per capita and unemployment for selected years

Indicator	1965	1985	1995	2005
GDP per capita (current US$)	US$77	US$960	US$3080	US$5716
Unemployment (% of total labor force)	-	26%	22%	32%

Source: Data from the World Bank Country Statistics

Botswana's diamond-led growth has resulted in an undiversified economy dominated by diamond mining and public spending financed largely by diamond revenues. To illustrate the dominance of diamond mining in Botswana economy figure 3.2 shows the percentage contribution to gross domestic product by selected economic activities.

Fig. 3.2: Percentage contribution to gross domestic product by selected economic activities

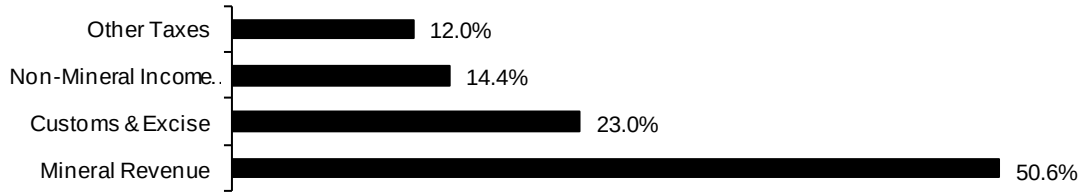


Source: Data from the Central Statistics Office and chart by author

Although Botswana does mine other minerals (copper, nickel, gold and soda ash) diamonds represent over 90 percent of all mineral revenues, which in turn represents 40 percent of gross domestic product between 2000 and 2008. Mining activities were followed by government activities which contribute about 16 percent to gross domestic product. The tourism sector (trade, hotels and restaurants) and the financial sector (banking, insurance and financial services) are the next most important sectors in Botswana contributing about 10 percent to GDP each. The manufacturing sector plays a very small role in Botswana economy contributing less than 5 percent to GDP. The traditional agricultural sector which was the main form of economic activity at independence now contributes less than 3 percent to GDP. Government

activities are largely financed by diamond mining with mineral revenue contributing half to government revenue in the last decade (see figure 3.3).

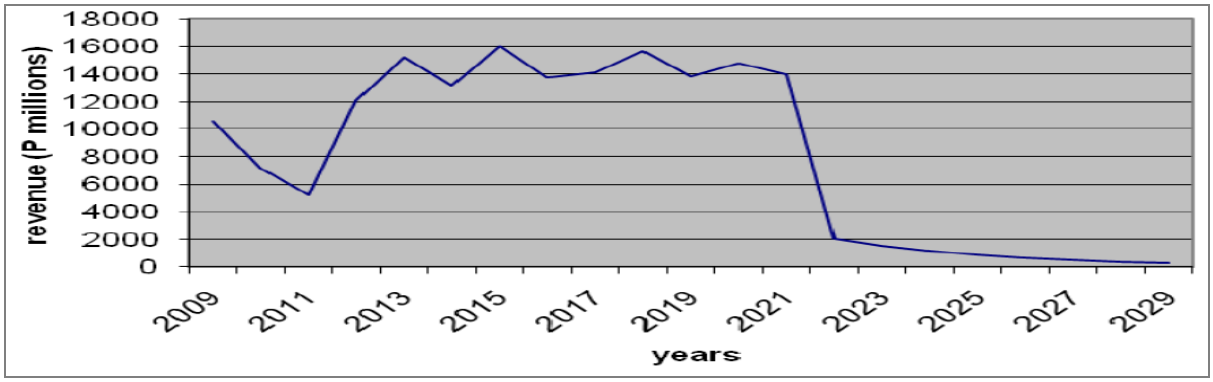
Fig. 3.3: Composition of government revenue (2000-2009)



Source: Data from the Central Statistics Office, graph by author

However, Botswana's diamond-led growth is under threat as the Government expects diamond revenues to start decreasing in the next decade when opencast mining will be replaced by underground mining. The cost of underground mining is higher than open cast mining and this will decrease the revenues accruing to government (Government of Botswana, 2009:6). Unless there are major new discoveries government revenue from diamond mining will decline, at first slowly and then rapidly over the next two decades (see figure 3.4). However, the likelihood of new discoveries is high given current exploration activities and the extension of the lives of the current mines (discussed in section 5). These two factors together make it likely that depletion could take place in three or more decades instead of the two decades stated by Government.

Figure 3.4: Projected Government Revenue from Diamonds (2009 - 2029)[7]



Source: Government of Botswana (2009)

However, the government has decided it is crucial that Botswana uses its remaining diamond resources to foster long-term economic growth through the private sector to create fiscal sustainability, in light of approaching resource depletion and in order to make the most of the remaining diamond deposits. The government is of the view that the beneficiation strategy or local processing of diamonds provides a real opportunity for Botswana to grow the private sector and create sustainable revenue for the government. The beneficiation imperative in the diamond industry argues that cutting and polishing of diamond's locally will further local economic development ensuring that a greater proportion of value derived from diamond exploitation will stay 'in country' and benefit local communities through increasing skills and employment.

[7]In Pula current prices, the Pula is the local currency which is roughly P6 to the US$1

Although Botswana has benefited from diamonds-based growth path through its partnership with DeBeers, the imperative question within the government is could the country have benefited more under a different arrangement with DeBeers that allowed for greater value added. Especially due to the growth path's limited employment spill-over's that mean that many still live in poverty despite the high GDP per capita and Botswana classification as a middle income country. This explains why job creation is one of the factors driving the government's beneficiation policy. Historically, a number of government officials[8] have questioned whether the DeBeers arrangement allows the country to full advantage of its diamond resource and whether beneficiating the countries diamonds would not lead to greater local economic benefit through job creation.

However, there is strong resistance amongst economists on whether or not beneficiation is based on strong economic fundamentals and is thus a good policy framework to promote exports. The main economic argument for beneficiation is based on transport costs which states that in the case of high transport costs it makes economic sense for the commodity to be processed where it is mined. However, this argument does not apply in the case of diamonds as they are lightweight and do not face high transport costs relative to other minerals. Hausmann, Klinger and Lawrence (2007) argue that beneficiation is a bad policy as it makes no sense conceptually, and is completely inconsistent with international experience. This conclusion is made based on quantitative analysis that found that factor intensities do a better job at patterns of production and structural transformation that forward linkages. This is because the factors needed in different segments of the value chain are often very different and thus capabilities in extractive industries will not result in capabilities in processing industries. It is yet to be shown that the beneficiation policy can be successful in creating sustainable export sectors. Despite this the Government of Botswana, like many other governments[9], is of the opinion that the beneficiation of diamonds can result in new and deeper linkages with the local economy that maximise local economic contribution by developing new capabilities. The government seeks to take full advantage of this opportunity through the beneficiation policy which is part of the current minerals policy. Through the beneficiation of diamonds the government plans to prepare Botswana for a 'life after diamonds' by creating downstream competencies that can continue to be utilised when diamonds are can no longer be mined in Botswana. The government's diamond beneficiation strategy is a four pronged strategy that aims to create downstream competencies in the cutting and polishing industry, jewellery manufacturing industry, diamond trading industry and ancillary businesses. The first part of the beneficiation strategy and the focus of this paper is the creation of a viable cutting and polishing industry.

Even before resource depletion became such a prominent concern the Government had already attempted to start a cutting and polishing industry in the early 1980s, mainly as a way of creating more employment opportunities in the diamond industry. At the time DeBeers did not support the government's ambitions, arguing that cutting and polishing activities were not economically viable in Botswana. Mild pressure from

[8] For example David Magang, the former Minister of Minerals, Energy and Water Affairs speech at the 2nd Financial Times conference in 1997 argued for greater value added in Botswana's diamond industry.

[9] Namibia, South Africa and Canada also have beneficiation policies for their diamond industries

government on DeBeers led to the start of three cutting and polishing factories between 1980 and 1990. However none of these factories ever reported a profit and critics have gone as far as saying that the companies reported a loss in order to keep perpetuating the DeBeers' notion that beneficiation was not viable in Botswana (Peter Kettle[10], 29th October 2009, Personal Interview). Despite the government's failed attempt at establishing a cutting and polishing industry some learning took place and the government continued to push DeBeers for beneficiation. Botswana's real opportunity came in 2005 when DeBeers 25 year mining license was due for renewal. The government had a lot of bargaining power due to the significance of Debswana's production in DeBeers' global production. In 2005, Botswana supplies about 60 percent of DeBeers' supply of rough diamonds (Even-Zohar, 2007:46). The government insisted that in order for DeBeers to renew its mining license for another 25 years it should help Botswana in creating a viable cutting and polishing industry. DeBeers gave in to the government's demands realizing that it could no longer hold back beneficiation in Botswana and signed the new mining contract.

After the new contract was signed the Government invited the world's most renowned cutting and polishing companies to establish factories in Botswana and transfer cutting and polishing skills to locals. 16 companies of these companies were selected and licensed in Botswana. DeBeers and government then established the Diamond Trading Company (DTC) Botswana in 2008 which is 50:50 joint venture. DTC Botswana is responsible for the sorting and valuing of Debswana's production as well as the local sales and marketing of diamonds to the 16 cutting and polishing companies and for the support and development of the cutting and polishing industry. The new agreement stated that DTC Botswana rough diamond sales to the local manufacturing industry have to be at least US$500 million a year and growing and create over 3000 jobs. It is not clear how the Government reached these numbers. The agreement does not stipulate the timescale in which these sales and employment targets should be reached. There is a penalty clause for non-performance in the area of beneficiation for DeBeers, so De Beers has a vested (and financial) interest in making beneficiation a success in marked contrast to the past (Even-Zohar, 2007:235). The 16 cutting and polishing companies, known as Sightholders, are only assured rough diamond allocations on the condition that they hire and train locals with cutting and polishing skills. The Government has established a Diamond Office to support government's primary objective of beneficiation in Botswana diamond industry. This office focuses on building strategic alliances, developing infrastructure and enabling a favourable fiscal regime in order to support diversification in the diamond industry and has managed to attract global companies that service the diamond industry in other cutting and polishing centres around the world to set up offices in Botswana. The diamond office is located at Diamond Technology Park and houses various ancillary businesses which include banking, logistics, gemmology, security and brokering companies.

In the five years that followed the new agreement with DeBeers, Botswana has made progress in establishing a local cutting and polishing industry. However, the degree of economic linkages taking place between the nascent industry and the local economy and the viability of the industry is still unknown. This paper aims to fill this major research gap. The specific research questions and methodology are discussed

[10] Former Head of Beneficiation in Africa at DeBeers

in section 5 but before that section 4 provides a brief discussion of the key role DeBeers in the governance of the diamond industry.

4. Research Questions and Methodology

This paper investigates the nature and extent of linkages in Botswana nascent diamond cutting and polishing industry.

Research Questions

The first research question is:

1. To what extent is Botswana succeeding in creating a viable and sustainable cutting and polishing industry?

   This research question assesses the extent to which the government has succeeded in implementing its ambitious diamond beneficiation policy.

2. To what extent have linkages been developed into the cutting and polishing links in the Botswana diamond value chain?

The second research question investigates the extent to which Botswana is succeeding in developing linkages in the cutting and polishing industry. Thus the paper aims to map the existing value chain cutting and polishing industry by identifying value-added links and economic activities, quantifying where possible value-added content at each stage of the value chain, and looking at the dynamics between value-added links.

3. What is the role of policy, ownership, NSI, skills, infrastructure and regional factors in enhancing or constraining the depth and breadth of linkages in Botswana's cutting and polishing industry?

The third research question investigates the role of key factors in constraining or enhancing the linkages in the cutting and polishing industry. These factors are based on the Making the Most Commodities of Program's (MMCP) hypotheses that the nature and depth of linkages are a function of ownership, infrastructure, skills, national system of innovation (NSI), policy and regional hubs (particularly the proximity of South Africa).

Methodology

The principle methodology used to address these research questions involved primary and secondary data collection in Botswana. Desktop background research was conducted to identify the key participants in Botswana's cutting and polishing industry. Preliminary fieldwork was then conducted in June 2009 to understand the development of the industry and the key constraints faced by the industry. Further fieldwork was conducted from October to November 2009 and again during May 2010. Interviews were conducted with key participants in the cutting and polishing industry (see table 4.1), suppliers (see table 4.2) government, private sector and

academia (see table 4.3) Interviews were semi-structured and lasted from 30mins to 2 hours. Interviews were conducted in English and Setswana using a semi-structured questionnaire. The data collected was of both a quantitative and qualitative nature.

Table 4.1: Respondents in the Cutting and Polishing Factories

Population (16)	Origin	Interviewed (12)	Person Interviewed
Motiganz Botswana	Israel	Yes	Production Manager
Suashish Diamonds Botswana	India	Yes	Managing Director
Lazare Kaplan Botswana	Israel	Yes	Managing Director
Leo Schachter Botswana	Israel	Yes	Production Manager
Diamond Manufacturing Botswana	Belgium	Yes	Managing Director
Eurostar Botswana	Belgium	Yes	General Manager
SAFDICO Botswana	South Africa	Yes	Managing Director
Steinmetz Diamonds Botswana	Israel	Yes	Managing Director
Zebra Diamonds	Belgium	Yes	Human Resource Manager
H&A Botswana	Thailand	Yes	Managing Director
Teemane Manufacturing Botswana	Belgium	Yes	Managing Director
Sherenuj Botswana	India	Yes	Managing Direct General Manager
Laurelton Diamonds Botswana	South Africa	No	-
Pluckzenic Botswana	Belgium	No	-
Dalumi	Israel	No	-
Yerushalmi	Israel	No	-

Twelve cutting and polishing firms were interviewed out of an overall population of sixteen. Prior to fieldwork the aim was to interview all the firms in the industry but this was not possible[11]. The sample represents 62.5 percent of the population but because the firms were not willing to discuss their production levels it is not clear what share of the market the interviewed firms represent. However, the sample is representative in terms of nationality of ownership, firm-size (based on employment) and the number of years established in Botswana. These and other firm characteristics in the sample will be discussed in greater detail in the findings section.

Table 4.2: Respondents in the supply chain

Business Activities	Population	Interviewed
Transport/Logistics	2	1
Brokers	3	1
Banking	3	1
Gem Certification	1	1
Insurance	2	2
Catering	Unknown	0
Security	Unknown	0
Cleaning	Unknown	0
Specialised Inputs	Unknown	0

[11] One firm, Yerushalmi refused to be interviewed and is also the managing firm for another firm, Dalumi

Six firms were interviewed that participate in the cutting and polishing industry's supply chain. These firms mainly provide services to the cutting and polishing firms. The sample is biased towards knowledge intensive services and not all business activities have been covered. Although all business activities are important, knowledge intensive services have the greatest potential for transfer high-value skills.

Table 4.3: Government, private sector and academia respondents

Organization	Sector	Person Interviewed
Diamond Hub	Government Office	Hub Coordinator Business Development Manager
Diamond Office	Government Office	Diamond Officers
Diamond Trading Company Botswana (DTCB)	Public-Private Joint Venture	Public Relation Manager
Botswana Export Development & Investment Authority (BEDIA)	Parastatal	Director: Business Development
International Financial Services Centre (IFSC)	Parastatal	Business Development Executive
Citizen Entrepreneurship Development Agency (CEDA)	Parastatal	Director: Structured Finance
Local Enterprise Authority (LEA)	Parastatal	Director: SMME Environment
Botswana Institute for Policy Analysis (BIDPA)	Parastatal	Executive Director
Innovation Hub	Parastatal	Principal Project Officer
Department of Minerals	Government Department	Minerals Officer
Grant Thornton	Private	Partner in firm
Prof. Happy Siphambe	Academia	Professor in Economics
Emma Muller*	Private	Consultant
Peter Kettle**	Private	Consultant
Karen Henry***	Private	Consultant

* Intermediary between Government of Botswana and manufacturers
** Ex-Head of Beneficiation in Africa at DeBeers
*** Gemmologist and daughter of a local diamantiare

Lastly, a number of institutions in the public sector, private sector and academic were interviewed. The aim of these interviews was to understand the support that the various institutions provide the cutting and polishing industry, how this support has evolved over time and what are the current plans to enhance the institutional support provided to the cutting and polishing industry.

The next section discusses the findings of the research on the nature and type of linkages in the Botswana's cutting and polishing industry.

5. Nature and Extent of Linkages

Firstly, this section maps the value chain in Botswana's diamond industry focusing on the forward linkages in the cutting and polishing industry. Secondly, the findings are discussed with regards to the nature and type of forward linkages taking place in the

manufacturing firms by measuring the local value added being created through the industry's consumption and financial linkages. Lastly, this section discusses the findings with regards to the nature and type of forward linkages in the cutting and polishing industry's supply chain by measuring the local value added being created as a result of the manufacturing firms demand for inputs from the supply chain.

5.1. Mapping the Value Chain

This sub-section maps the diamond value chain in Botswana starting with the upstream value chain and focusing on the cutting and polishing industry in the downstream value chain.

Upstream Value Chain

The upstream value chain starts with exploration to locate a viable diamond deposit for mining. Diamonds are found in a particular type of rock formation known as kimberlite pipes. Exploration is a high risk activity that requires a long term commitment to find a economically-viable diamond deposit and can result in high rewards. In the early stage exploration or discovery phases the first step is to decide where to explore and, through a combination of techniques, identify targets for subsequent phases. Once a promising diamond deposit has been identified a number of specific methods to further assess and develop it follow. Botswana first diamonds were discovered by DeBeers in 1967 after close to 12 years[12] of prospecting. According to Botswana's second presidents, Sir Keitumile Masire, the discovery was actually made a couple of years earlier but at the time Botswana was still negotiating its independence from Britain so the discovery was kept secret and only announced after independence was achieved in 1966 (Masire,1999). Before the announcement was made the Government changed the law to ensure that the Government instead of the tribes was the custodian of the all the country's minerals. This has enabled the government to use the country's mineral wealth to benefit all the people of Botswana.

Table 6.1: Current Prospecting licenses in Botswana (2009)

Commodity	Number of Licenses (% of total)
Diamonds	397 (35.3%)
Energy	250 (22.2%)
Metals	246 (21.9%)
Radioactive	155 (13.9%)
Industrial	76 (6.8%)
Total Licenses	**1124**

Source: Department of Geological Services

There is still significant diamond prospecting taking place in Botswana more than four decades after the first discovery was made. In 2009 the Department of Geological services had 1124 current prospecting licenses for all mineral prospecting and the biggest share of these licenses, over 35 percent, were for diamond prospecting (see table 6.1). There are over 50 companies which are involved with diamond exploration in Botswana with at least four kimberlites currently undergoing advanced prospecting stages (see table 6.2). Once a viable diamond deposits has been found the next

[12] DeBeers started prospecting in Botswana in 1955

stage of the value chain is mining. Most diamonds are extracted by open-pit mining, where diamond deposits are on the surface of the ground, or underground mining, where diamond deposits are below ground[13]. Due to the location of the resource in Botswana most diamond mining is open pit which is relatively cheaper that underground mining.

Table 6.2: Advanced prospecting activities

Kimberlite	Ownership	Stage
BK16	Firestone	Advanced prospecting
Tsabong	Firestone	Advanced Prospecting
AK8	African Diamonds	Advanced prospecting
AK9	African Diamonds	Advanced prospecting

Source: Authors research

Table 6.3 shows Botswana's current diamond mining activities. DeBeers operates four mines in Botswana which include the Jwaneng mine which is the most profitable diamond mine in the world[14]. These mines are operated by a joint venture between the government and DeBeers, known as the Debswana Mining Company. The government also owns 15 percent of DeBeers[15]. Debswana produces more than 30 million carats a year, about 22% of the world's output. Debswana contributes significantly to Botswana's economy, producing over 70% of the country's export earnings, 30% of Gross domestic Product (GDP) and 50% of government revenue. The Government receives over 80% of all gross profits realised by Debswana making it the single most important source of financing. Debswana's contribution to employment is not as significant as it contribution to economy as its mines are capital intensive. In 2008 Debswana reported that it employed 6500 people of which 95 percent were citizens of Botswana, making the company the second largest employer after government. Apart from the four diamond mines Debswana also owns a coal mine, the Morupule Colliery which started operating in 1973. Debswana's Orapa and Jwaneng mines are the most important with Jwaneng contributing 70 percent to Debswana total earnings and Orapa having the biggest kimberlite pipe in the world. However, both these mines are old and nearing depletion which the government expects to take place in the next two decades. To prolong the life of its richest mine, Debswana has embarked on the Jwaneng Cut 8 Project (see box 1). DeBeers also has a revenue optimization strategy within which diamonds are only mined when the demand exists, that is why all Debswana mines stopped production during the recession. DeBeers holds 10 prospecting licences in Botswana and spends US$ 4 to US$ 5million a year on finding new deposits in the country and the company is confident of prolonging diamond mining in Botswana beyond the 20 years of prevailing forecasts. The De Beers Exploration Manager for Southern Africa, Mike Roberts, said:

[13] Diamonds are also extracted from alluvial deposits, where they are removed from sand, gravel and clay. These can be deposited along the banks of a river, the shoreline or on the bed of the ocean. This process is called alluvial mining and is undertaken by Coastal and inland mining, where sand and soil are removed to find diamonds, or marine mining, where diamonds are excavated from the seabed.

[14] The Jwaneng mine has a high rate of diamond extraction, combined with high quality diamonds fetching excellent per weight prices, which make it the most profitable diamond mine in the world by value of recovered diamonds

[15] 45 percent is owned by the Oppenheimer family and the remaining 40 percent by Anglo-America.

'There are chances of finding another Jwaneng or Orapa, particularly in the western part of the country which is sand covered, such as in the Kalahari' (Mmegi Newspaper, 11th March 2011)

Table 6.3: Diamond mining activity

Mine and Type	Ownership	Start of Production	Sales Channel	Production and Lifespan
Orapa Open Pit	Debswana - 50% DeBeers - 50% Government	1971	DTC	17million cts/pa -
Letlhakane Open Pit	Debswana - 50% DeBeers - 50% Government	1975	DTC	1million cts/pa 6 years
Jwaneng Open Pit	Debswana - 50% DeBeers - 50% Government	1982	DTC	13million cts/pa 21 years
Damtshaa Open Pit	Debswana - 50% DeBeers - 50% Government	2003*	DTC	300 000 cts/pa or 5million carats over lifespan 31 years lifespan
Lerala -	DiamonEx	2008*	Independent	330 000 cts/pa 12 year lifespan
BK11 -	Firestone Diamonds	Mid 2010	Independent	1 million cts/pa 10 year lifespan
AK6 -	Boteti Mining - African Diamonds 28.381% - DeBeers 66.215% - Debwat 5.404%	End 2011	DTC	600 000 cts/pa for first 3 years 880 000 cts/pa for remaining 4 years 7 year lifespan
Gope Underground Mine	Gem Diamonds	TBA	Independent	1million cts per annum or 30 million carats over entire lifespan 30 year lifespan**

* mines are still under care and maintenance since production was suspended in early 2009 as a result of the economic recession

** This is the estimated lifespan, Gem Diamonds is a planning a phased approach to the construction of the mine with an underground mine planed to improve the company's knowledge of the ore body (Mmegi Newspaper, 18th March 2011).

Source: Authors research

The Lerala Mine owned by DiamonEx was the first independent mine in Botswana outside of the DeBeers/Government ownership. The mine started production in 2008 but production was suspended in early 2009 as a result of the economic crisis that started in the fourth quarter of 2008. Currently the Lerala Mine (as well Debswana's Damtshaa mine) is still under care and maintenance. Another independent mine was started last year by Firestone Diamonds and third mine is currently being constructed by the Boteti Mining Company with a majority shareholding by DeBeers. Lastly, the proposed Gope mine is located in the Central Kalahari Game Reserve (CKGR) and has attracted a lot of media attention due to an ongoing dispute between the

government and the Bushmen who have inhabited the reserve for centuries. The Government sought to move the Bushmen from the reserve stating that their way of life was not compatible with wildlife conservation. The Government build a new town for the Bushmen with all amenities and gave them livestock to assist them in starting a new way of life. The Bushmen subsequently took the government to court with the help of Survival Africa which felt the Bushmen were only being removed to make way for diamond mining. The Bushmen won the legal dispute and were let back into the reserve but early this year the Bushmen took the government back to court for denying them water in the reserve. DeBeers and Xstrata which initially owned Gope, sold it Gem Diamonds in 2007 for US$34.1 million (Mmegi Newspaper, 18th March 2011) due to all the negative media attention it was attracting. Amongst all the controversy a Gem Diamonds was awarded a mining license early this year and mining is set to go forward.

Unlike the Debswana mines, the government has no ownership in the independent mines and these mines were licensed on condition that their rough diamond production is traded locally. It is not clear why the government has changed its strategy in terms of the ownership of the new diamonds mines. The new mining licences state that the companies will be required to pay a diamond royalty of 10% on the gross market value of production from the mines. All the new producers except Boteti will sell their diamonds outside of the DeBeers channels. All diamonds mined by Boteti Mining Company will be sold to the DeBeers subsidiary, the Diamond Trading Company (DTC) International. At the end of 2010, Firestone Diamonds traded its first rough diamonds in Botswana through a tender process. The tender was attended by more than 30 diamond buyers from Belgium, Israel, India, Russia and southern Africa. This was the first time rough diamonds were sold independent of DeBeers' marketing channel in Botswana.

Box 1: Jwaneng Cut-8 Project – Extending the Life of the Most Profitable Mine

Adding Seven Years to the Super Pit

The Jwaneng Cut-8, is a key component of Debswana's North Star strategy and is the largest ever single capital commitment in the private sector in Botswana (Miningmx, 21st March 2011). The project, which was approved by Debswana in 2009, will extend the life of the Jwaneng mine by seven years and ensure profitable and continuous production at the mine to at least 2025 (Miningmx, 21st March 2011). Debswana is investing $500m in capital expenditure and, taking into account all project stages - including feasibility, design, implementation and mining operations, as well as the cost of plant and equipment - the estimated project investment is likely to total $3bn over the next 15 years (Miningmx, 21st March 2011). According to information provide on the DeBeers website at its peak, the project will create more than 1,000 jobs, DeBeers said (DeBeers. The development will require the removal of over 700 million tonnes of waste between 2010 and 2024, exposing an additional 78 million tonnes of diamond bearing ore, and deepening the Jwaneng pit to a depth of 650 metres. It is anticipated that this will create access to a further 95 million carats, which could be worth in excess of $15bn over the life of the mine.

Debate on Local Linkages

The Cut-8 project had stirred on local linkages. The project has created 2500 jobs are and over 1400 are for Botswana citizens. Thus in total, 86% of the workforce are Botswana citizens. In addition, 51% of contracts awarded to-date have been to citizen-owned or Botswana-based companies (Mmegi, 17th February 2010). The main contractor is Basil Read, an SA company. There has been much unhappiness amongst locals at this not being higher and at the large number of expatriates engaged. DeBeers argues that Cut 8 does more for Botswana over and above creating jobs. Saying, by extending the life of Jwaneng, Cut 8 is part of the process of building a strong Botswana economy that will endure far longer than Jwaneng Mine (DeBeers website.

Botswana produces over 30 million carats per annum with a value of about US$3 billion (see table 6.4). There was a large drop in diamond production in 2009 as a result of the economic recession that impacted on diamond jewellery sales and fed through the value chain in the last quarter of 2008. All diamond mines in Botswana halted production at the beginning of 2009 and to date two mines[16] have not re-started production. Botswana average value per carat is between US$80 to US$100 which includes both gem and industrial diamonds. Industrial diamonds are worth considerably less than gem stones and if they were reported separately the figure would give a more accurate value per carat for Botswana's gemstone production

Table 6.4: Botswana's Diamond Production

Year	Production (Pro.)			Exports (Exp.)			Exp. / Pro.
	Volume (Cts)	Value (US$)	US$/ Cts	Volume (Cts)	Value (US$)	US$/ Cts	
2004	31,036,367	2,576,018,461	$83.00	28,947,563	2,563,605,783	$88.53	93.3%
2005	31,889,771	2,890,079,390	$90.00	33,866,533	3,328,619,539	$98.29	106.2%
2006	34,293,401	3,207,570,684	$93.53	33,883,292	3,302,556,803	$97.47	98.8%
2007	33,638,000	2,960,144,000	$88.00	34,962,966	3,170,056,591	$90.67	103.9%
2008	32,276,000	3,273,001,000	$101.41	26,950,310	2,966,144,893	$110.06	83.5%
2009	17,734,000	1,436,454,000	$81.00	21,626,964	2,006,336,907	$92.77	122.0%

Source: Kimberley Process

To understand the magnitude of the diamonds being exported in relation to production table 6.4 also shows Botswana diamond exports. The De Beers' DTC International purchases the Debswana production at around a 10 percent marketing discount to its Standard Selling Values (SSV)[17], which is the figure used for exports statistics (and the Kimberley certificates) (Even-Zohar, 2007:68). In other words, Debswana sells all its output to DTC International at around 10 percent less of production value to pay DTC International for marketing its diamonds. This explains why the ratio of exports to production is less that 100% in some years but this does not explain why it is more that 100% in some years. Perhaps Debswana stockpiles in some years and only sells this production in other years. Thus for analytical purposes, export values are more relevant than the production figures.

Once rough diamonds have been mined they are sorted into different categories depending size, colour, shape and quality (clarity). All diamonds mined by Debswana are sorted and valued by the Diamond Trading Company (DTC) Botswana which was previously known as the Botswana Diamond Valuation Company (BDVC). The operations of the BDVC were transformed into the new company in 2005 after the new agreement between DeBeers and the government discussed in section 3. The BDVC was started in 1974 and previous to its establishment all Debswana output was sorted in London by DTC international.

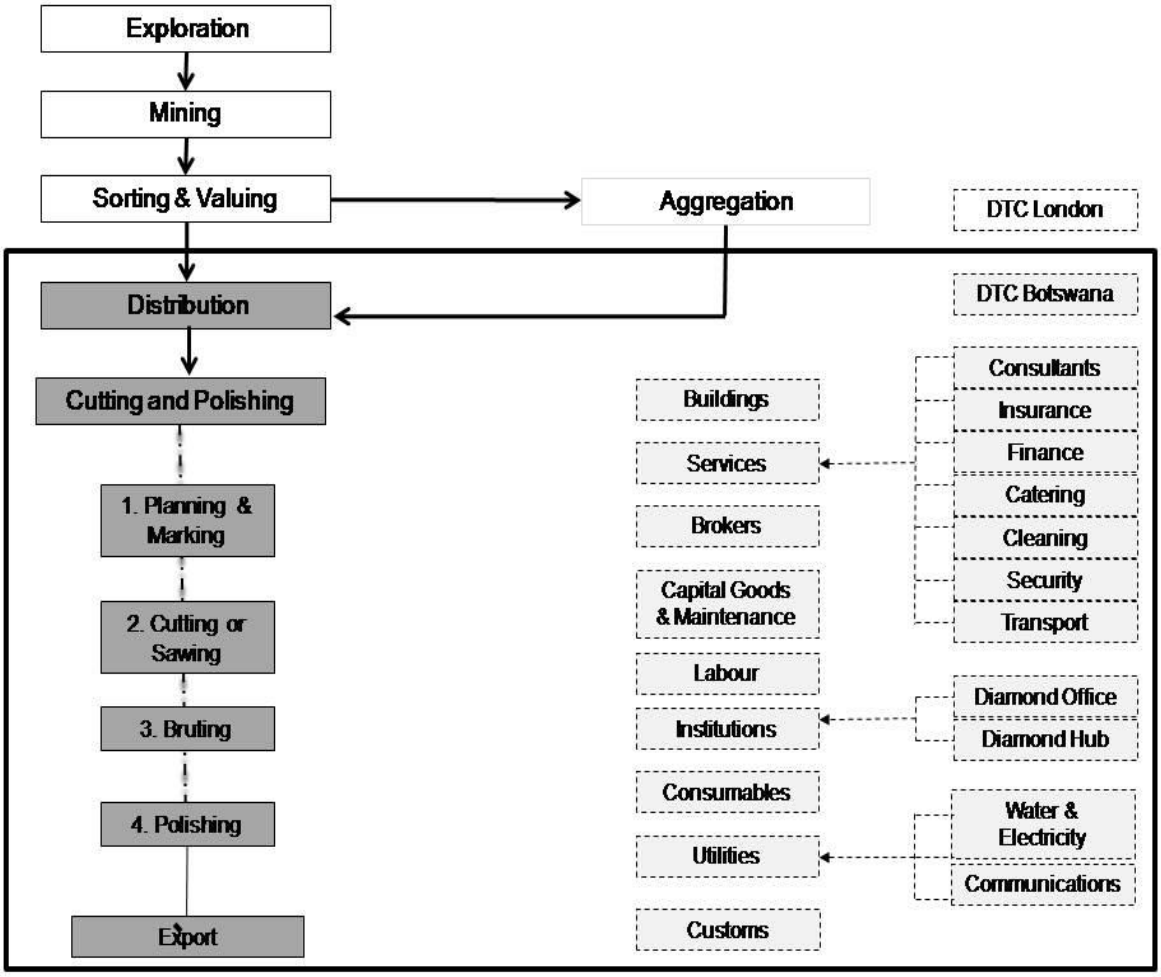
[16] Damtshaa and Lerala (see table 6.4)

[17] The DeBeers price book which it uses to price it producers production.

Downstream Value Chain

Currently, Botswana's downstream value chain ends with the cutting and polishing. This is expected to change in the future as two of the manufacturing firms[18] have recently built jewellery manufacturing firms which they expected to start operating before the end of 2011. This study focuses on linkages in Botswana's cutting and polishing industry. Figure 6.1 maps the Botswana cutting and polishing value chain. The items on the left hand side of the diagram are the various production stages required to turn a rough diamond into a polished diamond, these production stages are discussed later in this section. The items on the right hand side of the diagram show all the various inputs (goods and services) required by the cutting and polishing industry and these inputs are also discussed later in this section.

Fig. 6.1: Botswana's Downstream Value Chain



Source: Complied based on the Author's fieldwork research

Botswana has 16 cutting and polishing firms known as Sightholders which are supplied by rough diamonds through the DeBeers marketing channel by the Diamond Trading Company (DTC) Botswana. Although these firms are able to buy diamonds from other sources but their main supply of rough diamonds is sourced from the DeBeers channel. Once the Debswana's production is sorted and valued by the DTC

[18] These are the two Indian firms Shernuj and Suashish.

Botswana, it is exported to London. Prior to the beneficiation policy, Botswana diamond value chain ended here. In London DeBeers aggregates all of its supply, which includes diamonds mined by DeBeers in South Africa, Namibia, Canada, Botswana and those bought by the company in the open market. These are mixed together into what is known as the 'London mix'. DeBeers agreed to relocate this process to Botswana as part of the new agreement between the Government and DeBeers but DeBeers has postponed and blamed the recession. There has been no indication that DeBeers will relocate their aggregation activities in the near future.

Once diamonds have been aggregated in London, Botswana's allocation of rough diamonds is exported to Botswana and is sold to the 16 cutting and polishing firms, known as Sightholders, by DTC Botswana. So, each local Sightholders aggregated parcels of rough diamonds are prepared in London and sent to Botswana to be sold and marketed locally. Thus the diamonds sold in Botswana for local processing are not necessarily mined in Botswana but are a mixture all DeBeers supply. The diamonds are sold ten times a year to the Sightholders during DTC's 'sight weeks'. The Sightholders have to be well-financed because rough diamonds are expensive and DTC only accepts dollar (US) denominated cash. According to DTC Botswana local rough sales are currently US$367 million per annum and the DTC Botswana requires that 70 percent of these sales be processed locally (Kago Mmopi[19], personal interview: 28th October 2009). To verify this Botswana diamond imports data reported by the Kimberley Process data is presented in table 6.5, since Botswana rough diamond allocations for the Sightholders are imported back into the country for rough trading by DTC Botswana, this data should show the level of rough diamonds being sold to the downstream industry for beneficiation. This data shows that by 2009 rough trading was about 490 000 carats or US$334 million which is equivalent to 3 percent of the local production. The average value of these diamonds was high and over US$600 per carat indicating that there were on average medium to large sized diamonds. The average value is significantly higher that the US$80 – US$100 per carat of exports. It is difficult to compare to two figures because exports include industrial diamonds but it clear that very high value diamonds are being imported to Botswana for local processing.

Table 6.5: Botswana's Diamond Imports

Year	Volume (Cts.)	Value (US$)	US$/Cts.	Imports/Production
2004	81,822.38	$25,018,297.65	$305.76	0.26%
2005	78,864.25	$30,132,935.39	$382.09	0.25%
2006	165,894.15	$60,020,420.86	$361.90	0.48%
2007	222,860.50	$119,446,442.21	$535.97	0.66%
2008	388,210.14	$310,506,912.18	$799.84	1.20%
2009	485,760.34	$334,322,908.57	$688.25	2.74%

Source: Kimberley Process

Most of the Sightholders (about 14 of the 16) use a broker to facilitate the purchase of diamonds at the DTC Botswana Sight weeks. The brokers also provide the Sightholders with other business services to ensure that they comply with the DTC

[19] Public Relations Manager at the Diamond Trading Company Botswana

Botswana. Once the rough diamonds parcels have been sold to the manufacturers, it takes them three to four months to process the rough diamond parcel into polished diamonds. A diamond is cut and polished in a series of steps to prepare it for jewellery manufacturing. The first and most critical part of the production is the planning, wherein the rough diamond is examined to determine the biggest or best shape that can be achieved. Once this is determined, the diamond is marked to show where the divisions will take place. Next the diamond is cut using either a saw or a laser machine. The next step is bruting, where two diamonds are rubbed together, either in a lathe-type machine or an automatic bruting machine, to create a 'girdle' around the circumference, i.e. round-off the edges of the diamond. Finally, all the 'facets' (the planes which allow light to be reflected by the polished diamond, making it sparkle) are polished and finished. Cutting and polishing a diamond is a long and exact process that requires patience and precision. Cutting and polishing skills are developed over time and experience plays a key role in determining the workers level of skills.

During the production of polished diamonds the factories require human resource inputs, service inputs, utility inputs and capital goods and maintenance. When the 16 firms were established in Botswana there was no readily available pool of labour with diamond cutting and polishing skills and the firms are responsible for transferring these skills to locals. The training of locals is on-going in the firms and locals are being trained on-the-job by skilled expatriates. As will be shown below, some training also occurs off-site. When the 16 firms started their factories in Botswana, equipment was imported from other cutting and polishing centres such as India, Israel and Belgium. The firms need a number of service inputs to run their factories which include: consultants, finance, insurance, security, logistics, catering and cleaning. The factories also need infrastructure inputs like the building where their factories are located which can be either bought or rented, utilities (water and electricity), and communications (telephones and internet). During production the firms need consumables like the special glue (paste) used to hold diamonds in place in some processing stages, oil and diamond powder. Once the diamonds have been polished each diamond needs to be certified according to cut, carat and clarity before it can be exported. The cutting and polishing industry also needs institutional support provided by the government through by the Diamond Office, the Diamond Hub and DTC Botswana and lastly, the firms need the services of the customs office when exporting polished diamonds.

The significance of the financial linkages and consumption linkages taking place in the local economy these forward linkages are discussed next, looking at the local value added through the extent of local inputs provision and job creation.

5.2. Forward Linkages in the Cutting and Polishing Firms

For the purpose of this analysis forward linkages in the manufacturing firms are defined as the linkages that take place directly in the cutting and polishing companies as a result of the production of polished diamonds. These linkages take place directly from the use of the factors of production which are labour, capital and land. Table 6.1 shows some of the data collected from the interviewed firms. Apart from the two firms that started production during the government's first attempt at establishing a local cutting and polishing industry, the majority of firms interviewed were established

in 2007. A year later the industry was hit hard by the global recession and because diamonds are essentially a luxury good, demand fell significantly and has since recovered. Fieldwork research was conducted after the recession, to the extent to which it was possible firms were asked to differentiate their opinions and firm data like employment data from the pre and the post recession period.

Table 6.1: Selected Firm Data[20]

Origin of Parent Company	Est.	% Local Employ.	Salary Range**	Export destination	Own or Rent Property	Located in DH?
	1982	90%	-	Belgium	Own	No
	1990s	97%	P1300 – P3000	Belgium	-	No
	2007	95%	P1000	Belgium	Rent	No
Belgium	2004	95%	P1000	Belgium	Own	No
	1990	95%	P1500	Israel	Own	No
	2007	80%	-	Israel	Rent	No
	2007	95%	P900 – P3000	Europe	Own	Yes
Israel	2007	n/a	n/a	n/a	Own	Yes
	2007	80%	-	India	Rent	No
India	2007	85%	P1000 - P4000	India	-	
Thailand	2005	-	-	Thailand	Own	Yes
South Africa	2007	83%	-		Own	Yes

Note: The Pula (P) is the local currency which is roughly P6 to the US$1
Source: Authors research

Labour

The most significant linkage taking place in the cutting and polishing industry is from local employment in the 16 firms manufacturing polished diamonds. According to the Minister of Mineral, Water, Electricity and Water as of the end of 2008 the factories employed 3,178 people (Kedikilwe, 2010). Employment had decreased to 2,489 at the end of the 2009 due to the impact of the global recession on the diamond industry (Kedikilwe, 2010). The Government expects employment to have increased to 2,721 by the end of 2010 as the industry recovers from the impact of the recession (Kedikilwe, 2010). According to the selected firm data in table 6.1, post the recession the size of the labour force in the interviewed firms ranged from the biggest factory with 318 workers (which had fallen from 550 workers) to the smallest factory with 60 workers (which had decreased from 90 workers). The firms did not provide a breakdown of the employment by occupation. Based on the total firm employment

[20] Firms names were not disclosed for confidentiality purposes

the percentage of local employment amongst the interviewed firms ranged from 80 percent to 95 percent.

The jobs in the cutting and polishing factories fall under technical jobs, skilled and professional jobs. The cutting and polishing factories have to recruit locals to train for technical and skilled jobs which included: markers, bruters, sawyers and diamond polishers, computer programmers and laser operators. These jobs are involved directly in the production of polished diamonds in the factory and they represent the majority of employment in the industry. The locals recruited for technical and skilled jobs only require a low level education (Standard 7 or Form 3), good English communication skills, good eyesight, good dexterity and a basic knowledge of mathematics, physics, and computers. Training for technical and skilled jobs in the cutting and polishing factories is on-the-job by experienced expatriates who are training locals within a segment or all segments of the cutting and polishing process. According to the interviewed firms, cutting and polishing skills are largely firm-specific and the basic skills are industry-specific. The factories recruited the highly skilled expatriates to train locals from their global operations and some hired expatriates from other companies. The government assists the cutting and polishing factories with obtaining work permits for these highly skilled foreigners. Technical expertise is gained through experience in the industry therefore low labour turnover is critical amongst locally recruited workers. The minimum wage for workers in the manufacturing industry is P3.50 per hour (roughly US$0.57) and locals earn between P800 (roughly US$168) to P3000 (roughly US$500) per month. All the firms interviewed stated that they use performance based pay structures to encourage productivity.

Professional jobs in the cutting and polishing factories are in top and middle management level. All of the firms interviewed had foreign management (Managing Directors) although recently one of the firms appointed a local managing director. The government exempts work permits for critical roles like the managing directors, chief financial officers, head of marketing, head of operations and quality assurance because these are highly skilled jobs. Thus managers and supervisors tend to be expatriates and they are responsible for overseeing people working in technical, skilled, administrative and entry level positions. These experienced expatriates have previously worked in various positions in the industry in other diamond centres around the world. They have technical and professional training and are guided by industry standards. Other positions in the cutting and polishing factory are for workers in support services (accountants, human resources and office administrators). Smaller factories tend to have one person in charge of a number of roles within support services, whilst bigger firms have a number of individuals assigned to different roles within support service

Capital

All the firms interviewed are foreign owned, with only one having a local shareholder. Amongst all the firms only two have local shareholders. All the firms are subsidiaries of foreign companies and the parents companies provided the initial capital investment used to start their factories in Botswana. One firm disclosed that its initial capital investment in Botswana was between P45 to P50million (over US$8 million). Based on the dominance of foreign ownership it would be fair to assume that most of

the profit made by the industry is repatriated to the company's country of origin. However, the data for local turnover and the share of repatriated profits by the firms was not obtained during the research. In the next section the share of wage bill going to expatriates is estimated based on data provided by the interviewed firms.

Land

Six of the 7 of the 12 firms interviewed disclosed that they own the land that their factory is located on and paid for the construction of their buildings, whilst 3 firms said they were renting their premises. The government assists the companies in acquiring land through Botswana's Export, Development and Investment Authority (BEDIA). BEDIA provides the companies with either subsidised land to purchase or subsidised factory shells to rent. BEDIA is currently constructing new shells in the proposed diamond hub and plans to relocate most of the factories to this area.

5.2.1. Consumption Linkages from Direct Employment

In order to get some sense of the size of consumption linkages and local value added arising from the wage bill from the 16 cutting and polishing firms a simulation was done based on fieldwork research and its findings on employment levels, wages and localisation of employment. This simulation only considers the direct employment in the manufactures and does not take into account the indirect employment in the supply chain. The assumptions on total employment are based on the Government estimate, proportion of expatriate and locals employees by occupation, as well as the average monthly wages by occupation is based on information provided by the firms. Factory workers are the workers involved with production like the polishers, bruters and so forth. Middle management workers in professional jobs like the production management, accounting and other administrative jobs. Top management is the managing director or chief operations officer (CEO).

Table 5.2: Direct employment wage bill simulation

	Employees/ Total employment	**Employees**	**Average Monthly Wage (Pula & US$)**	**Annual Wage Bill (Pula &US$)**
Total employment	**100%**	**3000**		**P135,758,384 $22,628,064**
- Factory	91%	2730		P43,608,960 $7,268,160
- Middle Management	7%	210		P46,799,424 $7,799,904
- Top Management	2%	60		P45,360,000 $7,560,000
Total Locals Employed	**93%**	**2790**		**P47,568,384 $7,928,064**
- Factory	96%	2678	P1,200 US$200	P38,568,960 $6,428,160
- Middle Management	4%	107	P7,000 $1,167	P8,999,424 $1,499,904
- Top Management	0%	0		P0 US$0

Total Expatriates Employed	**7%**	**210**		**P88,200,000 $14,700,000**
- Factory	20%	42	P10,000 $1,667	P5,040,000 $840,000
- Middle Management	50%	105	P30,000 US$5,000	P37,800,000 $6,300,000
- Top Management	30%	63	P60,000 $10,000	P45,360,000 $7,560,000
Gross Salaries and wages as % of total costs (excluding rough diamonds)				15% - 45%

Source: Authors research

The direct employment in the cutting and polishing firms is resulting in an annual wage bill of over US$135 million. The portion of the wage bill accruing to expatriates is almost double the proportion of the wage bill going to the locals. This is because expatriates get paid considerably more than locals. Furthermore, about 2730 locals are estimated to be employed when only 210 expatriates are estimated to be employed in the firms. Thus 7 percent of the workforce earns 65 percent of the wage bill. Thus the consumption linkages taking place from locals are considerably less than the consumption linkages taking place from expatriates. Furthermore, in comparison to locals, expatriates probably spend a smaller proportion of their wage bill in Botswana. Expatriates earn more because they are more skilled, considering how much more the firms pay for expatriates it would make business sense for them localise some positions when the local skills have been created.

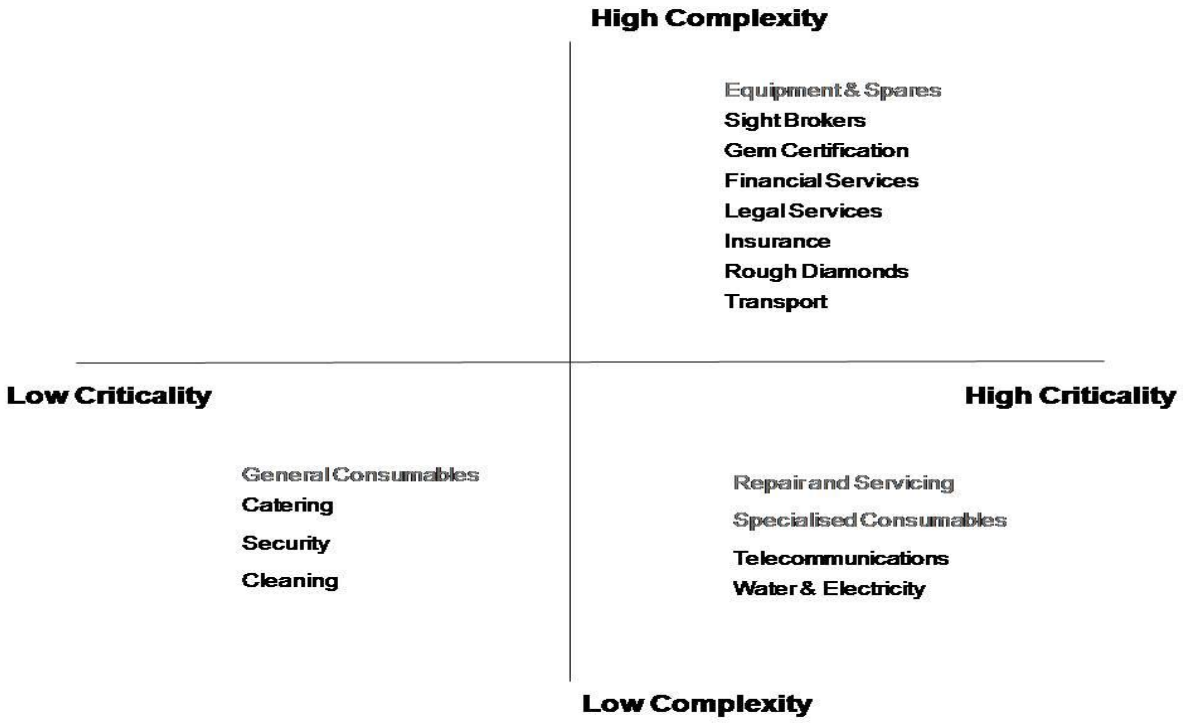
5.3. Forward Linkages in the Supply Chain

For the purpose of this analysis forward linkages in the supply chain are defined as the linkages that take place as a result of the demand for inputs from the supply chain by the 16 manufacturing firms. This section only considers these first-tier linkages and does not address second-and third-tier linkages down the supply chain. The industry's supply chain is still young and is being developed as part as the government's plan to create a viable cutting and polishing industry. The government's Diamond Hub has managed to attract some of the biggest players in the global supply chain to open offices in Botswana Diamond Technology Park. The Diamond Technology Park, built by one of the Sightholders, is designed to be a one-stop shop for the industry and houses a number of the downstream businesses including ancillary companies mainly in financing, transport, brokering, gem certification and consulting. This section will discuss the relative importance of each of the inputs and the nature and extent of linkages taking place from the supply of these inputs. Before this is done, a typology for the inputs is developed based on their relative complexity and criticality. A further differentiation is made between those inputs that are currently being sourced locally and those that are currently being imported.

The nature and extent of linkages taking place through the provision of each input will be discussed later in the section; here the focus is on developing a typology for the different types of inputs required by the industry.

Service inputs that are low in criticality and complexity are cleaning, catering and security services. These services that tend to be sourced locally because there are relatively less complex to provide and local suppliers exist. Therefore the greatest extent of local linkages in the supply chain is taking place in these services. Water, electricity and telecommunication are relatively low in complexity but are very critical to production. These services are critical because interruptions in these services can stop production completely. Local linkages are taking place and these services are being sourced locally at commercial rates. Consumable used in the production process and the repairing and servicing of equipment are highly critical but have a relatively medium complexity. These special consumables include a special glue, industrial alcohol, diamond dust and oil. These inputs are critical because there are important inputs to certain stages of the manufacturing process and a lack of them can stop production in certain sections of the production line. There is a lack of competitive suppliers and local value-added in the provisions of these goods and they are currently very little local linkages taking place. The repair and servicing of equipment is a critical part of the production process and requires some technical expertise and it is relatively more complex then the provision of consumables. The repair and servicing services are currently being imported due to a lack of local technical expertise however due to the relative ease of these skills the provision of these services has a lot of potential for future local sourcing.

Fig 6.2: The Pattern of Sourcing -Typology of Inputs



Key: Inputs with black font are mainly locally sourced inputs
Inputs with grey font are mainly externally sourced inputs
Source: Compiled by author based on research findings

The following locally sourced services are highly critical and are relatively more complex to provide: transportation, rough diamond sales, insurance, legal services, financial services, gem certification and brokering. These services are the most knowledge intensive and require suppliers that have a great deal of industry 'know-

how'. Reputation and trust is very important for the suppliers of these services because sensitive company information is exchanged with suppliers. These services are being sourced locally using expatriate and local skills and the local value-added (particularly employment) appears to be limited by the lack of industry knowledge and expertise amongst locals' on the provision of these services. Generally, reputable multinationals have set up offices to provide knowledge-intensive services in Botswana and some have brought in experts in the provision of these services to run these offices. In some services there is more local value added taking place and these differences in the extent of linkages will be discussed in great detail further in the section. Lastly, the provision equipment and spares are highly critical and highly complex because of the rapidly changing technology used in the industry. These specialised machinery and its spares are used to cut and polish diamonds and are currently being imported from other developed cutting and polishing centres.

5.3.1. The Supply Chain

This section discusses all the major players in the cutting and polishing industry's supply chain.

Rough Diamonds

Rough diamonds are sold to the Sightholders by the Diamond Trading Company (DTC) through DTC Botswana. DTC determines each firm's allocation in terms of size, type and quantity of stones and sends them to DTC Botswana to sell to the Sightholders. As stated previously, Debswana sells it production to DTC International at a 10 percent discount, DTC Botswana purchases the diamonds back from DTC International at SSV minus 5%. So through the new agreement with DeBeers, Botswana sales price to the DTC for the goods needed for domestic manufacturing has been improved by 5%[21], though the government has also assumed new marketing responsibilities (Even-Zohar, 2007:241). The sales to Sightholders are at the same selling prices (SSV) as those paid by DTC clients elsewhere. So through the new agreement the margin made by De Beers on the rough diamonds that will now be used for local manufacturing has been significantly reduced, but so has its marketing costs.

Rough allocation is critical to the firms because it impacts on profitability and the firm's ability to train locals. Rough allocation is therefore critical to the viability of Botswana's cutting and polishing industry and the sustainability of its linkages. The rough allocation also needs to complement the firms training activities as often firms train locals on smaller stones to minimise their costs. DTC Botswana performs regular audits of the firms to ensure that the firms have the capacity to handle the stones that they request and that training is taking place at a satisfactory rate. Thus DTC Internationals rough allocation to the firms plays a critical role in the development of Botswana cutting and polishing industry. DTC's rough diamonds are cheaper than diamonds on the secondary market, one Sightholder said "I can sell my rough diamond parcel from DTC as it is on the secondary market and make a 30 percent profit". This presents a major incentive for smuggling especially given relatively higher labour costs in Botswana.

[21] Prior to the new agreement the three then existing manufacturing firms where getting diamonds directly from DTC International and the open market.

In Botswana, the 'allocation ranking' will be based 50% on the SOC model, and 50% on a new Botswana scorecard. It is not clear what this scorecard is because the agreement between Botswana and DeBeers is not available publically. The Sightholders are licensed by DTC for 3 years and their new licenses come to an end at the end of March 2011. The Sightholders both in Botswana and internationally are currently applying for new Sightholders contracts and they have no guarantee that they will indeed get them despite the fact that may have invested millions of dollars their factories. Based an interview with a local Sightholder, all the Sightholders had to submit business proposals at the start of their contract and it is possible that the renewal of the contracts will be based on what progress they have made towards implementing their business proposals. It is also possible that DTC Botswana will appoint additional Sightholders in the new contracting period.

Sight Brokers

Although it is not compulsory, most (12 out of 16) firms chose to have Sight Brokers. During 'Sight weeks' the brokers get paid a commission for their services which is about 10 percent of the diamonds purchased. The brokers also provide the firms with other business services to manage the firm's relationship with DTC Botswana. Given the theory on core competencies, the use of brokers allows the firm to focus on its core competency which is cutting and polishing diamonds. However, there is more to this. Since the brokers work with a number of firms and they have access to all their confidential information. This gives them an advantage when they advise the customers on their strategic decisions as they also know what their competitions are planning. Thus the Sightholders also use brokers for strategic purposes. Brokers were initially established before the Supplier of Choice[22] (SOC) when DeBeers did not have close relationships with its Sightholders and thus needed a mediator to relay information and manage its relationships with its customers. The nature of the relationship between DeBeers and its customers has since changed with the SOC and thus some industry critiques believe that brokers are no longer necessary. However, brokers are still a part of the industry's supply chain.

Table 6.2: Brokers in Botswana's Cutting and Polishing Industry

Company	Clients	# of Employees	Nationality of Employee
Bonas	5	1	Botswana
Rothschild	3	1	Botswana
I Hennig	6	1	Botswana

Source: Authors research

There are three companies in Botswana that provide brokering services to the Sightholders, these companies also operate in the other cutting and polishing centres and have a long history in the industry. Each of these firms local operations are run by a single person operation. In the case of Rothschild and I Hennig the person is a local citizen whilst in the case of BONAS the person was a South African citizen who was based between South Africa and Botswana but the company has recently employed a local.

[22] The Supplier of Choice strategy is discussed in section 3

Gem Certification

The Gemmological Institute of America (GIA) provides all the firms in the industry with gem certification services. All companies need a GIA certificate before polished diamonds can be exported. GIA has developed the four C's criteria (colour, cut, clarity and carat weight) universally utilised in the diamond industry. Every polished diamond requires a grading report that can be accessed by all downstream purchasers like jewellery manufacturers and final consumers. A GIA lab was established in Botswana in 2008 and it currently employs 30 people. 90 percent of this employment is local. The employment breakdown by occupation was not provided. The company expects total employment to increase to 50 in the medium-term. Expatriates are mainly involved in quality control and over time the company expects locals to replace expatriates in quality control. Locals are trained on-the-job for 3 months and they do not need prior training. GIA also provides training for the public through short courses on gemmology and the Botswana Training Authority has recently accredited their courses. Thus the GIA may start playing a role in providing technical skills for the industry.

Financial Insurance and Legal and Auditing Services

The firms need financial services to facilitate the payment of their rough diamond purchases and to provide financing to cover their operating costs between the 3 to 4 months that it takes the firm to process the diamond purchased at each Sight week. The firms need US$2 to 3 million to cover operating expenses during the time the Sight is purchased and the polished diamonds are sold (Peter Kettle, personal interview on the 29th October 2009). Currently there are three banks in Botswana that provide the Sightholders with diamond financing services: Stanbic, Standard Chartered and ANB AMRO. ABN AMRO, which was interviewed, relocated from South Africa in 2009 to service local Sightholders and as well its clients in South Africa. ABN AMRO provides financing to pay for rough purchases. This type of financing constitutes a considerable amount of money and the bank needs to have good relationship with its clients as the client need to provide the bank with a lot of information on how the client makes money and manages its costs. ABN AMRO has 3 employees (one local) whilst the diamond financing divisions of Standard Chartered and Stanbic both have one employee (both local).

The 16 cutting and polishing firms require insurance to cover risk faced by their businesses. At least two insurance companies in Botswana offer these services to the industry. These companies are Marsh which stated that it has four clients and AON Botswana which stated that it has 6 or 7 clients. It is not clear where the rest of the cutting and polishing companies get their insurance services from. The firms also needed legal services and the only provider of legal services for the industry that was identified was Grant Thornton.

Transport/Logistics Services

Transport services to the cutting and polishing firms include the local transportation of diamonds as well as the exporting of diamonds. The providers of transport services need to have high-security vehicles and knowledge in exporting diamonds (like customs procedures in different countries) and international offices as the

diamonds can often pass through a number of countries before reaching their final destination. Two companies, Brinks and Malca-Amit, provide transport services to the industry. Malca-Amit was interviewed. The company was established in 2007, has 8 clients locally and currently employs 7 people of which 5 are locals. The employment breakdown by occupation was not provided.

Water, Electricity and Telecommunications

Water, electricity and telecommunications are sourced locally but the industry faces constraints with regards to the interruption in electricity services from the Botswana Power Cooperation. Botswana imports 60 percent of its electricity from South Africa which is currently facing electricity shortages that are affecting Botswana through rolling blackouts. Most of the interviewed Sightholders have generators which they sourced themselves and have increased their costs of doing business in Botswana. Botswana can also experience unreliable water supply and telecommunication services which negatively affect productivity in the cutting and polishing companies.

Cleaning, Catering and Security

All the firms need cleaning and security services and some of the firms provide their staff with lunch which is prepared on the premises. These services are sourced locally.

Consumables

The firms demand general consumables like office supplies and specialised consumables used during the production process like diamond dust, glue and industrial alcohol. These inputs are all being imported either by the firms through local agents.

Equipment, Spares and Maintenance

The firms' equipment for planning, evaluation, and measurement systems for diamond grading & gemstone production are provided by specialised technology firms like OGI and Sarin. Sarin has an office in Botswana to service their clients but no other technology supplier with a local office was identified. The firms import all of their equipment and spares. The firms also bring in specialists from other countries to repair and maintain their specialised equipment.

Other Industries

The downstream industry is also creating more direct demand other industries like transports (flights to Gaborone) and tourism (hotels occupancy and safaris). One firm said it brought 3 expatriates to the country for five nights during each Sight week and estimated that the industry results in about 1000 nights a year in hotel occupancy.

5.3.2. Production costs

To get a sense of what the firms spend on the different inputs from their supply chain the firms were asked to provide a breakdown of the production costs. Two firms

agreed to disclose the breakdown of the production costs. For the sake of anonymity the firms will be called *Company A* and *Company B* in this discussion. This information and other firm-specific information are provided in table 7.2.

Table 6.3: The Breakdown of Production Costs in Two Firms

Firm	***Company A***	***Company B***
Production Cost		
Labour	15%	45.5%
Sight Brokers	3%	3%
Security	5%	0.9%
Advertising	0%	0.4%
Catering	0.5%	0%
Financing	0%	16.2%
Manufactured Inputs	25%	2.6%
Servicing of Equipment	8%	0%
Water and Electricity	3.5%	2.6%
Telecommunications	2%	4.3%
Buildings and Land	3%	1.7%
Gem certification	20%	10.6%
Transport/Travel Expenses	5%	7.8%
Staff houses and utilities	0%	2.6%
Insurance	10%	0.9%

Source: Authors research

The biggest difference in the breakdown of total cost provided by the two firms is the inclusion or exclusion of the costs of rough diamond purchases. *Company B* had included rough diamond purchases in their costs whilst *Company A's* had excluded the rough diamonds purchases. *Company A's* rough diamond purchases are financed by its parent company in Belgium and this explains why the cost of rough diamond purchases are not taken into account by the subsidiary in Botswana. In contrast, *Company B* finances it own rough diamond purchases and spends just over 95 percent of its total costs on purchasing rough diamonds. This cost of rough diamond purchases is considerable to the firm relative to other production costs and this why the firms need to be well financed. Thus it appears that only the older firms may be able to finance their rough diamonds purchases themselves whilst the new firms depend on their parent companies to finance their rough diamonds purchases. In table 7.2, *Company B*'s rough diamond purchases were excluded and the remaining production cost were calibrated to make them comparable to *Company A's* production costs. Another possible difference between the firms is the sizes of the rough that they are polishing which may be impacting on the amount and type of expatriate labour that they need and therefore their labour costs. For example, one firm may be focusing on bigger stones whilst the other may be focusing on smaller stones.

Company A spends 15 percent of their production costs on labour whilst *Company B* spends 45.5 percent of their production costs on labour. *Company A* employs 201 people of which 7 are expatriates whilst *Company B* employs 147 people of which 20 are expatriates. Since *Company B*'s expatriate labour is 3 times the size of *Company*

A's this may explain to some extend why *Company B*'s labour costs are considerably higher than *Company A's*. Another reason that could be contributing to *Company B*'s labour costs is that the local workers get paid an average of P1500 (about US$250) whilst the local workers at *Company A* get paid an average of P1000 (about US$167) per month. *Company B*'s local labour force is could be more experienced than *Company A's* labour force since the firm has been operating for longer and this may explain why these workers get paid more. But it is not entirely clear why there is such a big difference in labour costs between the two companies since Company B has been operating for longer and one would presumably have a higher throughput and therefore the labour costs should be similar. One would also expect a lower level of expatriate labour at *Company B* since the firm has been operating for longer and it is not clear why this is not the case. This could show that ownership has an impact of the rate of skills transfer in the firms.

Both firms spend 3 percent of their production costs on Sight Brokers. As discussed in the previous section the Sight Brokers charge the firms a commission of 10 percent of the value of rough diamonds purchased at each Sight. *Company A* spends 5 percent of their production costs on security whilst *Company B* only spends 0.9 percent. This could be explained by the differences in location since *Company B* is located at some distance from Gaborone and *Company A* is located on the outskirts of Gaborone. *Company A's* does not spend anything on advertising whilst *Company B* spends 0.4 percent on advertising. This shows a difference in firm strategy in *Company B* in which the parent company involves the subsidiary in other value-added downstream activities like advertising and not just production activities. *Company A's* spends 0.5 percent of the production costs on catering whilst *Company B* does not spend anything on catering. *Company A's* provides its staff with lunch whilst *Company B*'s staff provides their own lunch. *Company B* spends 16.2 percent of their productions costs on financing which is mainly for the servicing of loans that they receive to finance their rough diamonds purchases. Since *Company A's* is completely financed by its parent company, it therefore does not spend any of its production costs on financing.

Company A spends 25 percent of its production costs on manufactured inputs (intermediate goods used in the manufacturing process) whilst *Company B* only spends 2.6 percent on manufactured inputs. It is not clear why these costs are significantly different between the firms and it could be a result of different production processes. *Company A's* spends 8 percent of its production costs on the servicing of equipment and this service is outsourced to technicians who are brought to Botswana by the company. In contrast, the servicing of equipment is done in-house at *Company B* and these costs would have been included in the labour costs, which may further explain why the labour costs in this firm make up a much bigger proportion of production costs. This shows a difference in company strategies with some companies keeping come functions like the servicing of equipment in-house whilst other chose to outsource these functions. *Company A* spends 20 percent of its production costs on gem certification whilst *Company B* only spends 10 percent. It is not clear why these costs are significantly different for the firms. *Company B* spends 2.6 percent on staff housing whilst *Company A* does not spend anything on staff housing. This could be as result of *Company B* being located outside Gaborone and thus having to provide some of it management with housing locally. Lastly, *Company B* only spends 0.9 percent of its production costs on insurance whilst *Company A*

spends 10 percent. *Company A* has only been established for 3 years and thus faces greater risks than *Company B,* which has been established for 20 years. This may explain why *Company A's* insurance costs are significantly higher than *Company B*'s insurance costs.

5.3.3. Consumption Linkages from the Indirect Employment

A wage simulation is presented in table 5.3. to get some sense of the local value added taking place through indirect employment in the industries supply chain. The estimates are based on the research findings on employment in the suppliers and the minimum wages in low skilled jobs like drivers and cooks, as well the current sectoral wages in Botswana. This simulation does not include externally sourced inputs and legal services and utilities as it is not clear how much employment has been created in the services as a result of demand from the cutting and polishing firms.

Table 5.3: Indirect employment wage bill simulation

	Employees	**Proportion**	**Estimated Monthly Wage**	**Annual Wage Bill**	**Proportion**
Total Employment	**118**			**P8,820,000 $1,470,000**	
Local	*112*	*95%*		*P4,020,000 $670,000*	*46%*
Expatriate	*6*	*5%*		*P4,800,000 $800,000*	*54%*
Financial Services	**5**			**3000000 $500,000**	
Local	3			*P1,080,000 $180,000*	
- Executive	2		P40,000 P6,667	P960,000 $160,000	
- Administrative	1		P10,000 $1,667	P120,000 $20,000	
Expatriate	*2*		-	*P1,920,000 $320,000*	
- Executive	2		P80,000 $1,333	P1,920,000 *$320,000*	
- Administrative	0		0	0	
Brokers	**3**			**P1,440,000 *$240,000***	
Local	*3*		*P40,000 $6,667*	*P1,440,000 $240,000*	
Expatriate	*0*		*0*	*0*	
Logistics	**10**			**P3,264,000 *$544,000***	
Local	*6*			*P384,000 $64,000*	
- Executive	0		-	-	
- Drivers	4		P3,000 $500	P144,000 *$24,000*	
- Administrative	2		P10,000 $1,667	P240,000 *$40,000*	
Expatriate	*4*			*P2,880,000 $480,000*	

- Executive	4		P60,000 $10,000	P2,880,000 *$480,000*	
- Drivers	0		-	-	
- Administrative	0		-	-	
Security*	**38**			**P592,800** *$98,800*	
Local	*38*		*P1,300* *$217*	*P592,800* *$98,800*	
Expatriate	*0*		-	-	
Cleaning**	32			**P307,200** *$51,200*	
Local	*32*		*P800* *$133*	*P307,200* *$51,200*	
Expatriate	*0*		-	-	
Catering***				**P216,000** *$36,000*	
Locals	30		P600 $100	P216,000 *$36,000*	
Expatriates	0		-	-	

* Assuming that each factory employs 2 security guards (1 per shift) and 6 employed at the Diamond Technology Park

** Assuming each factory employs two cleaners

*** Assuming ten of the sixteen factories provide lunch for their staff and outsource this to catering companies that employs two cooks per factory

Source: Authors research

According to the simulation 95 percent of the employment in the supply chain is local with only 5 percent being expatriate employment. Local get 46 percent of the wage bill whilst expatriates get 54 percent of the wage bill. The highest local value added is in low skilled jobs like security and cleaning whist the smallest value added is in knowledge intensive skills like financial services and logistics. This simple simulation shows that the consumption linkages taking place from employment in the supply chain have a higher level of local value added compared to the consumption linkages from employment in the manufacturing firms.

5.4. Financial/Fiscal Linkages

It is not clear at this stage of the industry's development if they are any fiscal linkages arising from the cutting and polishing factory because the Botswana Revenue Services has no publically available information tax collected from the industry.

5.5. Conclusions on the Nature and Extent of Linkages

The cutting and polishing industry does have significant linkages with the local economy in most activities of the value chain. However in some activities especially those with the most potential for employment such as the provision of consumables and maintenance and repair services there are limited linkages taking place as goods and services are largely being imported. The biggest potential for consumption linkages are through the direct employment of locals in the cutting and polishing factories. But currently the consumption linkages taking place from local job creation are significantly less than the consumption linkages for expatriate job creation. Over time this should decrease if local skills increase and more positions are localised.

Significant local value added is taking place through consumption linkages in supply chain but they are limited in knowledge intensive services.

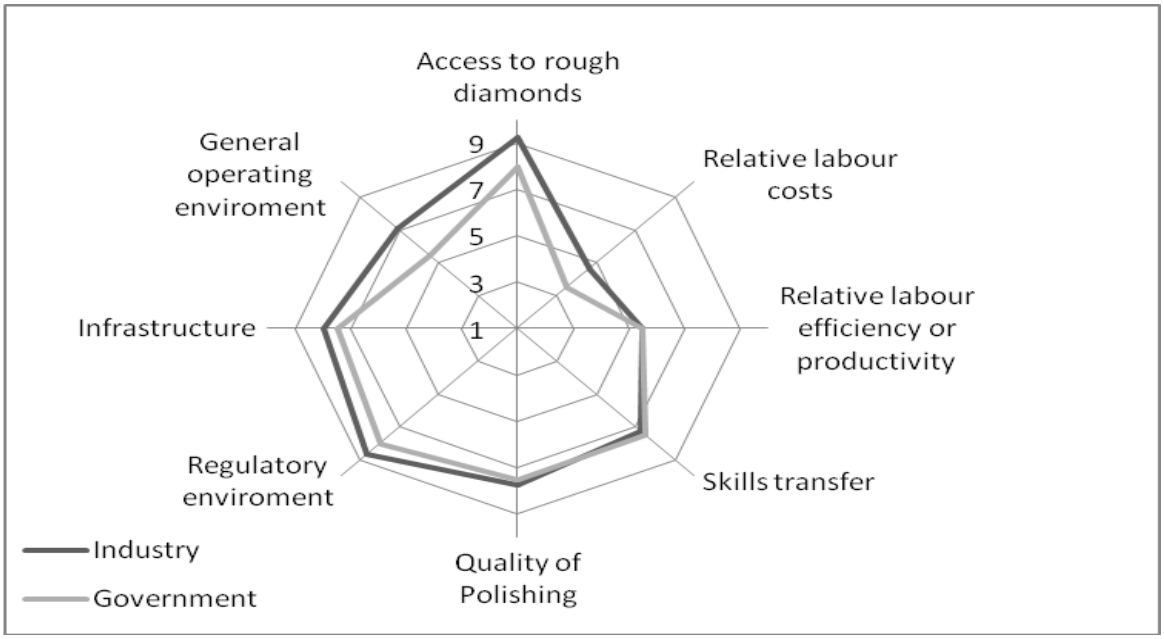
The next section the extent to which Botswana is succeeding in creating a viable and sustainable cutting and polishing industry by discussing the industry's key competitive factors.

6. Operating Environment

The firms and government responses on Botswana operating environment are discussed to determine the progress Botswana has made in developing competitive factors for the cutting and polishing industry. A number of competitive factors for the cutting and polishing industry were identified based on the findings of by Mangena (2007) who identified the competitive factors of South Africa's cutting and polishing industry. The relevance of these factors was explored through interviews with the cutting and polishing industries during the second round of fieldwork. These factors are: access to rough diamonds, relative labour costs, skills, quality of polishing, infrastructure and the regulatory environment. The government and the firms were asked to rate Botswana in these factors compared to other cutting centres out of 10, with ten being the highest.

The government rated the general operating environment in Botswana lower than the industry. In general the government rated the Botswana's performance lower than the industry. This may indicate that the industry may be cautious of being too critical on the government's efforts to create a cutting and polishing industry due to the political economy of the downstream industry.

Fig 7.1: Industry and firms assessments on various competitive factors



Source: Authors research

Rough diamond allocation is invaluable in the industry and the firms have to sensitive as to not jeopardise their rough allocation in any way. This is further strengthened by

the firms' very high rating of 9 for rough diamond allocation. Both the industry and the firms rated Botswana the highest for access to rough diamonds and lowest for relative labour costs. It is clear the incentive for the firms to operate in Botswana is access to rough diamonds whilst relative labour costs are the biggest constraint to operating in Botswana. Relative labour efficiency or productivity is also low.

Table 7.1: Industry estimates on the range of cost per carat in Botswana relative to some centres

	Industry	**Government**
Botswana	US$ 45 - 120	US$35 - 90
India	US$ 35	US$10
China	US$20 –US$ 25	US$17
Namibia	US$45 – US$100	-

Source: Authors research

Cost per carat is difficult to estimate as it depends on the size and quality of the rough diamonds. However, to get some indication of the Botswana costs per carat the industry and government respondents were asked to give a range of the cost per carat in Botswana (see table 8.1). The government estimates on costs per carat are much lower than the industries which may either show that industry over estimates their costs or that the government has a misconception on the costs faced by the industry. The range for Botswana cost per carat is much higher than the low cost centres (India and China) and similar to Namibia's cost per carat. Please note that less expensive goods are manufactured in India and China compared to Botswana so the lower ranges of the cost per carat in Botswana are more comparable to India and China's cost per carat. This is because Botswana's labour costs are relatively higher. This will not change as the government is not willing to change the labour law and conditions to compete with the lower working conditions in India and China. Therefore to become more cost competitive Botswana would have to work on decreasing other costs of production like utilities and increasing productivity or to work on higher value diamonds. Profitability is important to the viability and sustainability of the industry and there is some indication that the firms are profitable. As stated in the section 6 the average value of the diamonds being sold locally is US$600 and therefore at the cost per carat stated by both the industry and the government it is economically viable to manufacturer is Botswana. In fact there is some indication that the firms are profitable as the industry analyst Chaim Even-Zohar said:

> 'Though we have no hard data on profitability, interviews in two factories (Leo Schachter, Eurostar) indicate that these companies break even on some goods [diamonds] and make profits on others, so the economic viability of the local companies seems assured' (2007:242).

The quality of polishing coming out of Botswana and the regulatory environment both scored high from both the industry and the government (between 8 and 9). Infrastructure and skills transfer scored a bit lower but still high scoring more than 7 from both the industry and the government. Thus it appears that apart from relative labour costs and productivity Botswana is performing well with regards to the key

competitive factors. However the industry requires excellence in order to compete with successful cutting and polishing industries that are setting high benchmarks for Botswana

6.1. Conclusion on the Operating Environment

It appears that Botswana has made considerable progress at developing key competitive factors for the cutting and polishing industry. The access to rough diamonds is Botswana strongest competitive factor and it is reinforced Botswana's favourable regulatory environment. Relative labour costs and productivity are Botswana weakest competitive factor.

The next section discusses the drivers of these linkages focusing on the six drivers identified by MMCP and the extent to which they may be aiding or constraining linkages in Botswana's the cutting and polishing industry.

7. Linkage drivers

The Making the Most of Commodities Program (MMCP) explores six key drivers of linkages and these drivers are: ownership, infrastructure, national system of innovation (NSI), skills, regional factors and policy. The aim of this section is discuss the impact each of these drivers has on linkages in Botswana's diamond cutting and polishing industry, thus addressing the studies third research question. In the third round of fieldwork, five firms, two brokers and three government officials were interviewed and as part of the interview these industry respondents and the firm respondents were asked how the MMCP linkage drivers affect the government's ability to fulfil its vision for the cutting and polishing industry and the firms' business models for the cutting and polishing industry.

Table 7.1: Summary of linkage drivers

Driver	Not Important	Moderately Important	Quite Important	Very Important	Dominating Importance
Ownership					
Infrastructure					
NSI					
Regional Factors					
Skills					
Commodity Sector Policy					

Source: Authors research

Ownership and infrastructure are quite important drivers of linkages in the cutting and polishing industry. The ownership of the firms gives them access to final market and experience at running profitable cutting and polishing factories. The firms are well financed by their parent companies and are able to recruit experienced trainers from other cutting and polishing centres to train locals. Botswana is a middle-income country that still faces constraints with regards to various infrastructures like electricity. The cutting and polishing industry is still relatively new to Botswana and specialised inputs (for mainly consumables) are imported by the firms or specialised suppliers. The high import content within consumables impacts on production timelines and prices. The infrastructure constraints have been easing up over time.

Skills are a dominating driver because Government's vision is to become serious downstream player hinges on downstream skills creation. The NSI is currently moderately important because even though no research and development is taking place in Botswana's downstream industry, the firms can still benefit from innovation originating from more developed diamond centres like Israel, Belgium and India. Over time the NSI driver has to become more important to ensure that the Government realises it vision for the downstream industry. Regional factors, particularly the proximity of South Africa, are moderately important to linkages in the cutting and polishing industry. South Africa has a long existing cutting and polishing industry which is largely seen as a failure, however a number of specialised consumables can still be sourced in South Africa. The proximity of South Africa, the economic leader of the region, also enables the industry to source other general goods like office consumables from South Africa. Lastly, the commodity sector's policy is a dominate driver of linkages in the cutting and polishing industry because the industry was started as a result of political will and its long-term success largely depends on the ability of policy at directing the deepening and widening of linkages in the industry.

The rest of this section will discuss the impact of the MMCP drivers on the nature and extend of linkages in Botswana's cutting and polishing industry in more detail.

7.1. National System of Innovation (NSI)

There are currently no institutions such as universities and other research institutions that are conducting research for the downstream industry. However, the government does have plans to change this in the future. The Innovation Hub was established to help turn Botswana into a knowledge intensive economy and as part of these plans a Science and Technology Park is being built which will include a research focus on the diamond industry. According to the Government's 2005 National Research, Science and Technology plan research aimed at contributing to improved value addition and beneficiation of natural capital will be undertaken in the following areas: research into mining bi-product utilisation; research into downstream beneficiation of mining products; Research seeking to improve the efficiency of current processing technologies including environmentally cleaner production technologies; ICT research to support process control; and chemical sciences and engineering research into improved extraction and processing technologies (2005:20). This plan for the industry is yet to be implemented because no research was found to be taking place in the downstream industry.

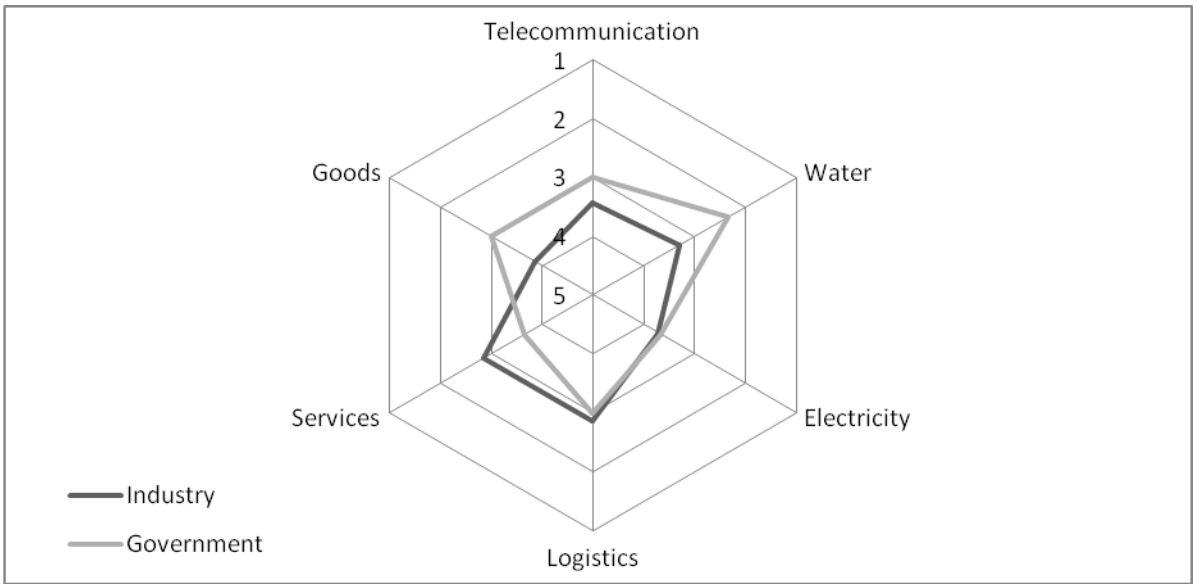
The importance of the NSI as a driver in the cutting and polishing industry has to increase in the medium- and long-term if the country is to realise its goal of becoming a world-class diamond centre. Nonetheless, it is clear that at the existing level of activity, none of the firms have experienced a shortfall in NSI inputs as a constraint to the deepening of their activities in general and to the widening of their backward linkages in particular.

7.2. Infrastructure

The government respondents felt that telecommunications, logistics and access to goods[23] are not having a negative or positive impact in the government's ability to realise its vision for the cutting and polishing industry.

Diamonds are easier to transport than most commodities since they are lightweight but their high-value means they require good security arrangements during transportation. When the industry started, the necessary infrastructure to export them safely was not in place. For example, when diamonds were exported they would be handed over to the pilot because the local airline did not have a vault in their aeroplanes. The pilot would put them in the vault at O.R. Tambo airport in Johannesburg where they would stay until they were placed on their connecting flight. Earlier this year, a P40 million diamond security transfer facility was completed at the Gaborone International Airport (that has been recently renovated into a state of the art complex built to resemble the facets of a polished diamond) and a high security exclusive road connecting the airport and the diamond hub has also been built. The Government has plans to turn the country into a transport hub which is more accessible to the rest of the world and the world class airport plans to attract even more frequent flights with more connecting routes. This should ease the current logistics constraints caused by the shortage of flights to Botswana. Thus it appears that the government is addressing the major gaps in the key infrastructure for the logistic and transport requirements of the industry.

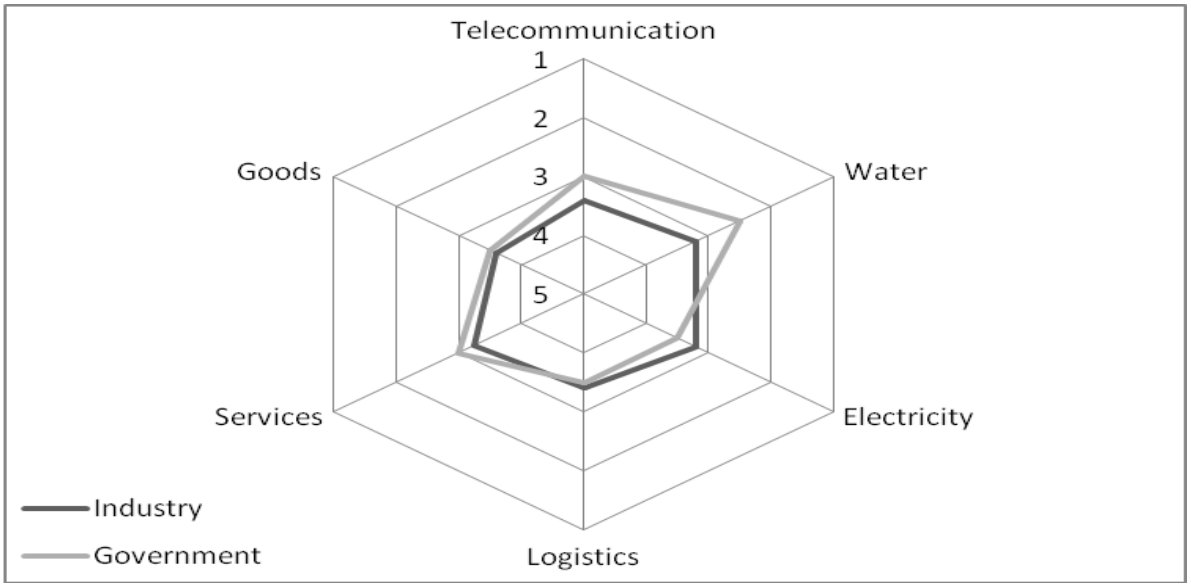
Fig 7.1: Impact of infrastructure on the Government's vision



Sample size: Sample size: 3 government respondents, 5 industry respondents (5 manufacturing firms)
Key: Where: 1 – Very Positive, 2 – Positive, 3 – Not at all, 4 – Negative, and 5 – Very Negative
Source: Authors research

[23] In the diamond industry the word goods means rough diamonds here it used to describe all consumables used by the industry

Fig 7.2: Impact of infrastructure on the Firms' business models



Sample size: 2 government respondents, 5 industry respondents (5 manufacturing firms)
Key: 1 – Very Positive, 2 – Positive, 3 – Not at all, 4 – Negative, and 5 – Very Negative
Source: Authors research

Although the government respondents said the access to goods is not having an impact on the government's ability to realise its vision for the cutting and polishing industry, the firms felt that it was having a negative impact. The government felt access to goods was only having an impact on the firms' ability to achieve their local business models. The firms said the local provision of goods presents a big opportunity for local business development and the local suppliers would contribute positively to the government's vision to become a diamond centre. The government is aware of this opportunity and said is it conducting an audit of the quantities of consumables that the firms are demanding in order to indentify the best opportunities for local entrepreneurs. Telecommunications needs to improve in order for it to have a positive impact on the industry. Internet is unreliable in Botswana and slower during peak times. The firms are multinational and often need to send big files to their parent companies, particularly when they are planning stones. Most of the firms have centralised information and technology systems that are administered in other countries and are accessed through the internet. Reliable internet is very important to ensure efficiency and could even encourage firms to decrease travelling by holding teleconferences. The government is installing fibre optic cables in the sea through private providers of these services like Seacom and expects telecommunication speed and prices to improve in the short-term. Water supply is more reliable in Gaborone but the firms located outside Gaborone in villages like Serowe have less reliable water supply. The lack of water can stop productivity as the staff cannot be kept at work without any running water.

The firms and government stated that the local provision of electricity had been unreliable in past couple years but had improved as rolling blackouts had decreased. Unreliable electricity supply is a problem that affects the whole economy and not just the cutting and polishing industry. The cutting and polishing equipment and technology is operated with electricity and without a generator, power cuts would stop the production in the whole factory and possibly damage some machines. Most

of the factories have generators to ensure electric supply. This increases the costs of doing business in Botswana. Botswana sources close to 75 percent of its electricity supply from South Africa and the rest of the electricity is provided locally by the Morupule A plant which is a coal fired power plant (Botswana Power Cooperation, 2010). Due to electricity shortages in South Africa, the country's electricity exports to Botswana will stop by the end of 2012. In response to this the government has a current project to increase domestic electricity supply. The project consists of the construction of a 600 MW coal fired power plant and associated transmission infrastructure. The Morupule B plant will be located adjacent to the existing Morupule A plant. The plant will be connected to the national grid by two new transmission lines. The works for the project started in June 2009 and the four generation units are scheduled to come online sequentially between January and October 2012 (African Development Bank, 2009). Once this power plant has come online, electricity provision for the whole economy should improve and the constraint it has placed on the operations of the cutting and polishing factories will ease.

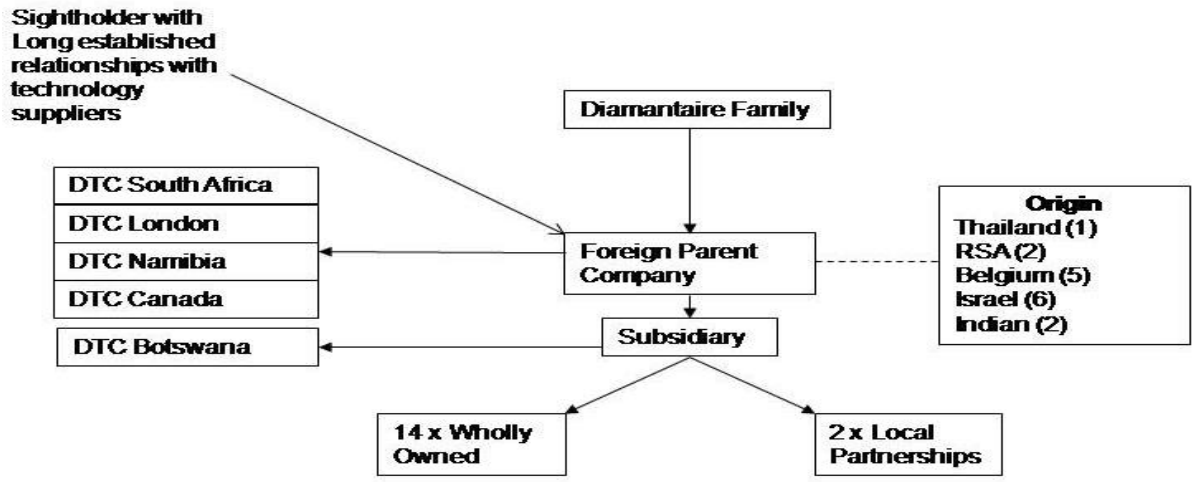
7.3. Regional Hubs

Economically the most important country to Botswana in the Southern African region is South Africa which is only 400 kilometres from Gaborone. Although Namibia also borders Botswana and has a young cutting and polishing industry, all the firms said its proximity has no impact on the competitiveness of their firms. South Africa has a long-standing cutting and polishing industry and the firms agreed that some goods (manufactured inputs and spares) could be sourced from South Africa. However the Sightholders further said that South African based suppliers were seldom price competitive. The firms are profit-driven and only bought goods from the cheapest suppliers in other cutting and polishing centres despite South Africa being in close proximity to Botswana. Some service providers, such as ABN AMRO and Malca-Amit, were previously located in South Africa's cutting and polishing centre but have since relocated their offices to Botswana. The reasons they stated for this was the fact that South Africa's cutting and polishing industry was largely seen as a failure and therefore Botswana's cutting and polishing centre offered new and potentially much better long-term prospects for the suppliers. Thus challenges faced in South Africa's cutting and polishing industry appear to have encouraged rather than hindered the start of local activities in Botswana's cutting and polishing industry.

7.4. Ownership

Ownership is a key factor in determining the breadth and depth of linkages in the cutting and polishing industry. The local manufacturing companies are subsidiaries of multinational companies that are owned by diamantaire families. Diamantaire families are diamond dealing families who have established themselves in the upper echelons of the world diamond industry hierarchy. The diamantaire families have a long history in the cutting and polishing industry and are highly-skilled craftsmen whose skills have been passed down from one generation to the next. These skills give them a considerable expertise when it comes to increasing the value and quality in different types of rough diamonds. These families own multinational companies that have factories in cutting and polishing centres like Belgium, India, Israel, South Africa, Namibia, Canada and Botswana. All the firms are Sightholders with DTC internationally and some of the companies publically listed.

Fig. 7.2: Ownership Structure of the Cutting and Polishing Companies



Source: Authors research

In Botswana two of the sixteen subsidiaries have local partners (shareholders) and the other 14 subsidiaries are wholly owned by their parent company (see figure 7.2). The local partners are often not involved in the running of the firm and thus very little skills transfers happening in these kind of shareholdings. There is a lot of concern amongst locals about the limited local ownerships and the head of structured finance at the Citizen Entrepreneurship Development Agency (CEDA) which is the government parastatal in charge of funding local entrepreneurs said the amount of capital required to start cutting and polishing firm is too high. He further added the knowledge required by the industry is very specialised and that locals need to either form joint ventures with companies with existing knowledge or the government needs to start an incubator which can promote a cottage industry where locals can start small business by polishing cheaper stones to develop their skills (Selotate, Personal Interview: 13th November 2009).

The parent company's existing relationships with various suppliers, particularly knowledge-intensive suppliers of technology, determines which of these suppliers the subsidiary works with in Botswana. The firms state that trust and reputation are the most crucial determinants for their relationships with these suppliers. Thus as a general rule, the firms predominantly source inputs from suppliers that they have existing relationships with in other cutting and polishing centres. In this way the firms are assured that these suppliers have the ability to provide the firm with the goods or services required. For example if the company uses Brinks to provide it with logistics services in other cutting and polishing centres, it will also use Brinks for it operation in Botswana because it knows Brinks has the ability provide this service. The firms also import their specialised equipment from the same suppliers they use in other cutting and polishing centres since the firms are already familiar with this technology. The firms' country of origin appears to determine which country their supplier of specialised equipment comes from, for example Israeli firms tend to import their specialised equipment from Israel. The parent companies are vertically integrated and have joint ventures or total ownership of companies further down the value chain like jewellery manufactures and retailers which gives them access to final markets. Some of the manufactures have developed brands for some of their polished

diamond designs. For example Leo Schachter has the Leo Diamond brand which is markets as “Manufactured in Botswana, sold all over the world”. Manufacturing in Botswana enables the company to market the diamonds as “green diamonds” that are beneficiated in producer countries, creating jobs and skills.

7.5. Skills

Skills are a major factor in determining the breadth and depth of linkages in the cutting and polishing industry. The government started the cutting and polishing industry specifically to create downstream skills that can ensure that once the mining industry has ceased to exist in Botswana in the next two decades, the country will have downstream capabilities that can be supplied to the diamond industry. There is no doubt that skills creation is critical to the success of the government’s ambitious plan to turn Botswana into a world class diamond centre. Skills can be separated into general skills such as literacy and numeracy, and firm-specific and industry-specific skills. Firm-specific skills are specialized skills which are of value to a specific employer, (Becker, 1975), reflecting the nature of each firm’s knowledge management system and manufacturing routines (Nelson and Winter; 1982). Industry-specific skills are skills that are general to firms in a given industry and constitute an important component of a typical sectors worker’s human capital stock (Neal, 1995:653). The following discussion on the role of skills in determining linkages will focus on which institutions are currently responsible for providing these different types of skills, the resources which are being used to provide these skills and skills that are being created.

Firm-Specific Skills

Firm-specific skills are being created by the cutting and polishing factories through a combination of on-the-job training and apprenticeships in the firms other operations. Cutting and polishing diamonds is a craft developed centuries ago and the firms cutting and polishing expertise has been passed down from one generation to the next. The technical expertise for cutting and polishing specific types of diamonds is the company’s most important source of competitive advantage and is therefore guarded closely. Locals are mostly trained to specialise in a section of the manufacturing process, in order to protect the firms’ competitive command over the whole process. Prior to starting their operations in Botswana, the cutting and polishing factories recruited workers and sent them for training in their other factories abroad for up to one year. These apprentices then formed part of the core group of local workers, combined with highly-skilled expatriates, which the company used to start production in Botswana. Over time the locals become more experienced and the firm’s capacity is increased by recruiting more locals who are trained on-the-job for about 4 to 6 months. The cutting and polishing companies interviewed stated that they prefer to hire workers without tertiary education or with low-level secondary school education (i.e. junior certificate) as there is a trend amongst more educated people to leave once when they find better opportunities. For the companies to operate efficiently they need a low labour turnover in order to justify the investment they make when training their workers. The firms have made a tacit agreement through Botswana’s Diamond Manufacturers Association to not poach each other’s workers. The firms made this agreement to decrease the cost of training when workers are lost to other firms. This means that these the firm training includes

industry skills which are optimally best produced through an industry association or government sector skills training initiative.

The Botswana Training Authority is responsible for accrediting diamond cutting and polishing programs for the companies in the downstream industry. To date, only three Factories and the Diamond Trading Company Botswana have accredited training programs with the Training Authority (see table 7.2). The first company is the DTC Botswana (DTCB) which is training workers in more industry-specific skills, and the rest of the firms are cutting and polishing factories, which train in more firm-specific skills.

Table 7.2: Botswana Training Authority (BOTA) Accredited Training Programs

Name of Company	Accredited Training Programs
DTCB Diamond Academy Gaborone	Foundation Manufacturing Intermediate Manufacturing Pre-RTOP Advanced Manufacturing Course Rough Diamond Sorting and Valuing
Eurostar Botswana	Diamond Polishing
SAFDICO	Certificate in Diamond Processing Automatic Machine Polishing Preparation Brillianteering Cross work Fancy Stone Making Sawing
Teemane Manufacturing Diamond Training School Serowe	Diamond Polishing

Source: Botswana Training Authority (BOTA)

BOTA does not have figures for the number of locals who have completed or are completing the accredited training programs in the three cutting and polishing firms that have registered. One factory stated the costs of registering programs for accreditation and the difficulty of doing so as some of the reasons for the low registration amongst firms. Due to the lack of data it is not possible to determine what share of turnover the firms are spending on training and how much of the firms' training costs are currently is being rebated to them by the government. However, given the low registration of programmes with the training authority it can be concluded that the firms and not the government are incurring most of the costs of creating firm-specific skills.

Industry Specific Skills

The Government has plans to produce industry-specific skills through the education hub but to date none of these plans have been implemented. The government plans to build a College of Arts and Technology near Gaborone which will offer courses relevant to the cutting and polishing industry. The government has also held discussions with the Indian government to determine if Botswana can source cutting and polishing training from India. The Indian Diamond Institute (IDI) plans to start a Indian-Africa school in Botswana. The IDI was established in 1978 and is a world-

class institute offering ISO-accredited diplomas and certificates in diamond processing, assortment and grading, gemmology, jewellery designing and manufacturing, computer application and management programmes. Although Botswana has developed upstream capabilities in the diamond industry, particularly skills relating to diamond mining, the downstream industry functions are very different from the upstream industry. Thus there are no skills spill-overs that can take place from, say for instance, mining to the cutting and polishing industry. If institutions producing industry-specific skills were available the cutting and polishing firms could have shorter training programs as locals would have basic industry-specific skills and similarly the suppliers would also benefit from the availability of locals with industry specific skills. Locals would have access to industry knowledge which would enable them to take advantage of business opportunities in the industry. Therefore the current lack of these institutions producing industry-specific skills is constraining skills creation in the entire industry.

7.6. Policy

Policy is also a key dominating driver of the breadth and depth of linkages in the cutting and polishing industry. This section discusses the government and corporate policies in terms of its relevant visions, key programmes, delivery, coherence and the capacity. The section also discusses how the corporate and government programmes affect the linkage drivers.

7.6.1. Government Policy

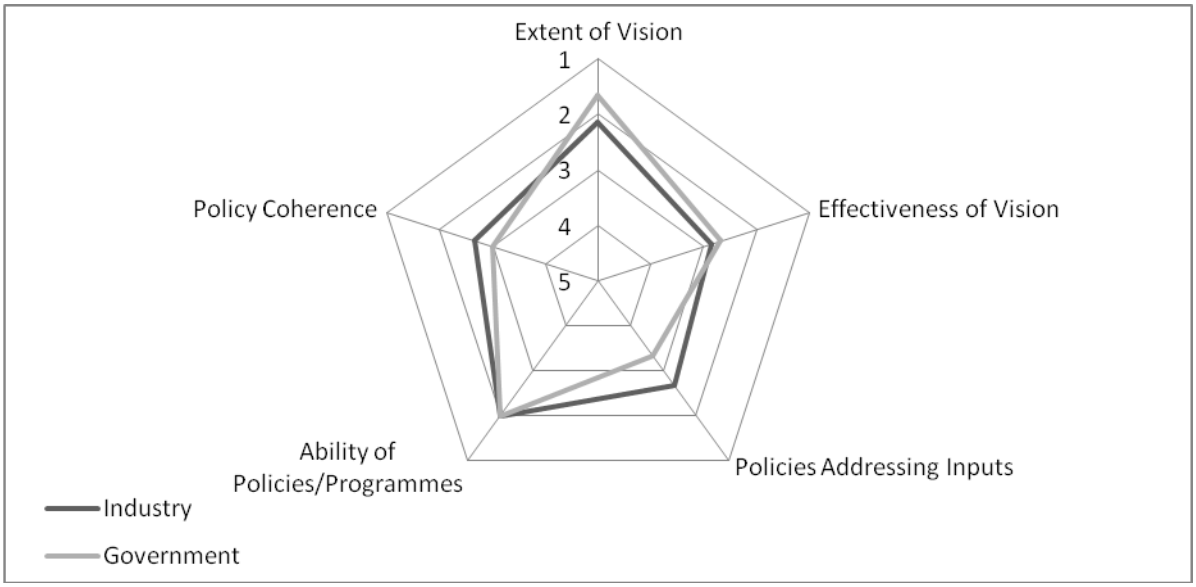
The current policy that is directing the development of linkages in the cutting and polishing industry is the Mineral Beneficiation Policy. This policy is discussed next with particular regards to the following aspects:

- The role that political will is playing in the policy's design
- The policy's coherence in terms of how it interacts with other key policies
- The policy's implementation and the government's capacity to implement the policy

All of these aspects of policy are crucial in determining whether policy is fostering or blocking linkages in the cutting and polishing industry. Thus the following critical success factors were used to access the Beneficiation Policy: the extent to which the government has a vision for the cutting and polishing industry, the effectiveness of that vision, the extent to which the vision address the use of inputs in the industry, the ability of the government programmes or policies for the industry to deliver on the vision and coherence of this programmes or policies.

This section discusses these aspects of government policy using the government and industry responses on the government's policy for the cutting and polishing industry (see figure 7.3).

Fig 7.3: Industry and Government Responses on Government's Policy



Sample size: 3 government respondents, 7 industry respondents (5 manufacturing firms and two brokers)
Key: 1 – Extreme, 2 – Very, 3 – Moderate, 4 – Slight and 5 - Not at all
Source: Authors research

Governments Vision

The government and industry respondents felt that the government has a vision for the cutting and polishing industry but the compared to the industry's response to the extent of this vision, the government felt it had a vision to greater extent than the industry. The industry was created as a result of political will which saw government managing to 'convince' DeBeers to help the country start a viable cutting and polishing industry. The opportunity provided by the expiration of the 25 year mining license gave the government the opportunity to force these policy changes on an unwilling DeBeers. As we have seen, the government's ambitious plan to start a downstream diamond industry is a response to the approaching resource depletion, as well as a desire to capture a greater share of the chain value-added by deepening linkages. The success of this planned industry is thus crucial for ensuring the future of the diamond industry in Botswana. The beneficiation policy also included the development of downstream ancillary businesses and both the government and industry respondents felt that the government's vision only moderately addressed the use of inputs in the industry. Instead it was the industry's suppliers, particularly service providers like banks, brokers and logistics companies that moved to Botswana on their own accord to service their clients. The government role in this was in reducing the hassle of starting their businesses in Botswana.

The Beneficiation Policy and its Key Programmes

The government's diamond beneficiation policy aims to foster economic diversification away from diamond mining through the creation of employment and the development downstream capabilities in the wider diamond processing industry.

The beneficiation policy requires that local processing be equivalent to 15 percent of Botswana's rough diamond production. The diamond beneficiation policy was designed to ensure that local job creation and skills creation takes place by stipulating that the cutting and polishing factories have to hire locals to train in cutting and polishing skills. The beneficiation policy also aims to create linkages with the rest of the economy by creating a supply chain network for the industry. To this end the government's Diamond Hub is tasked with the responsibility of attracting and assisting suppliers that provide the industry with goods and services to Botswana. Unlike the cutting and polishing firms that have hired locals, the policy does not require any form of local content from the suppliers. In order to support the industry the government has a number of policies. The cutting and polishing firms are classified as manufacturing companies which means they benefit from a lower corporate tax rate of 15 percent compared to the 20 percent paid by ther companies. The companies are also able to bring in skilled labour into the country to train locals and to this end their work permit applications are fast tracked through the Diamond Hub. The firms are exempt from paying the training levy and if they have their training programmes accredited by the training authority they are able to get rebates on the training expenses. The government has a programme were the companies can provide names for all the people who come to the country regularly to maintain and repair their equipments. These individuals often work for more than one company and the government provides them multiple entry business visas to make it easier for them to enter the country when their services are provided. Previously, they had to apply for visas that take more than 14 days to be processed every time they came to the country but on the suggestion of the industry the government improved this system. The companies are exempt from paying taxes on polished diamonds exports and only have to pay taxes if they export rough diamonds (unprocessed) or partly polished diamonds. This provides an incentive for the companies to process their diamonds in the country. The companies do not have to pay import duties on their technology imports.

The Ability and Coherence of Policy

Botswana current economic development policy is discussed next in order to understand how the diamond beneficiation policy fits into the nation's overall economic development plans. Botswana's economic development is guided by 6 year national development plans. The current National Development Plan 10 runs from 2010 to 2016 and is the country's key development policy. With the theme of 'Accelerating Vision 2016[24] Through National Development Plan 10', it adopts a broad, multi-sectoral and long-term approach, which also considers social and human development issues. Like the previous National Development Plan 9, the strategic thrust of the National Development Plan 10 is to strengthen economic diversification away from diamond mining towards private sector growth. The National Development Plan 10 aims to prepare the country for 'life after diamonds' by creating an optimal business environment and developing a skilled labour force to build a knowledge-based economy to achieve diversification through a private sector-led economy. The basic strategy for National Development Plan 10 places emphasis

[24] The government in 1996 adopted "Vision 2016," envisioning the transformation of Botswana into "an educated and informed nation" as well as "a prosperous, productive and innovative nation" as two key cornerstones of the strategy.

on creating an optimal environment for the private sector so that it plays a major role in driving economic development.

The Government aims to grow the private sector by removing all bottlenecks and constraints to private sector development, creating an optimal business climate for private sector growth. The bottlenecks and constraints will be removed by addressing the infrastructure needs of the private sector and intensifying investment in education and training to provide the skills needed by the private sector. The Government has identified human resource development as crucial to achieving private sector growth and aims to produce competitive and productive human resources to build the private sector. Private sector growth is supported by the establishment of the six key hubs in transport, education, innovation, medicine, agriculture and diamonds**.** The six hubs were established during the National Development Plan 9 (see box 2) in an effort to accelerate economic diversification and growth as well as create more employment opportunities. This new strategy was undertaken in order to give Botswana's comparative advantage in areas such as diamond mining, innovation, education, health, tourism and transport to enable the exploration of regional opportunities and markets to further diversify the economy.

Box 2: The Six Hubs to Achieve Diversification

During National Development Plan 9, and currently in National Development 10, the Government has identified areas to focus on for enhanced economic growth and diversification. The following six
'Hubs' were created:

- The ***Education Hub*** seeks to increase the quality and relevance of education at all levels and, thereby, make Botswana more competitive by attracting leading tertiary institutions, scholars,' researchers and students into the country.
- The ***Innovation Hub*** is aimed at creating a platform for local and foreign businesses engaged in R&D and knowledge intensive activities (e.g. ICT). It will also establish an incubator for start-up companies and facilitate networking amongst businesses.
- The ***Agricultural Hub*** will encourage participation in farming, mentor farmers on agribusiness skills, and endeavour to commercialize the agricultural sector in an effort to make the industry more sustainable.
- The ***Diamond Hub*** intends to establish a diamond trade centre for rough/polished diamonds and to promote sustainable downstream diamond activities such as polishing and jewellery making.
- The ***Medical Hub*** hopes to identify projects and programmes that will make Botswana a centre of excellence in the provision of healthcare services. It will also outsource certain hospitals in an effort to attract specialists and optimize the quality of the health facilities.
- The ***Transport Hub*** seeks to re-position the country as a regional hub for rail, road and air transport, and to support a competitive transport and logistics industry in Botswana.

Source: African Development Bank (2009)

The government plans to create links between these hubs so they support one another. For example the diamond hub will be supported by the education hub which would produce skills for the different industries in the diamond hub, whilst the

innovation hub would attract business to perform research for the industry and the transport hub would ensure that the all the necessary transport infrastructure needed by the industry is in place. It is clear that the government has formulated a very coherent economic development policy for the country. However, the efficacy of the development policy in creating a diamond hub and all the other hubs will be determined by its implementation.

Government's Capacity to Implement Policy

The mineral beneficiation policy in the diamond hub plans to create a number of industries such as diamond trading and jewellery manufacturing. However, to date, policy implementation has been focused on creating a cutting and polishing industry. The government sees the creation of a viable cutting and polishing industry as the first and most important step that needs to be achieved in order to pave the way for rest of the downstream industries. In terms of institutions, the government's Diamond Office and Diamond Hub which falls under the Ministry of Minerals, Energy and Water, oversee the implementation of the mineral beneficiation policy. The Diamond Office employs about three public officials who were previously minerals officers employed by the Department of Minerals. They have since been moved to the Diamond Office which like the Diamond Hub is located at the Diamond Technology Park. The Diamond Hub also employs three officials and the most senior official is the Diamond Hub Coordinator who is the key driver of the government's plan to become a serious downstream player in the diamond industry. The Diamond Office is responsible for the inspecting diamond exports, issuing Kimberley Process certificates and for monitoring the activities of the companies by doing 6 monthly audits together with DTC Botswana. The Diamond Hub on the other hand is responsible for developing programmes implement the government's vision to create a downstream industry. Thus the Diamond Hub is designed to be the driving force behind the industries creation.

However, it is not clear if the Diamond Hub has the capacity to design and implement the programmes for the cutting and polishing industry as this is still a fairly new industry and officials have not yet developed in-depth industry knowledge. Although 100 percent of the government respondents said that government has the capacity to implement its policies for the cutting and polishing industry, 61% percent of the industry respondents said the government does not have this capacity (see table 7.3). Although the Diamond Hub may understand the government's plan to create a cutting and polishing industry, in order to best implement the plan the office also needs an understanding of the business-side of the industry. Various interviews with the firms and suppliers revealed that the industry at large felt that the Diamond Hub did not have enough capacity to implement the policy mainly due to a lack of understanding on the business-side of the industry. A manager of a cutting and polishing firm said "Government lacks understanding of the industry and it needs to open its ears to the industry as this will bring more understanding. If this does not happen it will lead to illegal incentives, like in South Africa, where government policy is outdated and leads to a lot of illegal procedures that are legal in more mature cutting and polishing centres [like rough diamond trading]" . Another manager of a cutting and polishing factory said the "The regulator needs to increase its capacity". However, many felt that the Diamond Office was very approachable and willing to listen to the stakeholders in the industry. For example, a manager of a cutting and

polishing firms said “Policy is working with and not against the industry, the culture is very open and we can recommend things to the Diamond Hub”. Indeed despite their views on capacity 86 percent of the industries respondents said the government really does want to implement their policies and all the respondents said they are no issues of personal integrity amongst the relevant government officials affect the Government’s ability to implement its policies for the industry.

Table 7.3: Industry and Government responses on Government’s Capacity

	Government (n=3)		Industry (n=7)	
	Yes	No	Yes	No
Do you think the government has the *capacity* to implement its policies for the cutting and polishing industry?	100%	0%	29%	61%
Do you think it *really wants to*?	100%	0%	86%	14%
Do you think issues of personal integrity amongst the relevant government officials affect the Government’s ability to implement its policies for the industry?	0%	100%	0%	100%

Source: Authors research

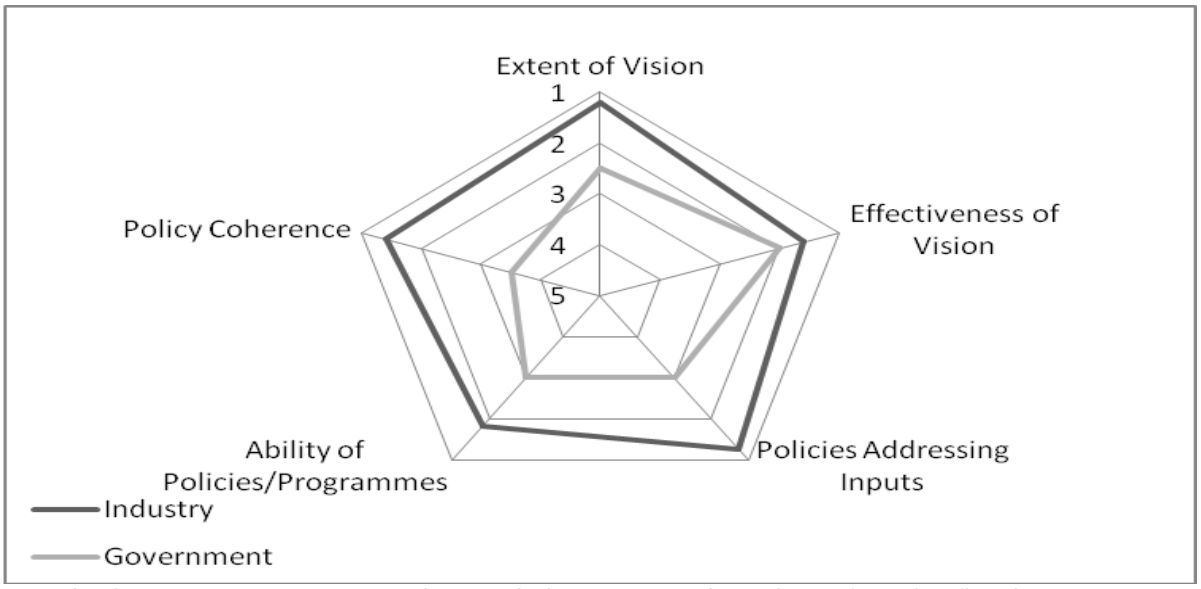
Another part of implementation that is lacking relates to the creation of linkages between the diamond hub and the other hubs. Although the transport hub has made considerable progress in addressing the key infrastructure gaps that existed when the industry was started, the education hub is still not producing skills for the industry and the innovation hub has not managed to attract companies to undertake industry focused research.

7.6.2. Corporate Policy

Corporate policy plays a very important role in the government’s ambition to become a diamond centre as it is with the 16 manufactures that the government aims to build cutting and polishing capabilities that will benefit the country when the upstream industry no longer exists. However, the degree to which the manufacturers’ business models are long-term will determine whether or not they stay in Botswana when they no longer receive their rough diamond allocations. The biggest threat to the government’s vision is the depletion of diamonds in the next couple of decades (if no new significant diamond deposits a discovered) after which the government cannot assure the manufacturers rough diamond allocations. If the manufacturers are only here for rough diamonds it is fair to conclude they will leave when diamonds are depleted especially because their costs of operating in Botswana are higher than in low cost centres like India and China. Furthermore, history has proven that the cutting and polishing industry is very mobile, moving to where it will receive the most government incentives and benefits from lower costs, particularly relative labour costs. It therefore possible that manufacturers’ vision or business model and the resulting policies are short term and are not aimed at benefitting the country in the long-term. For example their vision for skills development and therefore their human resource policies may not be aimed and developing high level skills but only enough skills to serve their production in the short-term. This section takes a closer look at the government and industry responses on corporate policy to try and understand the

role that corporate policy is playing in the development of Botswana's downstream capabilities.

Fig. 7.4: Industry and Government on Corporate Policy



Sample size: 2 government respondents, 5 industry respondents (manufacturing firms)
Key: Where: 1 – Extreme, 2 – Very, 3 – Moderate, 4 – Slight and 5 - Not at all
Source: Authors research

Company Visions or Business Models

The industry and the government's views differ on the extent to which the manufacturers have a vision, which was defined as a unique business model for Botswana's cutting and polishing. The industry respondents which were the manufacturer believe that they have a vision to the extreme extent whilst the government respondents only believe that the manufactures only have a vision only to a moderate extent. The manufactures global business models are centred on becoming a world leader in their industry whilst the local business models were centred on cutting diamonds in the most efficient manner, creating jobs and imparting locals with cutting and polishing skills. The firms said they are here to beneficiate Botswana's diamonds and a large number of them are donating to various charity causes as they believed that giving back to the community was also of beneficiation. Thus it appears that the industry's definition of beneficiation is much broader than adding value to diamonds, employment and skills creation as it taking on a form of corporate social responsibility (CSR). DTC's rough diamond allocation favours the Sightholders that are seen to be promoting beneficiation so it is possible that the companies are using CSR as part of their business models to gain favour from DTC with regards to their rough allocations. With regards to the efficiency of their local business models, the industry respondents were of the view that their local business models were extremely effective in maintaining their long-term profitability whilst the government respondents felt they were slightly less effective. This could indicate doubt from the government on the longevity and sustainability of the manufactures' business models.

Corporate Policies

The manufactures do not appear to have come up with their own corporate policies; instead their corporate policies seem to be guided by DTC's Diamond Best Practice Principles (BPP). All DTC Sightholders need to be compliant with BPP and the DTC Botswana audits the firms to check if they are compliant. The manufacturers are assessed according to their business, social and environment responsibilities. Their business responsibilities cover ethical standards, financial offences like money laundering, Kimberley Process and the system of warranties, disclosure and supply chain management. Their social responsibilities cover employment, health and safety, disciplinary procedures, child labour, forced labour and other human rights. Lastly, their environment responsibilities cover the best environmental practices and the regulatory framework. The firms have designed their corporate policies around BPP as they have to complete the BPP workbook regularly and this workbook sets out the performance indicators against which compliance with the BPP will be evaluated, verified and reported to DTC. The companies face penalties if they fail to comply and failure to comply with BPP constitutes a breach of the Sightholders obligations under the Suppler of Choice arrangement. The BPP applies to all Sightholders and not just those in Botswana.

Ability and Coherence of Corporate Policies

The government respondents were of the view that the policies could only deliver on the industries' business models to a moderate extent whilst the industry felt that these policies could deliver on to an extreme extent. The government's views on the inability of the policies are largely due to the weak coherence of the corporate policies. The government respondents felt that the corporate policies were only slightly coherence whilst the industry felt that their policies were extremely coherent. The firms said that their policies were extremely coherent because they were designed to be in line with BPP. The government felt the firms policy lack coherency with their objectives, it said on the one hand the firms objectives was to transfer skills but on the other hand not all the firms had detailed skills development programmes. The government respondents said the company policies were weak with regards to skills development. However, the government respondents added that there is variation amongst the companies with regards to their skills development programmes. Since some companies show to be serious about training by sending workers for off-firm training whilst other companies only use on-the-job training.

A large percentage of the firms used to export their rough diamonds to get planned and marked and re-import them for polishing. It is difficult to monitor this process since it is hard to tell if the diamonds that are being sent out are the same ones returning. Furthermore, this is a critical part of the manufacturing process as it determines the most profitable way for the firm to cut a rough diamonds, it is knowledge intensive and important skill to be transferred to locals. The Diamond Office noticed that the amount rough diamond exports for planning and marking were not decreasing over time and saw it as an indication that very limited skills transfer was taking place in this area. The firms were then asked to show the progression of their employees in the companies to show that they were being indeed trained and their skills were increasing over time. The firms complied and since then only a small of number of the firms still export their rough diamonds to be planned and marked. A

government official said “Before may be only three or four firms were planning and marking in Botswana and now only three or four firms export their rough diamonds to be marked and planned in other countries.” Thus the corporate policies on skills development amongst some of the manufacturers are weak and would be even weaker if government was not monitoring them.

Companies Capacity to Implement their Corporate Policies

Both the industry and the government felt that the companies had the capacity or skills to implement their corporate programmes (see table 7.4). But only half of the government respondents felt that the companies really wanted to implement these policies indicating that they were issues of personal integrity amongst the relevant company employees that affect the companies’ ability to implement its policies for the industry. Even amongst the companies 80% of the respondents said the company really wanted to implement it polices with 40% of respondents saying that personal integrity was a problem amongst some employees in their company.

Table 7.4: Industry and Government responses on Corporate Capacity

	Government (n=2)		**Industry (n=5)**	
	Yes	No	Yes	No
Do you think the company has the *capacity* to implement its corporate policies?	100%		100%	0%
Do you think it *really want to*?	50%	50%	80%	20%
Do you think issues of personal integrity amongst the relevant company employees affect the company’s ability to implement its policies for the industry?	100%		40%	60%

Source: Authors research

Thus capacity does not hinder the implementation of corporate policies, rather company will and the motives of some employees seem to be the problem.

7.7. Conclusion on Linkage Drivers

According to the firm and government respondents, the MMCP linkage drivers that matter in Botswana’s cutting and polishing industry are ownership, infrastructure policy and skills. The NSI is currently not playing a major role but its importance needs to increase in the long term to help develop the industry. There are some constraints faced with regards to infrastructure, but these have been easing over time. The proximity of South Africa means that a number of inputs can be sourced nearby; however the firms have found that the suppliers in South Africa are generally not price competitive. Ownership determines which suppliers the firm’s sources inputs from and vertical integration give firms access to final markets. Policy achieved through political will has been extremely instrumental in creating downstream linkages. It requires that 15 percent of Botswana’s rough diamond output is to be processed locally by the 16 cutting and polishing firms using local labour trained by expatriates. The implementation of this policy is being constrained by capacity issues in key government institutions as a result of an insufficiency of industry knowledge amongst locals. There is a variation in firms with regards to their visions and resulting policies. As a result some firm appear to be more serious about

skills transfer whilst others appear to have very short term policies on skills development.

Policy and skills are the dominating driver of linkages in the cutting and polishing industry. Skills are currently a major constraint to linkages in the nascent industry. Botswana needs to develop industry specific skills for the cutting and polishing industry as well as firm-specific skills in manufacturing. Cutting and polishing diamonds is highly-skill intensive and the firm-specific skills are created by the firms which are training unskilled locals on-the-job using highly-skilled expatriates. Currently no institutions in Botswana are producing industry-specific skills for the downstream industry. The lack of these institutions is because the relevant policy has not been implemented largely due to a lack of capacity in the relevant institutions responsible for implementation. Thus the policy driver interacts with the skills driver. In fact, it can be concluded that policy is the key driver of linkages in the industry and that skills are the brakes as a result of their impact on institutional capacity for policy implementation and local ability in industry and firm-specific skills.

8. Conclusions and Policy Recommendations

Summary of key findings

Botswana's diamond beneficiation policy aims to make the most of the remaining diamond resources and create downstream capabilities that can continue to benefit the country when diamonds are depleted in Botswana. Although Botswana is the largest producer of diamonds by value, producing over a quarter of the world's diamonds by value, it only processes one percent of the world's polished diamonds. Based on the major producers and manufactures there is virtually no correspondence between share of diamond production and share of cutting and polishing. Thus Botswana's vision of being a major processor when its production is depleted is not unreasonable as there appears to be no correspondence between production and processing. However, the real question is on the economic costs and gains of the beneficiation policy

No literature has been identified on the linkages in the global cutting and polishing industry including Botswana's cutting and polishing industry. Despite the lack in this literature a lot can be learnt from the governance of the value chain and its impact on linkages in the cutting and polishing industry. The diamond value chain is a higher governed value chain and historically the governance was almost completely driven by one major producer, DeBeers, which controlled the industry by using its monopoly power in rough diamonds supply to control prices in the entire value chain. As a result of its loss in market share, DeBeers has embarked on a new company strategy to change the diamond industry from a supply-driven chain to a buyer-driven chain. Despite the change in company strategy DeBeers still plays a major role in the governance of the value chain and it is unlikely that DeBeers will give up its power and shift the governance of the value chain entirely to buyers.

In the last five years Botswana has made progress in establishing a cutting and polishing industry. There are linkages in the industry and there is a high degree of localisation in the linkages. Wage bill estimates show that consumption linkages resulting from employment in the cutting and polishing industry are more valuable in

the cutting and polishing firms, about US$48 million per annum and represent 45 percent of the manufacturers' wage bill, and have a greater proportion of local value added in the supply chain, with 46 percent or US$4 million from the wage bill accruing to locals. The most significant local linkages taking place are through local employment directly in the sixteen cutting and polishing factories. The industry's supply chain is still being developed and to date Botswana has managed to attract major suppliers, particularly suppliers of knowledge intensive services to open offices in Botswana's diamond hub.

The research found that (a) forward linkages from diamond mining are policy driven (b) in general the firms seem to respect government's vision and to admire some of government policies and commitment to the industry, but (c) government officials are much more doubting of the firms' commitment and Botswana's operating environment than the firms (d) in terms of the MMCP drivers, two are critical as is shown in Table 7.1– government policy is driving the presence of skills and their progress is held up by skills (e) with some exceptions, like Botswana's operating environment, government and industry perceptions are often quite similar.

Policy Recommendations

- Policy needs to address the creation of skills in the industry to aid the development and localisation of linkages.
- The government needs a clear policy on the creation of skills for the cutting and polishing industry, particularly industry-specific skills. The government also needs to speed-up the implementation of current policy aimed at starting education and training programs which will create industry-specific skills for the cutting and polishing industry.
- With regards to the firm-specific skills, the government needs to set clear targets for skills transfers in the cutting and polishing industry and implement the registration of training programs in the 13 firms that have not yet accredited their training programmes with Botswana's training authority.
- The government also needs to collect data, perhaps through the training authority, on the number of locals being trained and the types of skills they are being trained within the cutting and polishing factories.
- The current policy on the reporting of diamond exports in the national accounts needs to change. Polished diamond exports and rough diamonds exports are aggregated and the polished diamond exports included only cover the exports of only 3 of the 16 factories. This coverage needs to increase and this data needs to be reported separately to give a clear picture of the industry's export performance over time.
- The national development policy aims to create links between the diamond hub and the innovation hub; it however needs to be implemented to increase the importance on the NSI as a driver of linkages in the long-term.

Research Gaps

- Interviews with the beneficiaries of training in the cutting and polishing industry should be conducted to understand the perspectives of the workers on the skills transfers taking place in the firms.

- Data is needed on the number of locals who are currently being trained by the cutting and polishing firms and the type of skills they are being trained with.
- More suppliers need to be interviewed, particularly suppliers of legal services and suppliers of specialised inputs to understand the degree of value-added taking place in the supply of these inputs.

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