

Competitive Advantage Challenges Affecting the Apparel Manufacturing Industry of South Africa (AMISA): Application of Porter's Factor Conditions

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Abstract—This paper applied factor conditions from Porter's Diamond Model (1990) to understand the various challenges facing the AMISA. Factor conditions highlighted in Porter's model are grouped into two groups namely, basic and advance factors. Two AMISA associations representing over 10 000 employees were interviewed. The largest Clothing, Textiles and Leather (CTL) apparel retail group was also interviewed with a government department implementing the industrialization policy were interviewed.

The paper points out that AMISA have basic factor conditions necessary for competitive advantage in the apparel industries. However advance factor creation has proven to be a challenge for AMISA, Higher Education Institutions (HEIs) and government. Poor infrastructural maintenance has contributed to high manufacturing costs and poor quick response technologies. The use of Porter's Factor Conditions as a tool to analyze the sector's competitive advantage challenges and opportunities has increased knowledge regarding factors that limit the AMISA's competitiveness. It is therefore argued that other studies on Porter's Diamond model factors like *Demand conditions*, *Firm strategy, structure and rivalry* and *Related and supporting industries* can be used to analyze the situation of the AMISA for the purposes of improving competitive advantage.

Keywords—Compliance rule, apparel manufacturing industry, factor conditions, advance skills.

I. INTRODUCTION

SOUTH Africa's manufacturing sector was ranked 22nd (out of 38 countries) in terms of global competitiveness, the sector dropped to 24th in 2013 and is expected to drop further to 25th position by 2018 [9]. This makes the mission of industrialization in South Africa a difficult project to achieve. Industrialization of South Africa through labour intensive industries like the AMISA should identify and respond to factors that impact the development of competitive advantage [28]. As a theoretical framework, the Diamond model Fig. 1 Porter is seen to provide a conducive environment for competitive advantage when used alone or with other theories/models [24].

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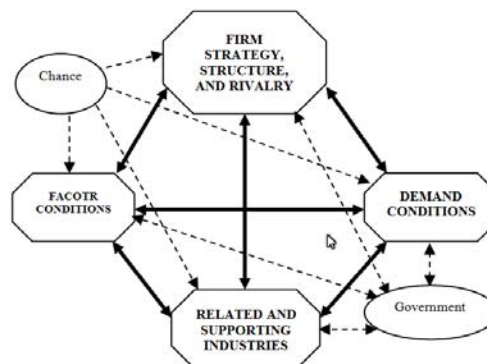


Fig. 1 Porter's Diamond Model [33]

Porter's Diamond model (1990) provides the theory to examine ways in which notions and companies can gain competitive advantage [24]. According to Porter's diamond model, there are four main factors necessary to create a competitive advantage atmosphere. *Demand conditions* - which focus on the quality of demand for products manufactured within the industry [20]. *Firm strategy, structure and rivalry*- deals with grounds in which industries are created, organized and managed in line with the kind of domestic competition [15]. *Related and supporting industries* - deal with the level of competitiveness of local related industries on an international environment [24]. As a focal point for this paper, *Factor conditions* are discussed below. This paper examines challenges affective the development of competitive advantage for the AMISA which is viewed as a priority for economic development in South Africa [9].

II. FACTOR CONDITIONS

Reference [33] states that factor conditions speak to factors of production (labour, capital, land, natural resources and technology) that are compulsory to manufacture goods and provide services. Reference [33] further categorizes factor conditions into two groups namely, basic and advance factors. The latter are discussed below to highlight competitive advantage challenges affecting the development of competitive advantage for the AMISA.

A. Basic Factors

Basic factors include debt capital, natural resources, location, climate, unskilled, and semi-skilled labour [33]. Basic factors mainly naturally inherent or required little capital investment. In this paper, basic factors stated above

have been grouped into three concepts to provide ease of understanding of the situation in South Africa.

1. Debt Capital and Investment

Reference [7] contends that South Africa has sufficient venture capital and developed financial market to aid industrialization. A guide to the DTI incentive schemes (2012/13) supports that South Africa has compelling capital available to aid business endeavours. The Industrial Development Corporation (IDC) approved funding of ZAR 400million in 2010 [36], while the department of trade and industry has spent close to ZAR 2.5 billion by 2014 through its grants and incentive programmes [37]. However, the debt capital given was not directed to the improvement of capital equipment in a large extent. This therefore has implication on advance factors that are a necessity for competitiveness in the international apparel manufacturing industry [36]. Currently, ZAR1.2 trillion has not been invested by South African companies, thereby resulting in lower levels of investment and ultimately lower levels of economic growth in the country.

The continuous loss of jobs and firm closures in the sector suggests otherwise. Inappropriately utilized debt capital and low levels of investment can challenge competitiveness and manufacturing output growth of the apparel manufacturing industry. It can be argued that the apparel manufacturing industry management lacks advance factors to attract Foreign Direct Investment (FDI) as observed by low investments. South Africa's FDI fell by 70% from US\$5.4 billion to US\$1.6 billion during 2009 to 2010 [21]. The AMISA imports the main textile/apparel production input which makes it hard for these industries to attract FDI through value chain industries [22]. South Africa has the potential of developing processing industries for fabrics like mohair, wool and cotton which could encourage local sourcing for raw materials thereby reducing cost of production for the apparel manufacturing industries [38]. Reference [12] predicted an inward FDI to be US\$150 billion by 2015. The apparel manufacturing industry needs to attract a share of the envisaged FDI to develop the above mentioned processing industries to fast track the development of competitive advantage for the AMISA.

2. Location, Natural Recourses and Climate Conditions

South Africa's geographical and climate conditions compel its richness in natural resources like wool, cotton and mohair used in apparel [38]. Reference [7] argue that South Africa has the right set of raw materials necessary for a sustainable competitive advantage in the apparel manufacturing industry as shown in Table I.

Table I outlines South Africa's competitiveness in terms of raw material. However, the competitive advantage in fibres has not been translated to the competitive advantage in the textiles industry and the apparel manufacturing. South Africa's apparel sector hardly find domestic fabrics and in sufficient variety for the manufacturing of various apparel categories [2]-[22]. The inability to process these raw materials to support the apparel manufacturing input (fabrics

and finishing products) perpetuate the lack of competitive advantage of the AMISA. Although the availability of raw materials in South Africa is scarce, the trend of climate change threatens the production of the few natural resources for apparel production. Reference [5] contends that South Africa lacks the capital, infrastructure, basic scientific knowledge and applied research to deal with climate change and its uncertainties. This highlights a challenge of a highly educated pool of South Africans to salvage the situation.

TABLE I
 SOUTH TEXTILES RAW MATERIALS [7]

Raw materials	Remarks
Wool	5 th world largest producer. Advance and sophisticated processing methods
Mohair	"54% of world's mohair production is generated in South Africa". Quality mohair fibre availability through advanced breeding and farming techniques.
Cotton	There are no strong competitiveness remarks regarding cotton
Leather	South Africa has all kinds of leather materials required to produce any kind of apparel leather product. Price pressures led to the decline of the leather industry
Vegetable Fibres	High quality fibre passed international sisal grading standards. The processing of South African flax and hemp is on the rise.
Man-made Fibres	Approximately 50% of South African fibres consumption was man-made fibres. There has been a decline since 2008.

3. Unskilled and Semi-Skilled Labour

Reference [2] argue the AMISA's skills levels comprise of 82.2% semi and unskilled workers, 13.45% mid-level skilled, and 4.4% high-level skilled in the year 2005. Since 2005 (five years later), little has changed. Table II indicates that out of the 61% of the formal sector, 82% are semi-and unskilled labour while 13% are skilled and only 5% are highly skilled labour force. Since the establishment of Clothing, Textiles, Footwear and Leather Sector Education and Training Authority (CTFL-SETA) ten years ago, the situation has not improved skills within the AMISA [22]. One can conclude that the investment in skills has been slow and has not featured as a factor contributing immensely into competitiveness of AMISA.

References [36]-[37] outlined challenges of a lack of skilled human capital to assume executive and senior management positions from the ageing industry executives. The AMISA has failed to develop continuation plans reflective of South Africa's racial groups to avoid the skills gap. The economically active population statistics suggest that qualified African professionals increased from 10.8% to 31.1% compared to a decline of 14.5% to 47% of white qualified professionals [30]. However, these promising statistics have not had any direct influence to the AMISA. The Department of Higher Education and Training needs to understand the country's skills shortage in this sector and the role Sector Education and Training Authorities (SETA) have to play in alleviating these challenges.

TABLE II
 PERCENTAGES OF EMPLOYMENT FOR THE CLOTHING INDUSTRY [25]

Year	Informal	Semi-and Unskilled	Skilled	Highly Skilled
1991	19	67	11	3
1992	21	66	11	3
1993	22	64	11	3
1994	24	62	11	3
1995	25	61	11	3
1996	26	60	11	3
1997	28	59	10	3
1998	29	58	10	3
1999	29	58	10	3
2000	29	59	10	3
2001	33	55	9	3
2002	34	54	9	3
2003	33	55	9	3
2004	35	54	9	3
2005	37	52	8	3
2006	38	51	8	3
2007	41	49	8	3
2008	39	50	8	3
2009	39	50	8	3
2010	39	50	8	3

B. Advance Factors

Advanced factors including modern technology, infrastructure, highly educated workforce, and university research institutes in sophisticated disciplines. The latter factors require substantial capital investments. Countries that have compelling advance factors across industry disciplines have sustainable competitive advantage. South Africa's advance factors challenges affecting the development of competitive advantage of the AMISA are discussed below.

1. Modern Technology

Reference [27] asserts that "Technology is one of the factors of production". Reference [18] defines technology as the combination of physical and knowledge processes employed to convert materials into outputs demanded by the consumer world. Technology may take the form of modern processing the manufacture or equipment used to support the production or used for the production. Fig. 2 highlights the technological uptake situation in South Africa [40]-[42]. The African Competitive report measured 134 countries in 2009, 139 countries in 2011 and 144 countries in 2013. The lower a country scores, the more uncompetitive the country is.

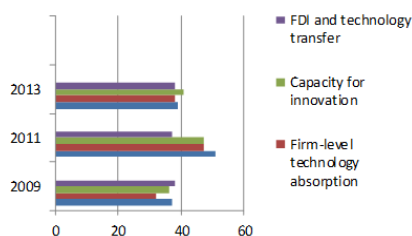


Fig. 2 Technological Factors of South Africa [40]-[42]

Fig. 2 shows that South African industry's poor technological uptake as indicated by approximately 50% of

latest technology uptake and less than 40% of FDI technology transfer and less than 50% capacity for innovation. This figure highlights a negative relationship between the availability of latest technology and poor absorption of technology within South African industries. Based on these figures, it can be concluded that there is a relationship between the lack of FDI and lack of innovation within amongst others, the AMISA's competitiveness and the lack of modern technology. The AMISA is confronted with a challenge of low technological innovation [28].

The lack of technological innovation affects AMISA's competitiveness both locally and internationally [7]. South Africa's capacity for innovation is poor as can be seen in Fig. 2. While CEOs around the world ranked *talent-driven innovation* (1 out of 10) as the most important factor to competitiveness, South African CEOs ranked it seventh [9]. Poor technological innovation also affects the proclivity of the AMISA's labour force. It is no wonder that China's exports take the lead and AMISA is forced to adjust its technological uptake and human capital in order to improve apparel's quality, maintain lower production cost, produce smaller batches of more varied products and respond rapidly to changing customer demand [29].

Quick Response's effectiveness within AMISA is undermined by the lack of advance skills, low innovation, technology uptake and the lack of research and development. Reference [18] defines quick response as the overall strategy to improve the flow of information back and forth, manufacturing processes and ordering and delivering of products. This strategy is supported heavily by technologically and skills. "For advanced economies, innovation is a matter of pushing the world frontier of knowledge, for developing countries technology assimilation is the central challenge" [34]. The following points represent modern technologies that the AMISA can adopt for it to achieve competitive advantage:

- (i) Automated sewing operations,
- (ii) Receiving point of sales (POS) data,
- (iii) Computer Aided Manufacturing (CAM),
- (iv) Computerized inventory systems,
- (v) Unit product systems (UPS), and,
- (vi) The skilled manpower to manage and operate the automated operations

Reference [7] argues that Fabric Objective Measurement (FOM)¹ is only used by one apparel manufacturing industry in South Africa. As a result, apparel retail groups have agreed that the use of FOM has the ability to improve competitive advantage for the AMISA in question. The FOM has two main systems, FAST and Kawabata systems², according to [7]. Reference [7] contends that FOM is not well known to some of the AMISA. Lack of technological skills and knowledge within the apparel manufacturing industry underscore the need

¹ "Fabric Objective Measurement (FOM) represents new generation of instrumentally measured parameters which provide a more complete picture of the fabric quality, tailorability and clothing performance".

² Reference [7] argues "the Kawabata system was essentially aimed at predicting the feel, handle and appearance of fabrics, whereas the FAST system was essentially aimed at predicting fabric tailorability."

for AMISA to refocus on strategies of competitive advantage and improving market share as well as employment statistics. A number of researchers have cited the following advantages for apparel manufacturing industries in implementing quick response [18]:

- (i) Shortened led time
- (ii) Improved market share
- (iii) Lowered inventory levels
- (iv) Improved profits
- (v) Reduction in manufacturing costs

While the AMISA's led time is at acceptable levels for some industries, the lack of technological factors and high skilled labour restricts adequate improvements. As a result, stated advantages eludes the AMISA and hence its inability to afford the minimum wage. Reference [14] contends that the presence of internationally competitive suppliers and related manufacturing industries within a nation provides benefits such as innovation, upgrading, information flow, and shared technological development that create advantages in downstream industries. This has not been the case in South Africa. Reference [16]-[28] states that retail buyers decided on offshore sourcing because the AMISA demonstrated a lack of response to competition ("E" inefficiencies). The AMISA's failure to address "E" requirements (computer-aided design and electronically managed supply chains) has negatively affected exports [17]. As a result of the above, South Africa has fallen twenty (20) positions down in the ICT Development Index [39].

2. Infrastructure

Reference [24] contends that South Africa has quality infrastructure because of the well-oiled transportation, water and electricity systems that support the economy. However recent developments provide evidence that South Africa is not as efficient as it was before the year 2002. Reference [39] advises us that the lack of infrastructural maintenance is largely responsible for the deteriorating infrastructure. As a result, South African infrastructure scored 45 out of 100 [26]. This suggests that South African infrastructure is moderately poor to support competitive advantage. Fig. 3 below illustrates South Africa's infrastructural rankings in Africa as per [40]-[42]. The African Competitive report measured 134 countries in 2009, 139 countries in 2011 and 144 countries in 2013. The lower the number a country scores, the more uncompetitive the country is.

In terms transportation, Fig. 3 indicates that the South African air transportation is afford competitive advantage to amongst others, the AMISA. The quality of air transportation infrastructure is the only competitive infrastructure that South Africa has, at 15 out of 144 countries. This is supported by a lower score in years to come due to the ZAR10 billion invested in new 20 A320 Airbus aircraft purchased by South African Airways (SAA) [6]. The AMISA can use this infrastructure to improve led time when supplying international markets through AGOA and other trade related bilateral trades. This should be used as motivation by other

South African divisions found to have poor infrastructural quality.

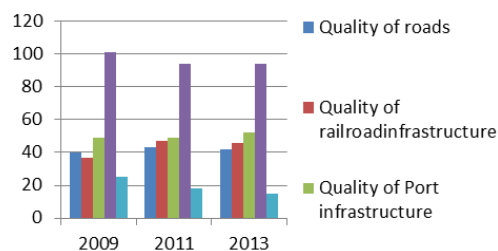


Fig. 3 South Africa's Infrastructural Rankings in Africa [40]-[42]

As indicated in Fig. 3, the quality of the South African railroad is moderately poor. Reference [32] supports this by stating that a parliament monitoring group cited poor maintenance as one of the challenges affecting the quality of railway infrastructure. [32] continues to state that despite South Africa having the largest railway network, a new railway connecting Swaziland and South Africa (KwaZulu-Natal has been commissioned. This will go a long way in improving the infrastructure but it will not address the poor quality of railway infrastructure. To facilitate the quality of railway improvement, Transnet³ has rolled out a ZAR205 billion rail project [32]. Such railroad improvements will aid competitive advantage for amongst others, the AMISA. Reference [3] states that road infrastructure is moderately poor. This is due to shortage of bitumen and infrastructural projects being unsustainable resulting in slow infrastructural development of South Africa. This presents challenges within the value chain and arguably adds to higher prices of apparel products manufactured in South Africa.

Based on Fig. 3, the quality of port infrastructure is far from being competitive. Since South Africa is viewed as the gateway to Africa, government spent some of its ZAR150 billion on increasing the ports capacity with ZAR4.3 million to ZAR7.6 million on 20ft containers [32]. The South African president stated that IMF forecasted that Africa would be the next centre of economic attraction following the decline of developed economies [1]. In preparing for this wave of economic activities, South Africa aims to upgrade its freight corridor from Gauteng to Durban and build a new port at the old Durban airport site in order to reduce handling costs. Reference [10] states that South Africa has increased its infrastructural expenditure proportion by 7.4% of GDP over the next three years in order to implement its mega-build programme. Even though it is surprisingly low compared to other developing countries, it remains a positive step towards fuelling the competitiveness of, amongst others, the AMISA. This advances the South African government's efforts to improve the availability of ports, but it has yet to address the poor quality of ports.

South Africa's electricity infrastructure is the poorest of all as stated in Fig 3. Even though lower from 101 scored in

³ Transnet is the operator of South Africa's transportation. It also holds majority shares in SAA, Spoornet (rail transport), Petronet (liquid petroleum) and Portnet [6].

2009, there are serious electricity infrastructural challenges in South Africa. Therefore it is at advance stages of building two power plants (Medupi and Kusile) which aim to produce 4 764MW and 4 800 respectively. South Africa's poor advance skills have seen the total cost of Medupi reaching ZAR150 billion [43]. Reference [43] argues that these costs would make Medupi the most expensive coal-fired plant in the world. These costs (ZAR150-billion) have been passed to consumers in the form of a 16% increase from an initial 25% requested in the cost of electricity in 2013 [11]. Over the years, South African electricity has increase by 170% [9]. Due to this increase shortfall, Eskom has yet to guarantee a continuous supply of electricity after 2018 due to a 29% shortfall of coal supply in South Africa [11]. Eskom has stated that the utility will have ZAR225-billion shortfall in revenue over the next five years. This paints a challenging future for the AMISA since the cost of input will continue to rise. This will continue to force the AMISA to be uncompetitive. With challenges already in advance skills, one can conclude that the AMISA will find it impossible to look for innovative ways of producing apparel and negating forecasted increases in input. The ability to pay the minimum will continue to be thorn on the AMISA.

South Africa surrendered its status of being the continent leader in internet and connectivity [39]. This provides evidence of poor maintenance of the telecommunication infrastructure by Telkom. Telkom incurred a loss of ZAR900-million to get mobile operator 8ta of the ground, it wrote off an unprofitable African venture and lost 6% of its data revenue [39]. South Africa's position on the ICT Development Index went down from 72 in 2002 to 92 in 2008 [39]. This highlights advance factor challenges facing amongst others, the AMISA.

Reference [35] states that the "logistics costs as a percentage of GDP in competitive countries should be between 8% and 10%. In South Africa, however, logistics costs as a percentage of total GDP rose by 0.7% to 12.6% in 2011 and are estimated to have risen to 12.8% in 2012 by the CSIR's state of logistics report for 2013". This is consistent with the above poor infrastructure critical for logistical cost reductions. One can argue that the high logistical percentage of 12.8% to GDP reflects the higher logistical cost characterizing the AMISA.

"The need to improve rail, road and port infrastructure is paramount..." [9]. To remedy the above poor infrastructure, [8] reported that former finance minister Pravin Gordhan made ZAR3.2 trillion available to realise South Africa's infrastructure-led growth. NEPAD is in a process of acquiring US\$6.9 billion to upgrade the North-South corridor between Durban and Tanzania [1]. This will see an improvement in its infrastructure and increase its chances of attracting 85 million manufacturing jobs set to move from China to other countries in the next five years by the World Bank. However, the challenge of advance skills still remains.

3. Highly Educated Workforce

"Education is a cornerstone of any progressive state, and significant investment is required to achieve a better standard of education in South Africa" [9]. The consequence of a methodical failure under apartheid to invest in the education and development of the largely uneducated black workforce remains evident. Reference [23] supports this by stating that poor whites were trained for supervisory, managerial and technical positions to create a more superior class than black people. Reference [37] outlines the following constraints:

- (i) The shortage of skilled labour to assume lucrative managerial positions from retired or retiring industry managers.
- (ii) The absence of a continuation plan (strategic failure).
- (iii) Lack of skills expansion plans for critical operation and production positions.

In light of this, one cannot rule out the impact of affirmative action policies⁴ of 1998 that produced unintended constraints for, amongst others, the AMISA. Affirmative action policy advocates that black Africans should be given first preference to occupy any position available in an organisation [4]. Compelling evidence show that whites occupy 73.1% of top executive management and 64.1% of senior management [30]. Reference [31] supports this by stating that it is difficult to find skilled and experienced "black staff to fill the quotas" as per the affirmative action legislation. One can argue that this policy accounts for the evidence of ageing apparel manufacturing industry's management while exposing the lack of continuation plans by the AMISA in line with the affirmative action [36]. The highlights implementation challenges of the affirmative action policy within the AMISA.

While South African education scored 82 out of 100 African countries [13]-[30] states that there has been an increase from 11% to 51% of black Africans with skilled technical abilities. Regardless of ageing senior and executive management holding on to these positions, the AMISA still lag behind (internationally) regarding quick response efficiencies, quality and delivery [36]. As a result of this, the sector's competitiveness capacity is shrinking. One could question the role of university research institutions since the apparel manufacturing industries are still faced with the same challenge ten years later.

4. University Research Institutions in Sophisticated Disciplines

Reference [9] advises that education and skills development are obstacles limiting South Africa's ability to be competitive. Universities offering clothing and textiles qualifications are not doing the apparel industry any favours in arresting the advance skills constraints. South African university clothing and textiles qualifications are predominately Fashion Design and Textile Design. There is lesser clothing manufacturing related qualification. And no programmes related to other aspects of textiles either then the textiles design. Only 34% of

⁴ Affirmative action policy of 1998 aims to eradicate the employment and wage gaps between the Africans and marginal whites produced by the apartheid government [4]-[31].

academic staff employed HEIs of South Africa have PhDs, compared to just one Brazilian university, the University of Sao Paulo, where 98% of their academic staff have PhDs [19]. The advance skills situation is worse in HEIs with clothing and textiles qualifications as indicated by Fig. 4.

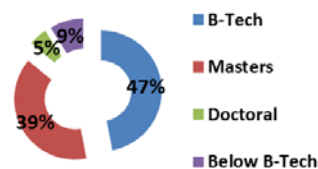


Fig. 4 Qualifications of Fashion and Textiles academic staff in the South African Universities ⁵

Fig. 4 indicates that 95% of clothing and textiles academic staff within HEIs of South Africa are without PhDs. Only 5% has PhDs. This highlights why the AMISA is battling with advance skills, technological development, technological application and innovation as they pursue competitive advantage. Reference [44] states that Hong Kong Polytechnic University in the Institute of Textiles and Clothing has a 90% academic staff complement with PhD. This explains why China has competitive advantage in clothing and textiles. It is thus evident that South African universities are a long way off from producing the kind of advance skills and graduates that can be necessary to develop competitive advantage through sophisticated disciplines [38].

Fig. 5 measure the effectiveness of HEIs of South African [40]-[42]. The African Competitive report measured 134 countries in 2009, 139 countries in 2011 and 144 countries in 2013. The lower the number a country scores, the more uncompetitive the country is.

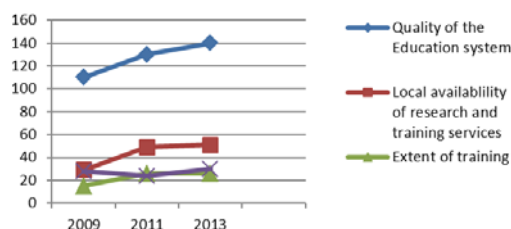


Fig. 5 Effectiveness of the Higher Education Institutions of South Africa [40]-[42]

Fig. 5 demonstrates the constant decline of the quality of higher education in South Africa. Reference [9] advises that South Africa's quality of education is in the bottom 20% of the world. This indicates that South Africa has the fourth worst quality of higher education system in Africa. The local availability of research and training services has also worsened since 2009. This is based on the poor research-related qualification output by HEIs of South Africa. Fig. 5 also shows a relationship between the poor local availability of

⁵ Data from Fig. 4 was collected from HODs of fashion and textiles departments through emails and telephone discussions. This data excludes one university and one university of technology with fashion related qualifications since they could not provide their data despite numerous efforts from the researchers.

research and training and university-industry research collaborations. The moderate collaborations between the AMISA and HEIs limits research output and industry competitiveness opportunities. Poor advance skills in Clothing and textiles HEI's departments contribute to lack of competitive advantage, poor research collaborations and research output. For South Africa to start competing within, amongst others, the clothing and textiles industry, indicators in Fig. 5 need to be at within a score of 1 and 10.

III. CONCLUSIONS

While AMISA have basic factor conditions necessary for competitive advantage in the clothing and textiles industries, Advance factor coordination has proven to be a challenging task for the AMISA, HEIs and government. It can be concluded that AMISA, HEIs with clothing and textiles departments and government lacks a cohesive competitive advantage plan, necessary technological upgrades and skills investment to overcome competitive advantage challenges.

Poor infrastructural maintenance has costs amongst others, the AMISA opportunities to close the cost competitive advantage gap and to develop competitive advantage through quick response technologies. South Africa's lack of advance factors impacts on the AMISA's value chain, thus the industry's failure to drive industrialisation as it has done before apartheid. This highlights government's lack of understanding of factors contributing to the development of competitive advantage of industries in general.

This paper highlighted the ineffective relationship between South Africa's state of infrastructure, clothing and textiles education, poor advance skills within the clothing and textiles departments and the AMISA in pursuit of competitive advantage. The use of Porter's Factor Conditions as a tool to analyses the sector's competitive advantage challenges and opportunities increased knowledge regarding factors limiting the AMISA's competitiveness. It is therefore argued that other studies on Porter's Diamond model factors like *Demand conditions, Firm strategy, structure and rivalry and Related and supporting industries* can contribute to the development of competitive advantage for the AMISA.

ACKNOWLEDGMENT

S. Mbatha thanks Prof Anne Mastament-Mason for her guidance, mentoring, and mostly for inspiring me to be a researcher. The author also thanks Walter Sisulu University (WSU) for financing the publication.

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