Higher Education, Skills and Work-Based Learning

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Received 17 August 2017
Accepted 25 September 2017

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Abstract

Purpose – The purpose of this paper is to improve the understanding of the drivers and determinants of skills demand in South Africa, given the country's history and its current design as a developmental state.

Design/methodology/approach – In this study, a mixed methods approach is used. The study draws information from in-depth interviews with transport sector stakeholders including employers, professional bodies, sector regulatory bodies and training providers. Complementary to the interviews, the study also analyses employer-reported workplace skills plans from 1,094 transport sector firms updated annually. A Heckman correction model is applied.

Findings – The study finds that changes in competition, technology, ageing employees, market conditions and government regulations are among the most frequently stated determinants reported through interviews. Using a Heckman regression model, the study identifies eight determining factors, which include location of firm, size of a firm, occupation type, racial and generational transformation, subsector of the firm, skills alignment to National Qualification Framework, reason for skills scarcity and level of skills scarcity reported. The South African transport sector skills demand is therefore mainly driven by the country's history and consequently its current socio-economic policies as applied by the state itself.

Research limitations/implications – Wage rates are explored during stakeholder interviews and the study suggests that wage rates are an insignificant determinant of skills demand in the South African transport sector. However, due to poor reporting by firms, wage rates did not form a part of the quantitative analysis of the study. This serves as a limitation of the study.

Practical implications – Through this research, it is now clear that the state has more determining power (influence) in the transport sector than it was perceived. The state can use its power to be a more effective enabler towards increasing employer participation in skills development of the sector.

Social implications – With increased understanding and awareness of state's influence in the sector, the country's mission to redress the social ills of the former state on black South Africans stands a better chance of success. Private sector resources can be effectively mobilized to improve the social state of previously disadvantaged South Africans. However, given the economic dominance of the private sector and its former role in the apartheid era in South Africa; too much state influence in a supposedly free market can result in corporate resistance and consequently, market failure which can be seen as result of political interference.

Higher Education, Skills and Work-Based Learning
Vol. 7 No. 4, 2017
pp. 408-422

2042-3896
DOI 10.1108/HESWBL-08-2017-0050

Originality/value – South Africa has had an unprecedented social and economic trajectory to date. This said, its economic and social policies are unlike what we have observed before. Thus, identification of determinants and understanding of mechanisms of influence, on skills demand in the sector in which an African state plays such a close and active role, is in itself a unique contribution to knowledge and compels us to revisit our traditional assumptions about market behaviour. This study is one of the very few of its kind in the labour market research with a South African context.

Keywords Determinants of skills demand, Developmental state, Direct state intervention in free market, Skills and employability demand

Paper type Research paper

Introduction

South Africa as a developmental state

Since 1996, at the end of over 12 years of international sanctions, South Africa's gross domestic product has almost tripled to $400 billion (United Nations Development Programme, 2015), and foreign exchange reserves have increased from $3 billion to nearly $50 billion (Collier *et al.*, 2015) creating a diversified economy with a growing and sizable middle class, within two decades of establishing democracy and ending apartheid.

High levels of unemployment, income inequality, growing public debt, political mismanagement, low levels of education, unreliable access to electricity and crime are all serious problems that have negatively impacted the South African economy. In 2016, the top five challenges to doing business in the country were: inefficient government bureaucracy, restrictive labour regulations, a shortage of educated workers, policy instability and corruption, whilst the country's strong banking sector was rated as a strongly positive feature of the economy.

The position of the South African economy should be understood from the point of view of its developmental history. The country suffered from decades of systemic and social bias, characterised by racial segregation and a system of selective developmental and economic exclusion formally described as apartheid (Thompson, 2001). This adverse political and social state meant that the country's majority population was denied access to both education and subsequently, decent employment. Instead, this non-white population served as cheap labour in favour of an economy exclusively benefiting the white population.

Whilst this state of affairs "drove" all sectors and industries (including the transport sector) of the South African apartheid economy; its negative consequences were burdensome to the post-apartheid and supposedly inclusive South Africa (Leubolt, 2014). Even though liberation of and transfer of political power to the black population is a major feature of the post-1994 South Africa; social development and meaningful economic inclusion are "pulled back" by low education and therefore low skills levels. These in turn, lead to "sluggish" absorption of the larger segment of the population into decent employment (Reddy *et al.*, 2016).

How the African National Congress lead state structured its role in the economy in promoting economic inclusion and social welfare is best explained by the theory of the developmental state. Developmental state, or hard state, is a term used by academia to describe a phenomenon in which a state (through its autonomous, political power) plays a strong intervening role, as well as extensive regulation and planning in the mainstream economy of the country (Johnson, 1982). A developmental state attempts to balance economic growth and social advances. It leverages state resources and state power to fight poverty and expand economic opportunities (Education Training Unit, 2017). Over the years since 1994, the South African state has committed itself to building a developmental state that efficiently guides national economic development by mobilising the resources of society and directing them towards achieving national goals, popularly documented in the National Development Plan (2012). Employment of previously disadvantaged groups into critical sectors such as the transport sector is one such strategy.

However, using state power to advance social policies has had challenges. In its early years, the democratic South Africa introduced affirmative action as a core element of the Reconstruction and Development Programme. This allocated black workers without the required skills into high-skilled and high-paying job positions. Whilst this action brought short-term social welfare for some individuals, it did not address the skills deficits caused by the apartheid system (Leonard and Grebler, 2006).

Since the beginning of the twenty-first century, after failure of the initial strategy (affirmative action), the South African state employed strategies that are more accommodating to economic growth. Among many strategies aimed at including previously disadvantaged groups into skilled employment; this study identifies three post affirmative action strategies: improving access to education for black children through investing high levels of state resources into education; closely regulating the employment market by applying socially friendly policies such the Broad-Based Black Economic Empowerment[1] and the drive for vocational education to fast-track employability of previously disadvantaged citizens through the introduction of Sector Education and Training Authorities[2].

Skills deficit and employment

Although the strategies mentioned above are intended to reduce skills deficit, improve employability and thus increase employment of previously disadvantaged individuals; evidence from the transport sector shows that there is a low rate of placement of qualified trainees into permanent position (Transport Education Training Authority, 2018). According to the Transport Education Training Authority (2017), the low rate of trainee placement is akin to further increase in demand for technical skills (in the same occupational groups the transport SETA has invested training for) in the transport sector.

The sector skills plan determines that this perpetual skills deficit (in the face of continuing skills development every year) is attributable mismatch between training content and sector skills needs; mis-estimation of skills demand levels; inadequate understanding of the behaviour of the sector by the training community and finally; dynamic changes in sector technology and operating standards.

Theoretical framework

Labour market regulation

This study borrows from the theoretical constructs of labour markets. Kalleberg and Sorensen (1979, p. 351) define labour markets as, "the arenas in which workers exchange their labour power for wages, status and other job rewards". Perfect labour markets therefore constitute institutions and practices that govern decisions about who to hire and who to fire, and at what level employees are to be remunerated. They also determine skills, at what level and of what type, and paid for by whom within sectors and industries. Such decisions are determined by employers and individuals in the light of incentives and signals set by the labour market. The classical assumption for labour markets states that perfect competitive markets represent efficient mechanisms for allocating resources and where possible, a relatively lightly regulated labour market encourages flexibility and maximises economic outcome (Keep, 2006). Neo-classical labour economics allows formulation and policy predictions of policy interventions scenarios on addressing poverty and inequality. There are contestations on the existence of perfectly competitive labour markets (Regini, 2000) and the markets are affected by a host of cultural, institutional, legal and political mechanisms which constitute labour market regulation (Benjamin, 2005).

Regulation encompasses all forms of deliberate state influence and social control or influence, including those that are not derived from the state, such as markets (Baldwin and Cave, 1999). The main objective of regulation is to enhance social equity and redistribution

to off-set the inequalities of income and power produced by market failures and injustice/exploitation, i.e. efficiency and/or equity (Betcherman *et al.*, 2001). Regulation also aims at: increasing efficiency; fostering consumption; extending social citizenship rights and improving job and income security (Regini, 2000). Labour market regulation approaches are dominated by two opposing perspectives; the "institutionalist" and "distortionist" views (Freeman, 1992). The former views job security arrangements, minimum wages and collective bargaining as providing important social protection for workers, as instruments for encouraging productivity growth. The latter emphasises the advantage of market processes and is concerned that these institutional forms of regulation impede adjustments to economic shocks, discourage hiring and favour "insiders", i.e. regular workers (Betcherman *et al.*, 2001). Benjamin (2005) identifies eight sub-categories of labour market regulation, these are: minimum conditions of employment; collective bargaining and worker participation; institutions of governance; dispute resolution and adjudication; promoting equality in the workplace; providing skills development and placement within the labour market; and providing employment-linked social security.

Employer skills demand

Skills of the labour force are normally regarded as a key engine for economic performance (Acemoglu and Pischke, 1999). In addition, most businesses within various economic sectors require specific skills which cannot be met by general-purpose education and require workplace training. Within the labour market/skills development nexus, a number of assertions are put forward regarding the links between labour market regulations and the development and/or maintenance of an adequate skills base (sf. Lloyd, 1999). Streeck (1997, p. 37) argues that labour regimes that suppress dismissals of workers influence employers to treat labour as a fixed factor of production, thus encouraging higher investments in skills. Non-competitive labour markets compress wages encouraging firms to invest in general training, i.e. training that is also relevant to other employers (Acemoglu and Pischke, 1999). Bassanini and Ernst (2002, p. 394) further argue that employment protection provisions affect the quality and provision of skilled labour leading to the emergence of issues regarding who will pay for investment in human capital and the nature of required competencies. In this context, it is argued that skills of a general nature which can be used in different firms and industries improve the market value of workers; hence workers are bound to invest in skills development. According to Ashton *et al.* (2000, p. 9), understanding sectoral systems of skills formation within a labour market context emanates from focussing on the structure of work opportunities and production processes that affect skills development. It assumes structured and often highly segmented labour markets where differences between occupational and internal labour markets are important as having different models of skill acquisition. Marsden (1994) in Ashton *et al.* (2000) gives two models of skills formation, i.e. school-based vocational training and private training provision by employers.

Stasz (2001, p. 386) gives four types of work skills identified in skills for work literature, these are: academic or cognitive skills associated with subject matter areas; generic skills such as problem solving and communications; technical or occupation specific skills; and work-related attitudes or "soft skills". Research shows that employers are more concerned with soft skills. On the other hand, Mounier (2001, p. 28) defines three logics of skills: technical, behavioural and cognitive. Technical logic concerns the exercise of labour in the process of production and is determined by particular production methods and technologies. Behavioural logic implies personal qualities to deal with interpersonal relationships required for the successful execution of job tasks. Cognitive logic concerns the level and kind of general education and training undertaken by a population to enhance understanding and action in the world. According to Stasz (2001), assessing employer skills demand has two ontological perspectives; economic and socio-cultural perspectives. The former views skills as attributes amenable to quantitative measurement by an

independent observer. According to Greeno (1998), the socio-cultural perspective shifts from focussing on individuals towards social systems with a recognition that social settings in which cognitive processes take place are an integral component of the activity not just the surrounding context in which they happen. This entails that skills demanded by an employer are context specific, and skills requirements redefined by qualitative measures. Such measures are embedded in socio-cultural values and varying mental models.

Research method

Data collection

A mixed methods research approach was adopted to capture both qualitative and quantitative data. Mixed methods is a research approach, popular in the social and behavioural science, in which researchers collect, analyse and integrate both quantitative and qualitative data in a single study (Creswell, 2014).

In gathering quantitative data, no sampling strategy was applied as data was collected from workplace skills plan (WSP) surveys which are submitted by employers in mandatory grant processes. However, statistics from the 2016/2017 sector skills plan prove that 6 per cent (or 1,094 out of a registered 17,400 companies) out of the entire transport sector participate in WSP/ATR processes towards skills planning for the sector.

The WSP data are supplemented with collection of information through a qualitative manner. The research team hosted stakeholder interviews in eight (out of nine) different provinces across the country. The provinces included: Gauteng, Free State, North West, Eastern Cape, Western Cape, Limpopo, KwaZulu-Natal and Mpumalanga. Invitation letters were circulated through e-mails and supplemented by follow-up phone calls (see sampling below). The interviews were targeted to senior managers of institutions. The selection of participants is based on a prescribed criteria provided by the research team (see sampling below). Interviews were used to get an understanding of how employers (and the sector as a whole) make decisions concerning skills needs and what affects these decisions.

Sampling

Target population and research context. The study targeted representatives of the South African transport sector which are arranged into eight subsectors, covering: aerospace, freight forwarding and clearing, freight handling, maritime, rail, road freight, road passenger and taxi chamber. The study relies on the views of sector representatives as they are subject matter experts who are at the forefront of skills development within the sector. Such sector representatives range from: labour unions, professional bodies, employers, commuter associations, traditional leaders, municipalities, NGOs, research institutions, youth-led organisation, SMMEs, HEIs, department and public entities together with TETA internal stakeholders across the various chambers and organisational units.

Sampling method. Given that the WSP annual reporting process includes all active employers in the country; there is no sampling strategy applied for the collection of quantitative data.

To obtain sufficiently balanced sample for the in-depth interviews; the participants were selected on the basis of subsector representativeness (making sure that all eight subsectors are represented). Second, participants were also invited based of the type of organisation (stakeholder type) they represents. The selection criteria presented as below were applied:

(1) the participants were required to have the authority to provide information regarding institution's skills developments performance (if it is classified as an employer);

(2) the participants were required to have at least two years' experience in the position occupied, or similar position in the previous institution;

(3) where a participant were required to nominate, the participant was required to not be pared with his/her superior (unless it is to satisfy Criterion Number 4);

(4) each organisation was required to bring two candidates (one male and one female); and

(5) the participants were allowed to speak any of the 11 official languages (provided that this is stated upfront).

In total, 56 individuals were interviewed across eight different provinces.

The interviews targeted senior managers of institutions with relevant experience to ensure that respondents are well-informed subject-matter experts. Senior managers are best-fit respondents to give insight on the issues of skills development as they are tasked with giving both strategic and operational direction for their organisations, making them knowledgeable on issues affecting institutional skills development.

Data analysis

As a result of the data collection methods applied, two types of data were gathered. Quantitative data from the WSP survey, and second, transcribed (qualitative) responses from the interviews. Thus, the analytical methods applied in the study included a quantitative analysis of the WSP data using inferential statistical methods (described below). Then an analysis of the qualitative responses using thematic coding (also described below). The findings from both analytical methods are then summarised and discussed comparatively to arrive to a conclusion.

Qualitative analysis. The transcripts from the interviews were coded. A thematic analysis was adopted (deductive coding) as a means of analysing qualitative data from interviews. Thematic analysis allows categories to emerge from data. The research team examined patterns across data sets into themes that were associated with the study. The arising themes subsequently became categories for analysis. Such themes were generated from the data based on relevance to the research question. The interpretation of themes was therefore supported by the coded data.

Quantitative analysis. After extensive data preparation, the WSP data were analysed using statistical software (Stata). Inferential statistics were employed to analyse the relationship between sector-reported skills needs (skills demand) and various employment, trade and demographic variables.

Being aware that a non-random sampling strategy was applied in collecting the WSP; the research team found it statistically inappropriate to apply techniques which are based on strong assumptions about the distribution of data. One such frequently applied technic would be ordinary least square regression. However, surveys such as the WSP survey (with self-selected respondents) are "notorious" for carrying alarming levels of selection bias. Selection bias refers to the distortion of a statistical analysis, resulting from the method of collecting samples, i.e. a skewed representation of the population as a result of the method of subject selection applied (Heckman, 1979). If the selection bias is not taken into account, then some "material" conclusions of the study may not be accurate.

Instead, the study uses a Heckman correction model. The Heckman correction, a two-step statistical approach, offers a means of correcting for non-randomly selected samples in a regression analysis. The model calculates and corrects the resulting regression model for the extent of selection bias as a result of a non-random subject selection method. Whilst this study applies and interprets results from the Heckman selection model to test and adjust for potential truncation (a phenomenon where the dependent variable is restricted around or beyond a specific value for all observed values of the independent variables); the explanation of the model is outside the scope of this study.

Empirical model. In this analysis, the theoretical framework builds on the work of Marchante *et al.* (2006), who studied the regional determinants of the propensity to have

scarce skills (hard-to-fill vacancies). In their work, they followed a Haskel and Martin (2001) model which assumes that the propensity of a company i to have hard-to-fill vacancies or skills shortages can be expressed as:

$$Y_i^* = X_i\beta + \mu_i, i = 1, \ldots, N, \quad (1)$$

where Y_i^* is a non-observed variable representing the propensity of a given firm i to have hard-to-fill vacancies, X_i is a vector $(1 \times m)$ of m explanatory variables in the firm i, β is a vector $(m \times 1)$ of coefficients, and μ_i is the error term with a normal distribution averaging zero and a constant variance per unit (Marchante *et al.*, 2006).

Whilst some of the explanatory variables used in Marchante *et al.* (2006) and Haskel and Martin (2001) before them are similar; the explanatory variables used in this study closely respond to the context of South Africa in which the state plays an active role in the market. In this study, important factors such as workplace transformation (process by which a demographic region or country changes in composition), location of firm, government regulation, growth of small and medium enterprises, skills levels and technology; are all contextually relevant to a South African case and should therefore be explored by this study.

In their papers, Marchante *et al.* (2006) and Haskel and Martin (2001) distinguish between internal factors and external factors. Internal factors are the factors which are within the "sphere of influence" of the firms, i.e. factors which can be changed or altered by a firm such as wage levels; whereas, external factors are the factors outside the "sphere of influence" of a firm. Such factors include government regulation, economic conditions, etc. Similarly, this study will make the same distinction.

Table I provides a list of explanatory variables (which are all being considered as demand-determining factors).

Factor	Description	Category
Location	Provincial location of the firm. Some provinces have high activity of transport business	Internal factor
Organisation size	Size based on the total number of employees	Internal factor
Reporting of skills development activities	Whether the firm is compliant in reporting skills planning and training annually	Internal and external
Occupation type	This is the category of the skill demanded	Internal factor
Generational transformation	Percentage of workers under the age of 30 years in decision-making positions	Internal and external
Racial transformation	Percentage of workers categorised as non-white in decision-making positions	Internal and external
Subsector	One of the 8 transport subsectors the firm belongs to	Internal factor
Standard qualification aligned	Whether the skills training programme of the occupation is aligned with National Qualification Framework (NQF)	External factor
Qualification level	The skills level rating of the qualification according to the NQF	External factor
Training regulation	Whether the training programme is regulated by the Sector Education Authority	External factor
Level of scarcity	Measure of the level of skills scarcity in recruitment months	External factor
Funding model	This refers to the manner in which the firm funds the skills programme	Internal and external
Reasons for scarcity	The firm's reported reason for categorising the skills as a scarce skill	Internal factor
Foreign immigrants in firm	This is the number of foreign-sourced skilled professionals employed by the firm	Internal factor
National critical skill	Whether the demanded skills has been declared as a critical skill in the national roster	External factor

Table I.
A list of explanatory variable

As explained in the background section above, the South African history shapes the way the industry operates and certainly how firms hire in the industry. Given that the South African law provides some level of autonomy at a provincial level, the study expects that the regulatory environment and levels of service provision between the different provincial locations to be different. Thus, in a country where the state plays such an active role in the industry, the location of the firm should be one of the external determining factors of demand. Similarly, the level and type of transformation in the firms is viewed as the firm's propensity to welcome national imperatives. In this case, the rationale is that a more transformed firm is more likely to be compliant and therefore more likely to focus on creating more employment opportunities when conditions are favourable. On the other side of the argument, rigid and very specific national skills targets and therefore skills development policies can make it difficult for firms to find and appoint needed skills. As an example, a firm in the transport sector can experience an abundance of skilled engineers who mostly happen to be from the same racial or gender group; but at the same time, the firm can simultaneously find itself forced to appoint new engineers if the state insists that engineers in each firm should reflect the racial or gender diversity of the country. In this case, the demand for engineers is directly influenced by regulation.

Results

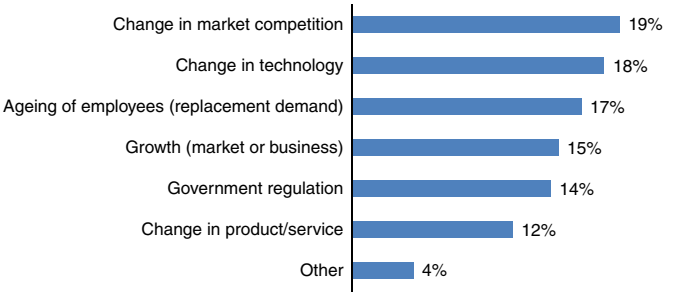
Results from qualitative data

Figure 1 is a result of the combination of in-depth interviews with stakeholders in the transport sector. As described in the methodology section, stakeholders include employers, labour union representatives, research institutions, training institutions, NGOs, representatives from government department, etc. Through the use of interview guides, a set of questions pertaining to the determinants of skills demand and supply were asked. A sample of questions includes the following:

- "What determines the number of new employees needed?"
- "What drives your demand for the list of skills provided?"
- "What was the reason you appointed new employees in the previous financial year?"

Interview transcripts were manually coded, using a deductive coding technic which identified emerging themes and codes from the actual responses. The coded data were subsequently analysed quantitatively.

Figure 1 shows that the three most popular determinants of skills demand are changes in market competition; which in some cases was an indication of competition for limited and



Note: $n = 180$
Source: Data from TETA research tab survey (2017)

Figure 1.
Determinants of skills demand

rare skills among many companies. In other cases, it is an indication of changes in economic conditions at the macro level. This mainly affects companies with exposure to currency fluctuations and international trade. This is mostly the case in road freight, aerospace and maritime businesses. The second most popular determinant is change in technology, followed by ageing of employees. Whilst technological changes are common to all other infrastructure-intensive sectors such as mining and energy sectors; ageing of employees seemed more unique to the transport sector. According to group discussion with employers, the transport sector (being highly technical) tends to keep its older and more experienced employees. However, many of the businesses are increasingly realising the need to replace those who are nearing the retirement age.

Descriptive statistics from quantitative data

Transport sector businesses tend to be concentrated around regions with high economic activity. In South Africa, it is a generally accepted reality that business and economic activity is concentrated in provinces with active metropolitans such as Gauteng (Johannesburg), Western Cape (Cape Town), KwaZulu-Natal (Durban) and to a smaller extent, Eastern Cape (Port Elizabeth), the transport sector in Johannesburg is driven by high activity of other sectors such as: retail, manufacturing (especially in the industrial areas of Ekurhuleni), construction, tourism and hospitality, etc. Meanwhile, transport businesses in the coastal areas are mainly driven by the ocean economy and, Tourism and Hospitality. Figure 2 provides a depiction of the geographical distribution of transport businesses across the country. Clearly showing how Gauteng is leading all other provinces, followed by the coastal areas.

Although the transport sector is largely known to host big state parastatals (such as SAA, Transnet, etc.) with the financial capacity to handle the infrastructural requirements of the sector, its largest constituency consists of small business (those providing employment to 1-49 individuals). In fact, according to the WSP (surveying about 1,094 companies), almost 50 per cent of the sector consists of small companies. The remaining half is equally split between medium size and large companies (see Figure 3).

Figure 2.
Geographical distribution of transport sector businesses

Source: Data summarised from TETA WSP (2017/2018)

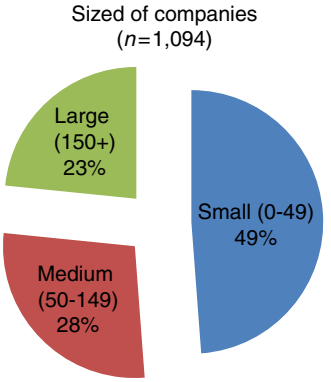
The sector mostly employs previously disadvantaged racial groups (black, coloured and Indian). These groups constitute about 85 per cent of the workforce. Out of all subsectors, road passenger and rail subsectors are the most "racially transformed" subsectors, whilst maritime and forwarding and clearing are trailing behind.

Integration of female workers (gender transformation) is still a challenge in the sector. The only gender-balanced occupation seems to be "clerical support work". Females are relatively less well represented in decision making and technical roles such as "professional, management, technical and associate professionals". Given that the national workforce has a 55 to 45 per cent split in favour of females (Stats SA, 2017); the sector still has more work to do to match it. The details are presented in Figure 4.

Inferential statistics

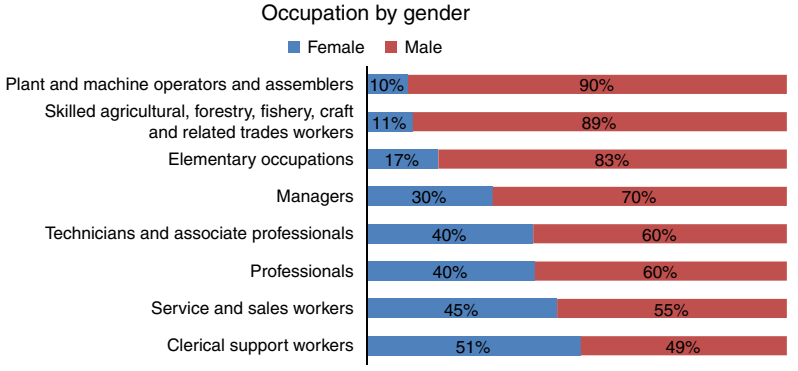
In this study, Equation (1) is modified to fit the research purpose. Equation (1) is as stated above:

$$Y_i^* = X_i\beta + \mu_i, i = 1, \ldots\ldots, N, \quad (2)$$



Source: Data summarised from TETA WSP (2017/2018)

Figure 3.
Breakdown of transport sector businesses by company sizes



Source: Data summarised from TETA WSP (2017/2018)

Figure 4.
Sector occupations by gender

To fit the purpose of this study, the subject of the equation is defined as the estimated demand i.e. Y_i^* is herein defined as an estimate of the true skills demand for the transport sector Y_i for company i. Therefore, this study estimate the relationship between skills demand in the transport sector and vector of possible internal and external explanatory factors as listed in Table I. The result of Equation (1) is summarised in Table II.

Table II shows a list of factors and their status as the potential determinants of skills demand. The results are obtained by replicating Equation (1) using a Heckman model to

Factor	Coefficient	*p*-value
Generational transformation	0.424902**	0.029
Racial transformation	0.383755**	0.004
Company size (Log of)	0.284855***	0.000
Foreign immigrants in firm	0.056658***	0.000
Occupation type		
Elementary occupations	0.3078	0.102
Managers	−0.53072***	0.000
Plant and machine operators and assemblers	0.579713***	0.000
Professionals	−0.71246***	0.000
Service and sales workers	0.009059	0.981
Skilled agricultural, for estry, fishery, craft and related trades workers	−0.04384	0.766
Technicians and associate professionals	−0.16284	0.254
Location		
Free State	0.164894	0.395
Gauteng	0.239684**	0.044
KwaZulu-Natal	0.301713**	0.021
Limpopo	0.142835	0.563
Mpumalanga	0.061945	0.792
North West	−0.14916	0.519
Northern Cape	0.128435	0.695
Western Cape	0.102915	0.557
Alignment to National Qualification Standard	0.212838**	0.018
Qualification Level	−0.01279	0.571
Measure of hard-to-fill vacancy		
Medium (7-12 months)	0.107414	0.234
Short (0-6 months)	−0.24235**	0.009
Reasons for scarcity		
National critical skill	−0.02894	0.748
Not enough training/training providers	−0.65827**	0.047
Candidates have knowledge of career opportunity	1.058285**	0.002
Change in technology	0.105401	0.731
Wages are pushed high/skill highly competed for	−0.02157	0.961
Subsector		
Forwarding and clearing	−0.37061**	0.022
Freight handling	−0.47268**	0.004
Maritime	0.060571	0.762
Rail	0.121948	0.491
Road freight	−0.13363	0.391
Road passenger	0.536408**	0.005
Taxi	1.392835**	0.006
Constant	−1.57601*	0.051

Notes: *,**,***Significant at 10, 5, 1 per cent levels, respectively

Table II.
Estimation of a Heckman model

adjust for potential selection (sampling) bias. Note that the model confirms transformation (both generational and racial transformation) as a significant determinant of skills demand in the South African transport sector. The model shows that there is a positive relationship between skills demand and the levels of transformation in a firm. This finding is expected to be unique to a developmental state such as South Africa in which the state highly regulates the labour market. It further confirms the assertion that a firm controlled mostly by "transformation candidates" tends to be more compliant in creating more employment opportunities for other transformation candidates.

The model also shows a positive and significant relationship between skills demand and the size of the firm. This relationship can be an indication that bigger and more mature firms with a lot of operating experience tend to fair relatively better than smaller firms. Therefore, such firms show relative better employment prospects than others, even in tough economic conditions.

Although only a small effect; the model also shows that firms which frequently use the option to recruit skills outside the country (which is strictly discouraged in South Africa and only allowed if the firm shows evidence of failure to successfully recruit from within) reflect relative higher skill demand than others. This study regards the finding as an indication of the level of and the sophistication of the skills required in these firms. For this reason, the study also controlled for the National Qualification Framework (NQF) levels of the skills. Interestingly, the NQF level of the skills did not come out as a significant determinant of skills demand even though, the fact that the skill and the related training programme are aligned to NQF (it has been rated), actually came out as a significant determinant of skills demand. In fact, the model shows that firms tend to be more in need of skills which are rated by the qualification framework. The underlying explanation of this can be that skills which are rated by the national framework are those which are mostly critical to the transport sector. Furthermore, by virtue of being rated, these skills are a fragment of the national training priorities and plans. Given that skills that are prioritised through qualifications framework by both the sector and economy tend to benefit from training funds from the state; the study can safely assume that rated (or accredited on NQF) skills are in turn, benefiting from relatively higher volumes of training. Following this logic, it is therefore highly improbable (or at least unlikely) that skills supply volumes (through high levels of training) do not match the consistently reported demand. This argument is therefore in support of the claim that the mismatch lies in the subject of skills demand and not necessarily the volume of demand. The finding is contrary to the popular assertion that there is a mismatch between skills training and skills demand in South Africa.

Complementary to the finding that NQF alignment is a significant determinant of skills demand; occupation type (which is also an indirect measure of the level of skill required) is a significant determinant of skills demand. Skills in senior positions (such as management and professional) show a negative relationship with skills demand; meanwhile, there is a positive relationship between skills demand and skills in technical positions (plant and machine operator). This finding can be explained by fact that the transport sector is a highly competitive and technically intensive sector in a developing country. In such a sector, firms naturally have a stronger preference for technical skills than they have for senior skills, which in South Africa can be filled by individuals without technical training.

As expected, skills demand can also be determined by the location of the firm. However, contrary to the conclusion made by Marchante *et al.* (2006), both firms' location in the capital (Gauteng) and firms located in the coast (KwaZulu-Natal) show a positive influence on skills demand. This is another finding unique to South Africa given that Gauteng and KwaZulu-Natal represent the biggest economic provinces for the transport sector. Whilst Gauteng holds the biggest industrial economy of the country; KwaZulu-Natal is the main port of entry for most of the country's international trade.

The history of South Africa is such that the black and poor majority was systematically excluded from quality education and therefore also relevant knowledge of career opportunities in the sector. It is thus not surprising that the study makes another finding characteristics of South Africa; limited training and limited knowledge of career opportunities were significant determinants of skills demand. This is arguable a challenge relevant only to a developmental state with employment policies such as applied in South Africa.

Lastly, the model also shows that skills demand in the transport sector can vary with variation in the type of transport business the firm operates. Specifically, the subsector or the fragment of the transport sector can determine the level and direction of skills demand in South African transport sector. Note that while the forwarding and clearing and the freight handling subsectors have "shrinking" effects on skills demand (negative relationship); the road passenger and taxi subsectors have expanding effects on skills demand in the South African transport sector. The two former subsectors are directly dependent on foreign trading and foreign markets which have shown a general recession during the time of the study, with reports of loss of employment during the time. On the other hand, the two latter subsectors are mainly driven by population growth in South Africa (which has always shown a growing trend). The country is highly dependent on public transport as the majority of South Africans commute via public transport. This said, the two subsectors have been experiencing an expansion hence a positive relationship with skills demand is observed.

Conclusion

This study has explored the relationship between a number of factors and their influence on skills demand. In its analysis, the following highlights are identified.

First, from the qualitative analysis (analysis of the data form interviews) of the study, we have found that among many reported determinants of skills demand: changes in competition, technology, ageing employees, market conditions and government regulations are among the most reported determinants.

Second, the study identified eight factors which significantly determine skills demand in South African transport sector. The factors are, namely, location of firm, size of a firm, occupation type, racial and generational transformation, subsector of the firm, skills alignment to NQF, reason for skills scarcity and level of skills scarcity reported. Whiles there are some similarities with the list from Marchante *et al.* (2006), Haskel and Martin (2001) as well as Green *et al.* (1998); this list tends to be more responsive to the South African context. The list shows particular consistence with other studies in reporting location, firm size and appointment of foreign skilled individuals.

Third, the findings draw from the logic and explanation provided by Marchante *et al.* (2006): that internal factors by definition tend to be short-term factors which are amendable to the decisions of a firm, whilst external factors are more systematic and long term, and are outside a firm's sphere of control. Out of the eight factors found to be the significant determinants of skills demand, three are external factors which are directly and indirectly a reflection of the country's socio-economic factors and therefore its economic and social policies. Even though the paper concludes that skills demand in South African firms is determined by both internal and external factors; external factors tend to be stronger and more important to the South African context. This conclusion is in line with assertion that employment and skills demand in South Africa are highly driven by the country's history and its current economic and social policies. Broadly, the country's social policy of redressing the ills of the past is a dominant factor which manifest itself through industry determinants such transformation, economic activity, alignment to national qualification (proxy for national priorities), location, etc.

Finally, in other studies, wages and wage rates are thoroughly explored as a potential determinant of skills demand. In this study, wage rates are explored during stakeholder interviews and the study suggests that wage rates are an insignificant determinant of skill

demand in the South African transport sector. However, due to poor reporting by firms, wage rates did not form part of the quantitative analysis of the study. This serves as a limitation of the study.

The main conclusion is that the fact that the state plays a close and direct role in the sector's employment has, in turn, close and direct effect on skills demand in the sector. The South African transport sector skills demand is mainly driven by history and socio-economic policies of the country as applied by the state itself.

Notes

1. Broad-based black economic empowerment, or B-BBEE, is a strategy to ensure that all South Africans are able to meaningfully participate in the mainstream economy. It covers prioritisation of previously disadvantaged citizens in skills development, employment equity, socio-economic development, preferential procurement, enterprise development, especially small and medium enterprises, promoting the entry of black entrepreneurs into the mainstream of economic activity, and the advancement of co-operatives.
2. SETA is an industry bodies convened in 2000 by the Minister of Labour with the mission to develop and implement a sector specific skills plan, registering and promoting learnerships and applying to SAQA for accreditation as an Education and Training Quality Assurance Body (ETQA) for qualifications in its sector.

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