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Boris Urban; John Mgwenya

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State-Owned Entities in an African Emerging Market Context: The Role of Entrepreneurial Intensity and Capabilities in Performance

Boris Urban
University of Witwatersrand, South Africa
Boris.urban@wits.ac.za

John Mgwenya
University of Witwatersrand, South Africa
John.Mgwenya@gauteng.gov.za

Research in public sector entrepreneurship is proliferating which indicates that it is viable for organisations operating within a government regulatory regime, such as in state-owned entities (SOEs). This study examined the extent to which entrepreneurial intensity and entrepreneurial capabilities influence the performance of SOEs, while moderating effects of the external environment on this relationship were analysed from an African emerging market perspective. Primary data was collected via a structured questionnaire from SOEs operating in South Africa. After checking for instrument validity and reliability, findings based on moderated regression analyses show that the degree and frequency of entrepreneurial events, as well as human capabilities, can predict improved performance. The originality and contribution of this study is highlighted in appreciating the role that entrepreneurial intensity and capabilities have on improving SOEs' public responsiveness and financial performance in an emerging market context.

Keywords: entrepreneurship, entrepreneurial intensity, innovation, capabilities, performance, state-owned entities, South Africa
JEL Classification: D8, J24

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Introduction

A considerable amount of research shows that corporate innovation and entrepreneurship are essential components of organisational management and strategy (Morris, Kuratko and Covin 2010; Schröder et al. 2021). Entrepreneurship at the organisational level can provide answers

to rapid technological change by delivering flexible innovative solutions, allowing organisations to respond with agility and proactiveness to resolve the various dilemmas they face in the 21st century (Urban and Maswabi 2021).

However, the notion and practice of entrepreneurship is not widely applied in the public sector environment, particularly in emerging markets. The reasons for this range from a highly restrictive regulatory public sector environment to an overall constricting mandate guiding public institutions in emerging markets (Bruton et al. 2015; Gil-López et al. 2020). Such challenges in the public sector realm coincide with a dearth of research undertaken on understanding entrepreneurship in this domain (Tremml 2018). Hence, the aim of this article is to better understand how, under the right circumstances and with the right capabilities, innovation and entrepreneurship can enhance organisational performance and create public value.

While research on innovation and entrepreneurship is prevalent in the general management literature, deliberation on entrepreneurship in public enterprises is only starting to evolve. In this regard, studies indicate that the public sector is also inclined to engage in entrepreneurial practices in the form of public/civic entrepreneurship (González-Álvarez and Argothy 2019; Jia, Huang, and Zhang 2019) and practice sustainability-oriented innovations in public procurement (Davtyan and Piotrowicz 2021), and that public sector entrepreneurship is possible within the confines of organisations operating within a government regulatory regime (Demircioglu and Chowdhury 2020; Meissner, Sarpong, and Vonortas 2019). An understudied yet important context where entrepreneurship can play a role is in state-owned entities (SOEs) (González-Álvarez and Argothy 2019).

SOEs are ingrained in government structures across the world, such as in China, the US, India, and South Africa, and are typified as a statutory institution formed to initiate commercial activities on behalf of the government and to assist the government in meeting its public goals (International Monetary Fund 2020; PricewaterhouseCoopers 2015). While much of the research has focused on SOE public administration issues (Bruton et al. 2015), the contextualisation of important aspects of innovation and entrepreneurship needs to be better understood, particularly under varying conditions such as those found in emerging economies (Urban and Maphumulo 2022). Considering the movement towards marketisation in the conveyance of public services (Kearney, Hisrich,

and Roche 2010), SOEs need to explore new ways of becoming innovative and maximising opportunities by being proactive towards their customers (Meissner, Sarpong, and Vonortas 2019). In this way, SOEs may promote a systematic way of managing their innovation capabilities within the parameters of organisational structures, legislation, and organisational culture (Meynhardt and Diefenbach 2012). Recent research highlights how public authorities need to find agile concepts to meet the challenges ahead (Schaebs 2021).

Recognising the gap in the management literature explaining the role of entrepreneurship in performance in the public sector domain, the objective of this article is to empirically *assess the extent to which (a) entrepreneurial intensity and (b) entrepreneurial capabilities influence the (c) performance of* SOEs*, while (d) the moderating effects of the external environment on this relationship are analysed from an African emerging market perspective.*

The relevance and importance of this study is based on the significant role which SOEs play in the South African economy. Many SOEs were established during the apartheid era to counter the impact of international sanctions against the country (Chitiga-Mabugu et al. 2021). Today, SOEs play a lead role in key sectors such as electricity, transport (air, rail, freight, and pipelines), and telecommunications, where limited competition is allowed in some of these sectors (i.e. telecommunications and air) (International Monetary Fund 2020). The Department of Public Enterprises has oversight responsibility in full or in part for the approximately 700 SOEs that exist at the national, provincial, and local levels, and which employ approximately 105,000 people. SOEs' assets amounted to 34 percent of GDP at the end of FY2019/20. Public-sector capital expenditure decreased by R6.1 billion (-3.0%) between 2020 and 2021, from R204.3 billion to R198.2 billion, representing the fifth consecutive year of decline. For the public sector, capital expenditure represents money spent on construction, machinery, equipment, land, buildings, and other fixed assets. The SOEs of Eskom (electricity) and Transnet (transport) recorded the largest decreases in 2021, where Eskom cut back on capital expenditure by R4.2 billion, from R36.4 billion in 2020 to R32.2 billion in 2021, to meet its liquidity requirements through effective cost management and deferral of capital expenditure (Statistics South Africa 2022).

Deficiencies in SOEs' service delivery, especially in electricity provision, combined with corruption scandals in procurement and administration, have been a source of discontent and have led to demands for

reform in South Africa (Chitiga-Mabugu et al. 2021). Moreover, the financial performance of many SOEs in South Africa continues to deteriorate, intensified by the COVID-19 pandemic and its implications for business, deferring their ability to deliver on their mandates without significant government backing (Statistics South Africa 2022). As a result, where SOEs in South Africa have an unsatisfactory service delivery history and the inadequate quality of their services is an ongoing dilemma, calls have been made for a better governance model that will promote innovation and proactive thinking by administrators to improve service delivery modes to communities (PricewaterhouseCoopers 2015). Considering the current economic climate in South Africa with high inequality levels, low economic growth, and inadequate revenue collection by government (Oualy 2021), it is imperative to establish economically sustainable SOEs (Republic of South Africa 2015). SOEs provide highly significant structuring elements which may influence development patterns such as transportation networks, bulk infrastructure, energy, and ICT infrastructure (International Monetary Fund 2020). With a dominant role in network industries, SOEs in South Africa provide key inputs to business and, given the extent of their influence, innovative, effective, and efficient SOEs are required in South Africa. More specifically, SOEs need evidence-based measures to adopt entrepreneurial practices to transform themselves so that they can provide better services to their many different beneficiaries (Jia, Huang, and Zhang 2019; Kearney, Hisrich, and Roche 2010).

The article provides some novel contributions to the literature on innovation studies and entrepreneurship. On a conceptual and empirical level, the paper elucidates the function of innovation at the organisational level by employing the constructs of entrepreneurial intensity (EI) and entrepreneurial capabilities (EC), and then relates these constructs in terms of improving performance within the context of SOEs. The notion of EI (Liu and Wang 2020; Lumpkin and Dess 2001; Morris, Kuratko, and Covin 2010; Urban and Maphumulo 2022) has been advanced in prior research to appraise the general nature and level of entrepreneurship amongst firms and individuals, insofar as it captures the 'degree and frequency of entrepreneurial events' (Wales et al. 2021). Considering the institutionalisation of 'public value management' in many organisations, entrepreneurial behaviour has now risen to some prominence in public sector organisations (Demircioglu and Chowdhury 2020; Kearney, Hisrich, and Roche 2010; Koe 2013). Accordingly, it seems fitting to evaluate

the usefulness of EI in this public domain setting. Building in this research direction, the study supplements earlier discourse on EI by recognising the significance of adopting a multidimensional approach towards assessing EI in terms of 'innovativeness, risk-taking, and proactiveness' in relation to organisational performance. Similarly, EC are deemed to be important co-determinants of EI and for the purposes of this article reflect a broad range of skills, abilities, or competencies regarded to be imperative to organisational performance (Unger et al. 2011; Urban and Maswabi 2021). Performance also requires contextualisation with respect to public sector environments, and to obtain contextual relevance, various dimensions of performance are operationalised in the context of specific public sector organisational environments, where the focus is not on profitability but also includes responsiveness to changing stakeholder needs (Kearney, Hisrich, and Roche 2010). Globally, SOEs may be subject to a weaker disclosure regime than publicly traded companies if they are liable to weak enforcement of relevant corporate disclosure laws applicable to SOEs. Consequently, specific reporting standards might subject SOEs to a higher level of disclosure about accounting for non-commercial activities, related party transactions, responsible business conduct, and sustainability, among other areas (Organisation for Economic Co-operation and Development 2022).

Lastly, by describing specific contextual influences, this article ensures that external environments are properly accounted for in the relationship between EI, EC, and organisational performance (Lumpkin and Dess 2001). While most studies on EI have been based on a western and Eurocentric perspective, the current study captures the richness of an emerging market context by focusing on South African SOEs. An essential feature of country level dynamics that distinguish 'developed economies from emerging economies' is the incidence of unsuccessful government interventions where prior studies on Africa denote that government engagement is more considerable and 'at times more detrimental than in other developed and emerging economies' (Urban and Maswabi 2021). Appreciating such shortcomings, it is anticipated that by investigating the extent to which both EI and EC can improve SOEs' organisational performance, while at the same time considering any environmental moderating effects, the study will fill an important gap in the innovation literature.

The article is ordered to first provide a relevant literature review on which to base the study hypotheses. Next, details of research design are

discussed concerning issues of sampling and measures used in the study. Research results are presented and analysed, while the last section concludes the study by discussing implications, limitations, and proposals for future research.

Entrepreneurship in the Public Sector

Entrepreneurship is a multi-dimensional construct pertinent to the firm level, where it includes various interactions between individuals and different organisational factors reflecting the collective character of the innovation process as well as the skills and capabilities of participants across the entire organisation (Morris, Kuratko, and Covin 2010). Innovation at the firm level has been conceptualised in many ways, such as 'corporate entrepreneurship, intrapreneurship, venture entrepreneurship, strategic entrepreneurial management, and internal corporate venturing' (Morris and Sexton 1996; Sefalafala and Urban 2015). A stream of studies underscore that an entrepreneurial orientation is essential as a basis for an organisational strategy leading to a competitive advantage (Lumpkin and Dess 2001; Urban and Maswabi 2021).

There is a wide-ranging literature on entrepreneurial orientation (Lumpkin and Dess 1996) and its derivative EI, which captures the 'degree and frequency of entrepreneurship' (Morris and Sexton 1996). The construct of EI determines the overall manner of entrepreneurship amongst firms and individuals (Morris, Kuratko, and Covin 2010). Studies reveal how EI is associated with the amount of dedication and concentration in bringing about an innovation (Liao, Murphy, and Welsch 2005). Several studies show that EI can be seen either as an all-encompassing construct incorporating 'innovativeness, risk-taking, and proactiveness' or as a multi-faceted construct where 'innovativeness, risk-taking, and proactiveness' are viewed as autonomous elements of EI (Liao, Murphy, and Welsch 2005; Lumpkin and Dess 1996; Morris, Kuratko, and Covin 2010). For the purposes of this article, it was necessary to portray the distinctive nature of the public sector context, and to take Covin and Lumpkin's (2011, 865) definition of entrepreneurial orientation as it applies to the public sector domain, where 'entrepreneurship in a public sector organisation is demonstrated by the extent to which the top managers are inclined to favour change and innovation for the organisation (the innovativeness dimension), to take business-related risks (the risk-taking dimension), and to take proactive strategic action (the proactiveness dimension) in order to achieve goals and objectives for the

greater good of society at large'. Moreover, in this article, the multi-faceted point of view of EI is accepted, and each dimension is examined in terms of the 'degree and frequency of entrepreneurial events' occurring in an organisation (Morris and Sexton 1996).

Furthermore, in the context of SOEs, scholars have given consideration to issues that 'mediate and moderate SOE strategy, structure, and outcomes, by extending transaction cost, agency, and neo-institutional theories' (Bruton et al. 2015; Liang, Ren, and Sun 2014). Organisational performance in fast and changing environments, especially in emerging markets, requires SOEs to efficiently develop and use their resources to meet different stakeholders' demands, particularly where customer satisfaction and responsiveness to changing stakeholders needs are now key performance measures (Mahmoud and Hinson 2012). Past studies (Kearney, Hisrich, and Roche 2010) have empirically evaluated the influence of EI on organisational performance, with evidence suggesting that EI is effective in achieving outcomes within the organisation over a certain period (Sefalafala and Urban 2015). Additionally, it has been noted that in the public sector domain there is a tendency for managers to be risk-averse, due to the magnitude of exposure associated with such risky undertakings, and consequently risk tends to be avoided (PricewaterhouseCoopers 2015). Other research findings show that the act of being proactive is useful in acquiring networking abilities and leveraging resources, although due to a diversity of demands from different stakeholders, this is a fine balancing act and may be curtailed in the public sector (Kearney, Hisrich, and Roche 2010; Meynhardt and Diefenbach 2012). Based on the above-mentioned theoretical discussions and prior research on EI as it relates to its different sub-dimensions, the first hypothesis is formulated as:

> HYPOTHESIS 1 *There is a positive relationship between EI (the degree and frequency of events with respect to innovativeness, risk-taking, and proactiveness) and organisational performance (in terms of contribution to local development, responsiveness to changing stakeholder needs and financial performance) of South African SOEs*

ENTREPRENEURIAL CAPABILITIES

The Resource-Based Theory (RBT) has developed into a 'dominant paradigm in strategic management', focusing on inherent non-substitutable tangible and intangible heterogeneous personnel-based resources

within the organisation, which have the potential to create a sustainable competitive advantage (Barney 2018). From the lens of RBT, EC can be viewed as an organisational resource which enhances the organisational capabilities to identify and develop new market opportunities (Morris, Kuratko, and Covin 2010). Consequently, capabilities are defined as 'accumulated knowledge and skills that enable a firm to coordinate its activities and advantageously deploy its resources' (Barney 2018: 3312). Following the major precepts of the RBT, the integration of internal capabilities and resources in the establishment of an organisation represent a fundamental ingredient of the human capital factor needed for successful performance (Unger et al. 2011). The RBT has been linked with entrepreneurial studies where capabilities in the form of EC are conceived as the organisation's capacity to sense, identify, and exploit business opportunities, and integrate its strategic objectives to generate a competitive advantage (Morris, Kuratko, and Covin 2010).

In the SOES domain, EC are relevant but restricted, often because of prevailing mechanistic structures, political interference, and a high degree of formalisation and bureaucracy (Kearney, Hisrich, and Roche 2010). Studies indicate that the organisational culture in public sector organisations is also an area of concern, as it may inhibit developing EC (Demircioglu and Chowdhury 2020; Jia, Huang, and Zhang 2019). Notwithstanding such constraints, EC can function as enablers in SOES for developing innovative internal organisational and structural systems (Gil-López et al. 2020; Sefalafala and Urban 2015). In this regard, public managers must be agile and assertive enough to maintain a balance between proactiveness and managing stakeholder demands (Kearney, Hisrich, and Roche 2010). Accordingly, there is a fundamental role played by EC in the development and maintenance of well-run SOES. SOES require tangible and competitive EC to augment their efforts to deliver public services to communities, especially in uncertain environments (González-Álvarez and Argothy 2019). In general, scholars have identified three forms of EC relevant for an organisation to be successful, namely:

1. Human capabilities, which include institutional knowledge, experience, skills, and attitudes (Unger et al. 2011), offer the resulting benefits: '(a) capabilities to discover opportunities; (b) capabilities to exploit opportunities; and (c) capabilities to consolidate and grow the business' (Urban and Maswabi 2021).

2. Social capabilities include social networks, strategic partnering, and relationship management. Social capabilities have often been classified as a resource that can harvest multiple benefits such as the sharing of knowledge and the increasing of information flow within an organisation, both of which have been positively linked to corporate entrepreneurship (Urban and Maswabi 2021).
3. Technology capabilities involve keeping abreast of new technological developments and refer to the managerial proficiencies that allow various technologies to be employed to yield innovations (Meissner, Sarpong, and Vonortas 2019; Tremml 2018).

Based on these arguments and by building on this research direction it is hypothesised that:

> HYPOTHESIS 2 *There is a positive relationship between* EC *(human capability, social capability, technology capability) and the organisational performance (in terms of contribution to local development, responsiveness to changing stakeholder needs and financial performance) of South African* SOES.

ENVIRONMENT INFLUENCES (SOES)

RBT theorists maintain that the relationship between resources and the value of such resources (Barney 2018) varies according to their environment (Lumpkin and Dess 2001). Consequently, many scholars adopt a contingency perspective in organisational studies where environmental impact and involvement has been diagnosed and associated with the performance of organisations across different industries and contexts (e.g. Uzkurt et al. 2012). In this regard, different external environment factors can affect the failure and success of innovations at organisations. These factors include 'environmental munificence (i.e., favourable environmental conditions) or hostility (i.e., unfavourable environmental conditions)' (Edelman and Yli-Renko 2010). Consistent with prior research on the environment and organisational performance, the 'environmental dimensions of dynamism and hostility' are adopted to represent environmental influences at SOES (Uzkurt et al. 2012). Prior studies demonstrate that these two dimensions are valuable for predicting EI and organisational performance (Lumpkin and Dess 2001).

In terms of the South African SOES context, adherence to 'best practice standards such as the OECD Guidelines on Corporate Governance of State-Owned Enterprises are recognised as the global benchmark for

government SOE oversight' (Organisation for Economic Co-operation and Development 2018). The South African government aspires to implement such principles associated with proficiency and competency development, ensuring that conditions for enhanced SOE performance are in place. The reform of the institutional governance framework is an attempt by government to address the challenges faced by SOEs, which have traditionally been typified by weak governance and operational inefficiency (Republic of South Africa 2015).

Under such a scenario, where the SOEs environment is considered to be convoluted and dynamic, organisations must foresee future circumstances and foster EI to manage such uncertain environments (Covin and Lumpkin 2011; Koe 2013). Prior studies show how 'dynamism acts as a positive moderator in explaining organisational performance where institutions are typically weak and often underdeveloped in the African context' (Urban and Maswabi 2021). Other studies shed light on the 'moderating effect of the environment on the relationship' between EI and organisational performance and illustrate the distinctiveness of contingency factors in a transition economy, as well as in an African market context (Urban and Maphumulo 2022).

Consequently, in line with research pleas to analyse EI from a 'contingency perspective in terms of how environmental, organizational, and individual factors, may moderate, mediate or interact' with EI to enhance organisational performance (Edelman and Yli-Renko 2010; Uzkurt et al. 2012), it seems plausible to predict that environmental hostility and dynamism may interact with EI and EC to increase overall organisational performance.

> HYPOTHESIS 3 *The relationship between (a) entrepreneurial intensity, (b) EC (human capability, social capability, technology capability) and organisational performance (in terms of contribution to local development, responsiveness to changing stakeholder needs and financial performance) of South African SOEs is positively moderated by the external environment (dynamism and hostility)*

Methodology

The paper was survey-based and cross-sectional in design, with SOEs targeted in the Gauteng Province, South Africa. Gauteng Province in South Africa is the major contributor to the GDP of the country (Republic of South Africa 2015). Since the end of apartheid in 1994, South

Africa has experienced many reform measures and has the most industrialised economy on the African continent. However, South Africa also has one of the highest inequality rates in the world and is characterised by a massive infrastructure backlog legacy, corruption, and a lack of services delivery where many citizens continue to struggle with access to elementary services such as electricity, housing, water, and sanitation (Organisation for Economic Co-operation and Development 2015; PricewaterhouseCoopers 2015). Moreover, a decline in SOEs productivity has shown a substantial negative impact on the rest of the economy (Chitiga-Mabugu et al. 2021).

In terms of the study population, 23 Agencies and Trading Entities operating as SOEs within the Gauteng metropolitan municipalities were targeted. These SOEs, which served as the study sampling frame, include, amongst others the Gauteng Growth and Development Agency (GGDA), Gauteng Enterprise Propeller (GEP), Gauteng Tourism Authority (GTA), Automotive Industry Development Centre (AIDC), Gauteng Industrial Development Zone (GIDZ), and The Innovation Hub (TIH) (Republic of South Africa 2015). The study unit of analysis and target respondent was middle-level management, as past studies indicate that these managers tend to have engaged with policy implementation and have public interface, and can impact their organisation's EI and EC, since they are allocated the duties of resource distribution, project development and implementation (Kearney, Hisrich, and Roche 2010; Sefalafala and Urban 2015). The size of the target population is an aggregate of 420 respondents based on the official staff numbers obtained and maintained by the respective human resources divisions of the SOEs.

An appeal was presented to each of the Gauteng metropolitan regional municipalities offices to attain needed consent for managers to partake in the online survey. An ethics authorisation procedure ensured that the participant's privacy and confidentiality was preserved. A consent form was sent to all the participants with a 'yes' or 'no' option to participate. The data collection phase was conducted during the September 2021-December 2021 period, and after several follow-up remainder requests a response rate of 13.8 percent was obtained, considered satisfactory for surveys of this type (Schindler 2019). To counter any potential sampling bias, responding and non-responding individuals were assessed using 'tenure of employment' as a control variable, and the t-test result indicated a non-significant result ($p > .10$).

Sample characteristics show that respondents are mostly female (55%), and most of the sample (31%) are in the 21–30 years age group, followed by 26 percent in the 31–40 years age group, 24 percent in 41–50 years age group, and 19 percent in the 51–65 years age group. Most respondents (63%) had tenure of more than 7 years' employment in the same organisation. In terms of organisational characteristics, most of the sample (71.4%) had between 51–250 employees as their workforce, and most organisations (73%) had been established for less than 25 years.

The research was based on a structured, self-administered questionnaire. This instrument was founded on previously used measures based on past theory, which concurs with the principal constructs under examination. Perceptual appraises were used as they are commonly utilised in EI research (Morris, Kuratko, and Covin 2010), and all items were measured with a 7-point Likert scale ranging from 1= strongly disagree to 7 = strongly agree.

During the pilot phase (n = 10), it became clear that minor modifications needed to be made to accommodate the local context relating to SOES as relevant to the external moderating environment in South Africa. Table 1 shows the measuring instrument in terms of the level of construct and sub-dimensions, definitions, and sources for each measure.

Using the SPSS software package, data was analysed in terms of descriptive statistics, factor and reliability analyses, and regression analyses with moderating effects. To check for common-method bias (Podsakoff, Mackenzie, and Podsakoff 2012), several procedural and statistical steps were taken where existing scales were pilot tested to ensure that the scale items were clear and unambiguous to the study respondents. Statistically, a single 'principal component analysis (PCA), using Harman's one-factor test was used on all measurement items' (Podsakoff, Mackenzie, and Podsakoff 2012), which resulted in nine different components, accounting for 50 percent of variance, suggesting that no single factor accounted for most of the variance and consequently no evidence of common method bias is evident. With the 'multi-level dimensionality of the constructs, level 1, 2, and 3 analyses' are displayed in the results section in line with the study hypotheses, where the moderating effects are only displayed in terms of the 'higher-level (1) formulation' to allow for overall descriptions to emerge.

Exploratory factor analysis (EFA) was conducted with all the scale items to assess the validity of the constructs under investigation (Schindler 2019). The 'Kaiser-Meyer-Olkin (KMO) Measure of Sampling Ade-

TABLE 1 Measurement Instrument

Description of construct/sub-dimensions / Definition		Sources
Independent variable: EI: Innovativeness, risk-taking, and proactiveness (12 items) and degree x frequency of events (4 items).	EI is the scale of entrepreneurship at the organisational level which considers both the 'degree and frequency of events with respect to innovativeness, risk, and proactiveness. Frequency of entrepreneurship was measured by using summative measures of these three dimensions as they apply to the degree and frequency of entrepreneurial events (associated with multiple events over time).'	Lumpkin and Dess (1996); Morris, Kuratko, and Covin (2010); Morris and Sexton (1996); Sefalafala and Urban (2015).
Independent variable: EC: Human capabilities (4 items); social capabilities (4 items); technology capabilities (5 items).	EC are quantified as 'distinct entrepreneurial competencies' associated with increased improved performance; these are: (1) human capabilities in terms of knowledge, experience, skills, and attitudes which allow individuals to discover and exploit opportunities; (2) social capabilities in terms of social networking, strategic partnering, and relationship management; (3) technology capabilities that include keeping abreast of new technological developments and refer to the managerial proficiencies that allow various technologies to be employed to yield innovations.	Barney (2018); Unger et al. (2011); Urban and Maswabi (2021).
Dependent variable: Organisational performance (4 items).	In the public sector performance is centred on contribution to local development, responsiveness to changing stakeholder needs and financial performance. Performance was operationalised as an aggregate financial performance of the SOE sector including key financial indicators in terms of the performance of the portfolio from the state owner's perspective. Non-financial information bearing on environmental, social and governance practices was also sourced.	Mahmoud and Hinson (2012); Organisation for Economic Co-operation and Development (2022); Sefalafala and Urban (2015).
Moderator variables: Environmental hostility (4 items). Environmental dynamism (4 items).	'Environmental hostility was operationalised as an unfavourable business climate', such as restrictive legislation facing SOEs. 'Environmental dynamism was operationalized as both the rate and unpredictability of change' in the SOEs context.	Edelman and Yli-Renko (2010); Uzkurt et al. (2012).

quacy value' for the various scales ranged between 0.733 to 0.876, indicating the sample was adequate for running EFA as 'it was greater than the required threshold 0.5, and the Bartlett's Test of Sphericity was significant' ($p \leq 0.001$) across all variables (Schindler 2019). Variables showed factor loadings ranging from 0.612 to 0.887 explaining between 61.8 percent and 87.9 percent variance across distinct factors where communalities less than 0.3 were eliminated during the factor analysis. EFA using the principal component analysis with Harris Kaiser Case II rotation was used and components with eigenvalues > 1 converged in 6 iterations after rotation.

Built on the Scree plot and proportions of variation explicated, a nine-factor model emerged connected with the main constructs as per the study hypotheses. These factors were checked for 'internal consistency and scale reliabilities were calculated using Cronbach's alpha coefficient' (Nunnally 1978), with the following result:

Factor 1 = EI innovativeness $\alpha = 0.877$, Factor 2 = EI risk-taking $\alpha = 0.811$, Factor 3 = EI proactiveness $\alpha = 0.632$, Factor 4 = EI degree and frequency of events $\alpha = 0.771$, Factor 5 = EC human capability $\alpha = 0.786$, Factor 6 = EC social capability $\alpha = 0.798$, Factor 7 = EC technology capability $\alpha = 0.836$, Factor 8 = Environment influence (dynamism and hostility merged as one factor) $\alpha = 0.702$, Factor 9 = Organizational performance $\alpha = 0.814$. In this respect acceptable reliability results were attained (> 0.70) in terms of all the factors.

Results and Interpretation

Descriptive statistics are shown in Table 2, where on the Likert-scale 1 to 7, mean scores are above-average mid-point (3.5) with the highest for EI innovativeness (M = 5.98, SD = 0.99), followed by EI proactiveness (M = 5.87, SD = 0.92), and the lowest mean score was for EC technology capability (M = 4.03, SD = 1.21) with a relatively high standard deviation. Table 2 additionally indicates several positive and mostly significant Pearson correlation coefficients. For instance, the results show performance is significantly correlated with all the variables and several intercorrelations are noted between the different variables. This configuration of intercorrelations emphasises elevated levels of correlations amongst the factors and performance (Schindler 2019).

Initially the suppositions for regression analyses were ascertained in terms of 'linearity, homoscedasticity, independence of error terms, multicollinearity and normality of error terms' (Schindler 2019). All the

TABLE 2 Descriptive statistics and correlation matrix

	Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1	EI innovation	5.98	0.99	1								
2	EI risk-taking	5.53	0.92	0.598**	1							
3	EI proactiveness	5.87	0.89	0.568**	0.694**	1						
4	EI degree and frequency	5.11	0.93	0.636**	0.537**	0.490**	1					
5	EC human capability	5.55	0.98	0,697**	0.602	0.641	0.608	1				
6	EC social capability	5.04	0.82	0.573**	0.549*	0.499	0.501	0.660**	1			
7	EC technology capability	4.03	1.21	0.342	0.411*	0.649	0.683*	0.609**	0.330	1		
8	Environment influence	5.75	1.07	0.476*	0.413	0.511	0.608*	0.622	0.553*	0.417	1	
9	Performance	4.97	1.05	0.536*	0.403*	0.361*	0.589*	0.728*	0.556*	0.542*	0.535*	1

NOTE **Correlation is significant at the 0.05 level (2-tailed)*

study variables were mean centred prior to analysis, and separate regression models were fitted to test H1 and H2, while a moderation regression model was used to assess H3.

To check for multicollinearity, the variance inflation factor (VIF) was used and VIF values were obtained which were deemed to be within the acceptable level, insofar as small VIF values indicate low correlation among variables and under ideal conditions are VIF< 3. Statistical independence of error terms was evaluated using the Durbin-Watson test. The test looks for the presence of autocorrelation in residuals and for this study the Durbin-Watson values were 1.849 and 1.881 indicating that there was no serial correlation, since this value was within the acceptable range of 1.4 to 2.6 (Schindler 2019).

For H1, the summary regression results indicated in Table 3 show a significant regression output ($F = 5.795$, $p < 0.001$) with an R^2 of 0.392 indicating that the independent variables explain 32.5 percent of the variability of organisational performance. Even though most of the constructs are positively correlated with organisational performance ($p < 0.05$), only one of the regression coefficients is significant (EI degree and frequency of events, $\beta = 0.410$; $p < 0.05$). Thus, H1 is only partially supported.

Interpreting H1 shows that the results obtained for these constructs explain a relatively meaningful amount of variance on the dependent variable and that the EI sub-dimensions of innovativeness and risk-taking show positive correlations with organisational performance. Howev-

TABLE 3 Hypothesis 1: Model summary showing different sections.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.626[a]	0.392	0.324	0.55188	1.849

NOTES [a] Predictors: (Constant), EI proactiveness, EI innovativeness, EI risk-taking, EI degree and frequency of events. [b] Dependent Variable: Organisational Performance.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.060	4	1.765	5.795	0.001[b]
	Residual	10.964	36	0.305		
	Total	18.024	40			

NOTES [a] Dependent Variable: Organisational Performance. [b] Predictors: (Constant), EI proactiveness, EI innovativeness, EI risk-taking, EI degree and frequency of events.

Coefficients[a]

Model		(1)		(2)	t	Sig.	(3)	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.632	0.537		4.905	0.000	1.543	3.720
	EI Proactiveness	-0.009	0.117	-0.015	-0.079	0.938	-0.247	0.229
	EI Risk-taking	0.025	0.134	0.036	0.187	0.853	-0.248	0.298
	EI Innovativeness	0.169	0.120	0.263	1.404	0.169	-0.075	0.413
	EI degree and frequency of events	0.304	0.130	0.410	2.347	0.025	0.041	0.567

NOTE [a] Dependent Variable: Organisational Performance. (1) Unstandardiszed Coefficients, (2) Standardiszed Coefficients, (3) 95.0% Confidence Interval for B

er, the only regression coefficient which was statistically significant was the combined EI degree and frequency of events construct, suggesting that EI is best captured as an all-encompassing construct incorporating 'innovativeness, risk-taking, and proactiveness', rather than as a multidimensional construct where these are viewed as autonomous elements of EI (Liao, Murphy, and Welsch 2005; Morris, Kuratko, and Covin 2010). This finding resonates with the argument that all EI dimensions are 'central to understanding the entrepreneurial process, although they may occur in different combinations, depending on the type of entrepreneurial

opportunity the firm pursues' (Covin and Lumpkin 2011). Other studies report that frequent innovations disseminated among different innovative localities can be part of the cause to enhance the value of public service offerings (Kearney, Hisrich, and Roche 2010), particularly as innovation can increase the capability of the public sector to manage societal challenges (Meynhardt and Diefenbach 2012). As privatisation initiatives and management re-education – the most common approaches in SOE reform (PricewaterhouseCoopers 2015) – cannot by themselves bring about the necessary change, there is a need for entrepreneurial and innovative managers with requisite entrepreneurial capabilities to grapple with societal challenges.

For H2, the summary regression results indicated in Table 4 show a significant regression equation ($F = 15.627$, $p < 0.001$) with an R^2 of 0.559, which indicates that the independent variables explain 52.3 percent of the variability of organisational performance. Even though all constructs are positively correlated with organisational performance ($p < 0.05$), only one of the regression coefficients is significant (EC Human Capital, $\beta = 0.520$; $p < 0.05$). Thus, H2 is only partially supported.

A significant positive relationship between EC human capital capabilities and organisational performance was obtained for H2; however, for social capabilities and technology capabilities, despite positive relationships established with the DV, these were non-significant relationships. This finding aligns with several studies which indicate that entrepreneurial behaviour has a direct impact on an organisation's EI (Urban and Maswabi 2021), particularly as entrepreneurial human capital provides several advantages in the direction of organisational performance in terms of imparting capabilities to realise and use new opportunities (Unger et al. 2011). However, not entirely surprising was that EC social capability and technology capability were not significantly associated with organisational performance of South African SOEs. Such a lack of significant findings could be attributed to the unique circumstances of SOEs in South Africa, where many SOEs are often the only providers of essential goods and services, such as electricity. Until recently, ESKOM has enjoyed a monopoly of power generation in South Africa and the resultant effect of such monopolistic tendencies is the absence of market competitive forces which are required to stimulate the need for developing technological capabilities (International Monetary Fund 2020). Moreover, many public organisations' administrative systems are fundamentally contrary to the innovative and entre-

TABLE 4 Hypothesis 2: Model summary showing different sections.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.748[a]	0.559	0.523	0.46355	1.881

NOTES [a] Predictors: (Constant), EI proactiveness, EI innovativeness, EI risk-taking, EI degree and frequency of events. [b] Dependent Variable: Organisational Performance.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.074	3	3.358	15.627	.000[b]
	Residual	7.951	37	0.215		
	Total	18.024	40			

NOTES [a] Dependent Variable: Organisational Performance. [b] Predictors: (Constant), EI proactiveness, EI innovativeness, EI risk-taking, EI degree and frequency of events.

Coefficients[a]

Model		(1)		(2)	t	Sig.	(3)	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.589	0.565		2.811	0.008	0.443	2.734
	EC Human Capability	0.411	0.138	0.520	2.987	0.005	0.132	0.690
	EC Social Capability	0.145	0.137	0.155	1.057	0.297	-0.133	0.422
	EC Technology Capability	0.122	0.097	0.175	1.260	0.216	-0.074	0.318

NOTE [a] Dependent Variable: Organisational Performance. (1) Unstandardiszed Coefficients, (2) Standardiszed Coefficients, (3) 95.0% Confidence Interval for B

preneurial behaviour required to nurture EI and EC, which means that modern technologies which would permit more openness and limit corruption in SOES while streamlining their administrative obligations are often not introduced (Organisation for Economic Co-operation and Development 2015).

In terms of H3, Table 5 shows a significant regression equation in the moderator model ($F = 25.849$, $p < 0.001$), with an R^2 of 0.662 and a change in R^2 of 0.120, suggesting that the interactions between the independent and moderator variables explain a weak to moderate change in organisational performance. Table 5 further highlights that only one of

TABLE 5 Hypothesis 3: Moderated regression summary

Constructs	Base Model				Including Moderator			
	B	SE	Beta	p	B	SE	Beta	p
Intercept	0.000	0.076			0.107	0.068		
EI	0.095	0.135	0.108		0.126	0.121	0.144	
EC	0.624	0.162	0.588	***	0.346	0.151	0.325	*
Environment influences	0.352	0.146	0.253	*	0.442	0.124	0.317	**
EI* Environment influences					-0.026	0.150	-0.020	
EC* Environment influences					-0.575	0.168	-0.396	**

NOTES * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; R^2 Base = 0.662; $\Delta R^2 = 0.120$; F (3,38) Base = 24.846; F (5,36) with moderator = 25.849

the moderated regression coefficients is significant (EC*Environment influences, $\beta = -0.396$, $p < 0.001$). Such a negative coefficient implies a weak negative effect, at the same time as the p value for the relationship was greater than 0.001, consequently, the relationship was significant. This result means that H3 is partially supported, and that the supplementary investigation of these moderated associations is worthy of deliberation in forthcoming analyses.

Although the results for H3 showed a significant effect this was a weak negative influence, suggesting that the interactions between the EI and EC and moderator variables explain a weak to moderate change in organisational performance. This finding is supported by the prevailing socio-economic milieu evident in the South African SOE environment where ineffective legislation and a restrictive regulatory context function as a negative external influence that can erode an SOE's capabilities and lead to detrimental organisation performance (Organisation for Economic Co-operation and Development 2015). Other plausible reasons for the partial support for H3 may be attributed to the South African public sector environment, where SOEs typically operate in a monopolistic or oligopolistic environment (Organisation for Economic Co-operation and Development 2015) and hence do not perceive any need for adopting innovativeness and proactiveness. The absence of statistical significance findings for H3 resonates with SOEs' weak financial performance which has been characterised by consistently poor profitability, liquidity, and solvency indicators, the latter reflected in a high level of indebtedness

(International Monetary Fund 2020). Furthermore, the government, as a main shareholder, tends to intervene in these SOEs, which are highly structured and governed in terms of a strict legislative regime and oversight committees (Republic of South Africa 2015), thereby limiting their levels of EI.

Comparatively, while internationally many SOEs are especially prevalent in utilities, transportation, and banking, as is the case in South Africa, 60 percent of utility firms in other emerging markets have a mix of public- and private-sector owners. In the case of Brazil and China these countries have taken advantage of private involvement to improve incentives for efficiency in SOEs. However, in South Africa, the largest SOEs are typically 100 percent government-owned (International Monetary Fund 2020).

Given that several emerging markets have faced difficulties with SOEs, a variety of reform measures have been implemented in stages over many years depending on country-specific contingencies. For example, SOE reforms in China increased private participation in the economy from what was originally a soviet-style system. These reforms included creating a favourable political economy environment, and markets were developed to be sufficiently competitive to encourage SOE managers to be efficient. Many emerging markets have liberalised trade, removed barriers to entry and levelled the playing field by removing specific SOE advantages, such as special tax breaks and preferential procurement arrangements to attract private participants. Moreover, by unbundling large SOEs some countries have changed the ownership structure of theses SOEs either by 'retaining majority shareholding with corporate governance reforms (e.g., Brazil, China, India, Poland), maintaining minority shareholding after a sale of the majority to the private sector (e.g., Brazil, Poland, Spain, UK, Norway), or fully divesting companies (e.g., Argentina, Brazil, New Zealand)' (International Monetary Fund 2020).

Conclusion

Recognising that many unanswered questions remain regarding how entrepreneurship can be advanced in public sector organisations, this article addressed this gap by empirically testing the influence of EI and EC on organisational performance in the South African SOEs context. Furthermore, in acknowledging the importance of contextualisation of EI and EC, particularly under varying contexts such as found in emerg-

ing economies (Urban and Maphumulo 2022), the article evaluated the moderating effects of the environment on the relationship between EI and EC and organisational performance.

This article highlights the value of innovation and entrepreneurship in a unique SOE African emerging market context. Entrepreneurship can play a significant role in SOES which can augment their performance in terms of contribution to local development, responsiveness to changing stakeholder needs and financial performance. This study has made an important contribution by conducting empirical research on EI and EC, while accounting for the moderating environment effects of environmental hostility, such as restrictive legislation facing SOES, and environmental dynamism, such as the rate and unpredictability of change in the SOES context. Consequently, these article findings may be deemed beneficial, especially as only a small number of empirical analyses have focused on EI and EC, while accounting for the environmental influences in the public sector sphere. Moreover, by evaluating the study instruments for reliability and validity the adequacy of these measures in a non-western, African emerging market context has been established.

Based on the study findings, recommendations are aimed at SOE leaders and managers to employ evidence-based measures to adopt entrepreneurial practices to improve performance and deliver better services to its different constituencies. It is recommended that SOES foster higher levels of EI and EC in the form of innovativeness, risk-taking, and proactiveness as well as human, social and technology capabilities to plan and execute service delivery programmes. In this regard it is suggested that employees, and in particular managers, in SOES must be exposed to an intensive training programme which is anchored in research evidence-based EI and EC domains. Furthermore, since SOES tend to operate independently and in silos because of their unique service delivery mandates, it would be prudent that clusters of SOES be formed to coordinate and collaborate, and build on each other's accruals of EI and EC.

In terms of furthering the study's contextual understanding it must be recognised that in South Africa, pre-existing circumstances such as low economic growth, crime, and corruption are now magnifying the effects of poor management for many SOES. The government in South Africa should consider adopting a series of institutional reforms and capital resource developments as conducted in other transitioning and emerging economies over the past four decades, where governments privatised some SOES through public-listed shares in the stock mar-

ket and restructured others through corporatisation and consolidation methods (Organisation for Economic Co-operation and Development 2015).

Study limitations revolve around issues of cross-sectional design which prohibits achieving causality in results and cannot be used to analyse behaviour over a period to time. A *longitudinal study* using the same sample at several points in time may potentially yield different results on the influence of EI and EC on organisational performance. The study findings should be interpreted with the understanding that other contingencies not incorporated in this study may affect the complex EI and EC and performance relationship, particularly as they relate to emerging market measurement issues. Future researchers could examine how some of the more informal and cultural aspects of the African ecosystem affect the framework in which SOEs function. For instance, a culture of non-payment for essential services which SOEs offer has permeated some African economies. Future studies could pay greater attention to how some SOEs have greater immunity to absorb shocks and major disturbances, such as during the COVID-19 pandemic, and how they adopt and practice EI and develop EC to improve their performance in terms of responsiveness to changing stakeholder needs.

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