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Infrastructure, Finance, and Innovation as Drivers of Employment Growth in Saudi Arabia

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Abstract

The pursuit of sustainable economic development and job creation is a fundamental priority for nations globally, particularly in regions such as the Kingdom of Saudi Arabia (KSA), where fostering an enabling business climate is crucial. This paper analyzes the influence of an enabling business climate in fostering employment development in the Kingdom. Leveraging data from the World Bank Enterprise Surveys, the study applies an ordered probit model to analyze the effects of infrastructure, access to finance, and innovation on job creation, recognizing the categorical nature of the dependent variable. Results suggest that certain aspects of innovation, such as the introduction of new processes and products, positively promote job growth, whereas spending on research and development shows unanticipated negative connections. Access to finance, purchasing fixed assets, and the presence of a line of credit or loan from a financial institution are found to have a major impact on employment creation. Additionally, infrastructure factors, particularly power outages, reveal a positive link with employment growth. Sector-specific analyses show the varied influences of these factors on employment development within manufacturing, retail, and other sectors. Overall, the findings underline the need of establishing an enabling business climate in KSA through improved infrastructure, enhanced access to finance, and targeted innovation policies to drive job creation and foster economic growth.

Keywords: Access to finance; enabling business environment; infrastructure; innovation; job creation

1. Introduction

In today's quickly changing global scene, the imperative of supporting employment development and creation through an enabling business climate remains a crucial concern for politicians, economists, and business executives alike. According to Okeke et al. (2020), the acknowledgment of the significance of an enabling business environment was underscored in the Declaration and Action Plan of the initial phase of the World Summit on the Information Society. The underlying pillars of economic development lie upon the capacity of governments to establish an environment where firms may thrive, innovate, and expand, hence sparking employment possibilities. This study embarks on a detailed exploration of the critical role played by an enabling business climate in encouraging employment development and creation, with a specific focus on the Kingdom of Saudi Arabia (KSA).

The relevance of nurturing a suitable corporate environment has earned considerable acknowledgment in academic discourse and policy circles. A variety of studies attest to the association between an enabling business climate and heightened rates of entrepreneurship, economic growth, and employment generation (Das et al., 2020). At its foundation, an enabling business environment encompasses a spectrum of elements, ranging from sturdy infrastructure and access to finance to supportive legislative frameworks and innovative initiatives (Christy et al., 2009). These characteristics jointly sustain the resilience and vitality of organizations, especially small and medium-sized enterprises (SMEs), which serve as the backbone of many economies globally (Aterido et al., 2011).

Despite the consensus on the essential importance of an enabling business climate, its precise influence on employment development and creation within the particular socio-economic context of Saudi Arabia remains relatively underexplored. Saudi Arabia, regarded as a leading Petro-state, has embarked on a revolutionary path defined within Vision 2030, trying to diversify its economy and lessen dependency on oil earnings (Moshashai et al., 2020; Ahmed, 2021). Therefore, understanding the delicate interplay between the corporate environment and employment dynamics becomes increasingly crucial. This study tries to overcome this gap in the literature by performing a systematic evaluation of the relationship between a conducive business climate and job growth in Saudi Arabia.

Central to this analysis are three interrelated characteristics of the corporate environment: infrastructure, access to finance, and innovation. Infrastructure acts as the backbone of economic activity, facilitating the seamless operating of firms and raising productivity levels. Access to finance, on the other hand, is crucial for firms looking to develop, grow operations, and generate employment prospects. Moreover, innovation, including technical developments, research and development activities, and a culture of entrepreneurship, plays a catalytic role in establishing an ecosystem conducive to business growth and employment creation.

Furthermore, the Kingdom's ambitious Vision 2030 highlights the importance of developing a vibrant and dynamic business climate as a cornerstone of its socio-economic development strategy. By diversifying its economic base and cultivating a culture of entrepreneurship and innovation, Saudi Arabia wants to unleash the full potential of its people capital and propel sustainable growth trajectories. Against this context, explaining the link between an enabling business environment and job development has heightened significance, delivering significant insights for policymakers, investors, and business executives alike.

Moreover, the Kingdom's key geographical location and its role as a regional economic powerhouse render it an intriguing case study for understanding the mechanics of employment creation within the framework of a developing corporate landscape. By diving into the delicate interplay between infrastructure development, financial accessibility, and innovative efforts, this study strives to explain the mechanisms via which an enabling business climate catalyzes job prospects and supports equitable growth.

The investigation of the function of an enabling business climate in fostering employment growth and creation in Saudi Arabia bears tremendous value in the modern discourse on economic development and sustainability. Through an interdisciplinary perspective covering economics, business studies, and public policy, this research initiative intends to provide unique insights to the current body of literature while delivering actionable recommendations for policymakers and stakeholders. By unraveling the intricate tapestry of forces driving employment dynamics, this study intends to enable Saudi Arabia in its quest for prosperity and resilience in the 21st-century economy.

To this end, this study explores the significance and importance of an enabling business climate in supporting job creation and robust growth among firms in Saudi Arabia. This is an intriguing case

study as it throws light on the specific issues and opportunities present in the Kingdom's economic landscape. Additionally, this paper attempts to complement and expand the existing—albeit limited—literature on the enabling business environment and job creation in Saudi Arabia, with the aim of prompting a shift in how enterprises are valued and revealing hidden potentials. Notably, this study marks the first of its like to our knowledge, addressing the confluence of an enabling business environment and employment development in Saudi Arabia. In addition, this study is the first of its sort, to our knowledge, addressing the relationship of an enabling business environment and job creation in Saudi Arabia, drawing only from data gathered through the World Bank Enterprise Surveys. No other research paper has undertaken a study on Saudi Arabia using this dataset, placing our research uniquely to provide innovative insights and fill current gaps in the field.

The rest of this paper is organized as follows. Section 2 reviews existing literature on how a supportive business environment, including qualities like infrastructure, access to financing, and innovation, fosters employment generation or creation. Section 3 outlines the data and models utilized. Following that, in Section 4, we explore the major findings and conclusions obtained by the empirical model utilized to appreciate links and causality. Lastly, Section 5 analyzes policy implications and recommendations for both enterprises and governments.

2. Literature Review

The literature on the relationship between an enabling business environment and job creation, including both theoretical frameworks and empirical evaluations, is substantial. This research digs into three essential facets: infrastructure, access to finance, and innovation, exploring their varied contributions to supporting employment development. Numerous scholarly publications have investigated the complicated links between these elements and employment creation, shedding light on their significance in creating economies throughout. In particular, the discussion will highlight the nuanced ways in which infrastructural development, greater access to finance, and creative practices influence job markets across various countries.

2.1 Infrastructure

Infrastructure acts as a foundational pillar for economic growth and development, playing a key role in establishing the business environment of a nation. A set of empirical studies has

continuously emphasized considerable returns associated with infrastructure investment, as evidenced by Esfahani and Ramírez (2003). For instance, Dalenberg et al. (1998) attempt to quantify the impact of public capital on state employment while accounting for a variety of factors, including infrastructure effects from diverse sources. Significantly, highway public capital regularly has a favorable and significant influence on job creation, exceeding other types of infrastructure (Dalenberg et al., 1998). Although net public infrastructure may appear statistically insignificant at first, adjustments reveal its significance, albeit with a smaller influence than highways. According to the authors, simulations indicate that improving infrastructure, even with accompanying tax increases, leads to a net rise in employment.

In addition, Vana et al. (2021) explore how infrastructure initiatives affect employment creation and agricultural output among farm families in the second district of Nueva Ecija, Philippines. The study focuses on identifying these households' socioeconomic profiles, documenting implemented infrastructure projects, and comparing employment creation dynamics before and after infrastructure development. The data show that infrastructure development, notably in road construction, increases career opportunities for respondents. Some job categories even show enhanced ratings following infrastructure development, showing a beneficial relationship between infrastructure developments and increased employment opportunities in the surrounding population. However, differences in employment creation reveal discrepancies across respondents, implying that the influence of infrastructure development may not be consistent across all participants (Vana et al., 2021). Similarly, Garin (2019) investigates the influence of road construction projects funded by the American Recovery and Reinvestment Act on local employment development at the county level, using extensive geospatial data. The results show that for every additional dollar invested in road building, local construction jobs rose by 30 cents over a five-year period. However, unlike the study undertaken by Vana et al. (2021), the larger impact on overall local employment and payroll aggregates beyond the construction sector is negligible, particularly in locations with lower population and less outward commuting.

Another research by Sawada (2019) investigates the complex interaction between infrastructure investments, technological breakthroughs, and employment growth in the Asia and Pacific area. The author emphasizes the importance of physical infrastructure, such as transportation and communication, in promoting economic growth and enabling creative manufacturing processes.

Despite concerns about job displacement owing to technological advancement, the paper contends that infrastructure investments can offset these effects while still contributing to total employment growth. Sawda (2019) uses empirical facts and case studies, such as impact assessments of dams in India and mobile phone networks in Kerala, to demonstrate the positive impact of specific infrastructure projects on employment creation in industries such as agriculture and trade. Building on this foundation, Abbasi et al. (2022) undertook an important study that also examines the joint impact of road expansion and electricity on employment growth in Sub-Saharan Africa. The study finds that enhanced accessibility to roads and electric grids has a favorable and significant impact on employment, underscoring the complimentary nature of their interaction. In addition, Ianchovichina et al. (2013) investigated how investing around 6% of the MENA region's GDP yearly in infrastructure could result in direct, indirect, and induced jobs. The major findings indicate that such an investment has the potential to produce around 2.5 million jobs. While infrastructure projects can be a short fix for unemployment issues, they cannot cure the underlying problem; additional reforms and changes in the business environment are required (Ianchovichina et al., 2013).

2.3 Access to Finance

Moving on, access to finance is another essential driver of economic growth and employment creation. This section investigates the delicate relationship between access to finance and employment dynamics, highlighting the vital role of financial inclusion in establishing a healthy business environment. Starting with a paper by Brixiová et al. (2020), this paper explores the impact of access to finance on employment in Sub-Saharan Africa. The research proposes a model wherein business development involves entrepreneurial search and start-up cost payment, with employment size based on financing access. Employing an impact evaluation-based technique on firm-level data from 42 African nations, the authors employ propensity score matching to estimate the impact of formal finance on Small and Medium-sized Enterprises (SMEs). Key findings reveal that SMEs with formal financing create more jobs, and employment development is fastest with affordable and larger loans, notably in the manufacturing sector. Similarly, Benbekhti et al. (2021) study the impact of Islamic finance in solving unemployment by supporting small and medium enterprises (SMEs) in Turkey. Utilizing a Vector Autoregressive model with data from 2009 to

2017, the authors find that Islamic finance acts as a valuable alternative funding source for SMEs, improving productivity and contributing to job creation in the labor market.

More interestingly, Ayyagari et al. (2016) investigate the crucial link between access to finance and job growth in developing countries, focusing on 50,000 firms across 70 nations. Employing a rigorous methodology that includes a difference-in-difference approach and propensity score matching, the study utilizes the introduction of credit bureaus as an exogenous shock to assess the impact of increased access to finance. The findings reveal a robust positive relationship, indicating that firms with access to loans exhibit notably higher employment growth, with the effect being more pronounced among micro, small, and medium enterprises (MSMEs) compared to larger firms (Ayyagari et al., 2016).

Eid (2006) investigates the critical role of entrepreneurial financing, particularly private equity, in fostering employment development in emerging regions, focusing on the Middle East and North Africa (MENA). The article underlines the success of private equity finance programs in specific MENA nations, resulting in job creation rates up to five times the regional labor market growth average (Eid, 2006). The author concentrates on the idea that the necessity for a balanced strategy, integrating macroeconomic and governance changes with sectoral initiatives, including entrepreneurial finance, to improve job creation outcomes is crucial. Overall, Eid (2006) offers a detailed argument for the role of entrepreneurial finance in tackling employment creation difficulties in emerging nations.

Shifting focus to micro-finance in Nepal, Dhungana (2018) studies the influence of micro-finance on business growth and employment concentrating on a sample of 500 micro-finance clients in four districts of the western development region. The study analyzes the impact of micro-credit on the initiation and sustainability of micro-businesses, particularly focusing on persons who have been participating in micro-finance programs for the last five years. The findings reveal a positive correlation between loan size and its application, emphasizing that clients with larger loans demonstrate greater application of money in productive sectors (Dhungana, 2018). The conclusion claims that micro-finance has considerably improved the formation of micro-businesses, producing self-employment and job opportunities.

Furthermore, Cull and Xu (2013) intend to study the link between financial structure and workforce growth in varied economic environments. Utilizing firm-level data from 89 countries,

the study focuses on the influence of private credit/GDP in low-income countries and stock market capitalization in high-income countries on rates of workforce growth across different industries. The authors apply several estimating methodologies and instrumental variable regressions to address potential endogeneity issues. The major results demonstrate a favorable link between private credit/GDP and labor growth in low-income countries, particularly in industries strongly reliant on external funding (Cull and Xu, 2013). Conversely, in high-income nations, the positive link between workforce growth rates and stock market capitalization weakens when endogeneity is addressed according to the authors. Additionally, the study challenges the concept that small-scale enterprises benefit the most from private credit market expansion, demonstrating that larger firms have a more meaningful boost in labor growth rates in low-income nations.

2.4 Innovation

Embarking on the investigation of innovation as a critical aspect in fostering job creation within the context of an enabling business climate, this part digs into the delicate interplay between innovative practices and employment dynamics. Giuliodori and Stucchi (2012) evaluate the influence of product and process innovations on job growth in the Spanish manufacturing sector from 1991 to 2005, specifically concentrating on changes in employment protection legislation (EPL) in 1997. The major findings indicate that both product and process innovations positively increased employment, with the effect on temporary workers more pronounced and rapid, while permanent worker increases were observed largely two years post-innovation (Giuliodori & Stucchi, 2012). This conclusion was also supported by Pianta (2004). The study also demonstrates alterations in the relationship between innovation and employment before and after the EPL reform, stressing a strong positive impact on permanent workers post-1997.

Similarly, Ciriaci et al. (2016), for example, study the relationship between innovation and job creation in firms. The study focuses on comparing the employment growth patterns of creative and non-innovative organizations, studying differences in the persistence of jobs they create. Using a semi-parametric quantile regression technique on a longitudinal dataset of 3304 Spanish enterprises from 2002 to 2009, the authors analyze the influence of innovation, firm size, and age on employment growth. The major findings imply that creative, smaller, and younger enterprises are more likely to have high employment growth episodes (Ciriaci et al., 2016). Notably, among high-growth firms, only innovative companies keep this speed over time. The study underlines the

significance of innovation in accelerating job creation and provides policy implications for integrating R&D and innovation activities to drive growth in Europe (Ciriaci et al., 2016).

Furthermore, Meghir et al. (1996) aim to explore the influence of technological innovation on net employment creation in British enterprises. The study applies a structural labor demand model, incorporating observable metrics of technological innovation and firm-level panel data. The authors focus on understanding how innovation affects several characteristics of a firm's employment decisions, distinguishing between changes in output, shifting factor intensities, and adjustment costs. The major results imply that enterprises with a higher stock of innovations incur reduced adjustment costs, indicating better flexibility in reacting to changes. This conclusion means that, over time, technologically innovative organizations tend to create more jobs (Meghir et al., 1996).

Han et al. (2017) intend to explore the relationship between innovation types, government support, business performance, and new job creation within the context of venture enterprises in South Korea. The study focuses on three independent variables: technological, marketing, and managerial innovations, coupled with government backing, whereas the dependent variables are business performance and new job creation. The research, based on a sample of 488 South Korean venture companies, adopts a quantitative methodology to examine the impact of these characteristics. The major results demonstrate that marketing and managerial innovations, coupled with government backing, favorably influence both business performance and the creation of new jobs. Interestingly, technical innovation is found to significantly contribute to new job creation but does not demonstrate a significant association with overall business performance (Han et al., 2017).

More intriguingly, Chege and Wang (2020) authored a paper with the purpose of investigating the association between information technology (IT) innovation and employment creation in small and medium-sized firms (SMEs) in developing nations. Employing a detailed seven-step synthesis approach for a literature study, the authors examine significant data. Technology breakthroughs significantly affect employment in SMEs, playing a crucial role in economic development and worldwide market competitiveness (Chege & Wang, 2020). The authors call for government assistance in the form of technology innovation policies to increase SME performance and drive employment development.

3. Research Methodology

3.1 Data and survey

This paper draws data from the World Bank Enterprise Surveys, which are nationally representative firm-level surveys designed to investigate how an enabling business environment promote job creation, namely employment growth, which is a proxy for job creation (Van Stel & Storey, 2004; Shah et al., 2024). Top managers and owners of businesses are interviewed using a globally comparable questionnaire that covers a broad range of business environment topics as well as firms' characteristics and performance measures including performance, finance, trade, workforce, regulations, innovation, and infrastructure. This article studies employment creation in Saudi Arabia which encompass a random sample of 1,573 observations; but, after deleting observations with missing values and executing an in-depth data cleaning exercise, the final sample is reduced to 1,151 firms.

3.2 Variables

3.2.1 Dependent Variable

Annual employment growth will be used as a proxy for job creation. Employment growth will be quantified using two indicators, present employment, and employment in the past three years, and then transformed into a categorical variable, whereby the variable can take the value 'increased', 'remained unchanged' or 'decreased'. Thus, the analysis tries to explore the effect of an enabling business environment or in other words the effects of infrastructure, access to finance, and innovation on the chance of having increased employment. This study applies the ordered probit model to empirically assess the effects of an enabling business climate on job creation considering the survey data's discontinuous nature. Furthermore, given the nature of the independent variables, dummy variables, it is expected that having a categorical dependent variable will generate more meaningful and contextual coefficients. While multiple publications normally investigate the influence of individual aspects, such as infrastructure, access to financing, or innovation, on job creation, our research tries to analyze the linked impact of these three essential business environment characteristics on job creation in KSA.

3.2.2 Independent Variable

The independent variables are categorized into three categories: Innovation, Access to Finance, and Infrastructure. Category one represents the capacity of businesses to introduce novel ideas, products, or processes, fostering competitiveness and adaptability, and it includes three variables (1) if the establishment has introduced new or significantly improved products or services; (2) if the establishment introduced any new or significantly improved process; (3) if the establishment spent on research and development activities, either in-house or contracted with other. Moving forward, category two is a vital aspect for the growth and sustainability of organizations. It involves three variables: (1) if the establishment purchased any fixed assets (2) if the establishment has a line of credit or loan from a financial institution (3) if access to finance is deemed to be the largest hurdle challenged by this establishment. Furthermore, category three contains the physical and organizational elements that form the backbone of any economy, and it includes three variables: (1) if the establishment had any power outages (2) if the institution has submitted an application to obtain a water connection (3) if the institution has submitted an application to secure an electrical connection; It is worth noting that all independent variables are dummy variables that take the value of 1 if the response to the survey question is Yes and 0 otherwise.

Furthermore, the business sector is classified into retail services, manufacturing, and other services. Firm size is characterized as small (5-19 workers), medium (20-99 workers), or large (100+ workers). The age of the firm being below 20 years old or above, are also included as firm characteristics indicators and control variables. Moreover, the variable 'Year' is included as an independent variable serves to offset potential year-specific effects. Given the dataset spans two years, 2022 and 2023, this adjustment adjusts for any temporal discrepancies in employment growth among questioned enterprises. By controlling for the year fixed effect, we ensure a more precise study of the impact of the enabling business environment on job creation in Saudi Arabia, boosting the trustworthiness of our findings.

In addition to the variables relating to infrastructure, access to finance, and innovation, Saudization is examined as a control variable in this study. Saudization, formally known as the Saudi nationalization scheme, refers to the national strategy of Saudi Arabia aiming at expanding the employment of Saudi citizens in various areas of the economy (Sadi & Al-Buraey, 2009). While Saudization activities are important to the socio-economic landscape of Saudi Arabia, for the

purpose of this study, it is assumed that Saudization does not have a direct impact on employment creation within the framework of an enabling business environment. Therefore, it is regarded as a control variable to account for potential socio-economic factors that may influence employment trends but are not directly addressed in this research. Including Saudization as a control variable enables the model to account for any potential confounding effects that may result from socio-economic policies and initiatives performed by the Saudi government. By explicitly addressing Saudization as a control variable, this study assures that the estimated impacts of infrastructure, access to financing, and innovation on job creation remain strong and unaffected by external factors not expressly accounted for in the methodology.

3.3 Summary Statistics

Table 1 presents an overview of the descriptive statistics for the selected variables in the analysis, together with firm characteristics. Among the 1,151 analyzed enterprises, 18.59 percent reported a drop in employment, 36.06 percent maintained stable employment, and 45.35 percent observed an increase in employment. In terms of innovation, only 8 percent developed a new product or service in the last three years, and 6 percent enhanced processes. Additionally, roughly 5 percent reported spending on research and development. Regarding access to finance, roughly 13 percent purchased fixed assets, 6 percent had a financial institution loan, and around 11 percent viewed access to finance a severe hurdle. For infrastructure, 6 percent encountered power outages, and 6 percent asked for a water connection, while 9 percent of the firms asked for an electric connection. These findings indicate the restricted resource allocation towards infrastructure, innovation, and finance in KSA.

Examining firm characteristics, 43.3 percent are small, 38.5 percent are medium-sized, and around 18 percent are large. In addition, 49 percent of these enterprises belong to the manufacturing sector, 40 percent to the retail sector, and roughly 11 percent belong to other sectors. More interestingly, 83.5 percent of the enterprises are older than 20 years, while 16.5 percent are younger than 20 years. We employ the Variance Inflation Factor (VIF) to examine the extent of multicollinearity among our variables in the empirical model (Table 2). According to Tu et al. (2004), VIF values above 10 suggest that the multicollinearity assumption is violated. Consequently, we can infer that none of the variables employed in this model suffer from multicollinearity, as the provided scores are below 10, with an average of 1.59.

3.4 Methodology

In this study, we analyze the role of infrastructure, access to finance, and innovation in fostering employment growth within the setting of Saudi Arabia. Given that our dependent variable is categorical, one can pick for either ordered probit or ordered discrete logit models, both accounting for the ordinal structure of the dependent variable. In our inquiry, we adopt the ordered probit model, a choice influenced by the properties of the dependent variable, which matches well with the analysis criteria. Importantly, the results derived from this model indicate consistency with those from an alternate model, specifically the ordered logit model. The major distinction between the probit and logit models resides in the assumption regarding the distribution of errors. The logit model assumes a standard logistic distribution of errors, while the probit model assumes a normal distribution. The normality assumption is based on utilizing the cumulative standard distribution function when predicting the chance of falling into category one. As described by Greene (2012), the normality assumption closely mimics the logistic distribution, with the sole exception being the shape of the tail. Consequently, the option between these two models has minimal impact on the outcomes.

Let Y_i' represent the possible unobservable dependent variable. Although the latent variable Y_i' is not directly observed, we have access to the information reported by firms about the change in employment. As a result, the latent variable is converted into observable categorical variables Y_i with discrete values of 1, 2 and 3. Here, 1 refers to decreasing employment, 2 denotes no change, and 3 refers to increasing employment.

Additionally, let Inf_i denotes a vector that includes infrastructure indicators, Fin_i represents a vector that contains access to finance indicators, Inv_i indicates a vector that comprises innovation indicators, $Char_i$ resemble a vector involving firm characteristics and the variable year, and S_i represents Saudization. Moreover, β, α, δ, λ, ρ, and θ are parameter vectors, while μ_i, the error component, follows a standard normal distribution.

Consequently, the ordered probit regression applied to illustrate the model is phrased as follows:

$$Y_i' = \alpha + \theta Inv_i + \delta Fin_i + \beta Inf_i + \lambda Char_i + \rho S_i + \mu_i$$

In line with the subsequent ordered probit rule and the following assumption:

$$Y_i = \begin{cases} 1\ if\ Y_i' < 0 \\ 2\ if\ Y_i' = 0 \\ 3\ if\ Y_i' > 0 \end{cases} \quad \& \quad \rho = 0$$

We estimate the proposed model above using the cumulative standard normal distribution function:

$$E(Y_i|Inv_i, Fin_i, Inf_i, Char_i, S_i) = \Phi(\theta Inv_i + \delta Fin_i + \beta Inf_i + \lambda Char_i + \rho S_i)$$

4. Empirical Results

Table 3 displays the coefficients of the independent variables determining the chance of having positive employment growth. Positive coefficients signify an increase in job creation, negative coefficients indicate a decline in job creation, and null coefficients suggest that the independent factors do not significantly influence job creation. Upon studying the empirical findings produced from the ordered probit model, we observe the following: two out of three variables grouped under innovation display positive coefficients, indicating a favorable impact on employment creation.

The introduction of new processes or significant improvement of already-existing ones not only boosts operational efficiency but also increases employment growth. The coefficient is positive and highly statistically significant, which comes in accordance with previous studies on this topic. Giuliodori and Stucchi (2012) support this view, demonstrating that process innovation, in conjunction with product innovation, greatly enhances employment growth within organizations. Also, recent studies such as that conducted by Zhu et al. (2021) especially focused on the influence of technical innovation on employment in China, reaffirming the positive effect of process innovation on job creation. Notably, Zhu et al. (2021) stress that process innovation not only leads to total job growth but also benefits certain segments of the labor force, particularly better-educated but less-skilled people. Additionally, their findings challenge the assumption of reciprocal complementarity between product and process innovation, underlining the autonomous and significant importance of process innovation in promoting job growth.

Additionally, the coefficient linked with the launch of a new product or service is positive but not statistically significant. This could be ascribed to insufficient market demand for new or enhanced products in Saudi Arabia, potentially resulting in little job creation despite efforts in product innovation. Previous studies have produced varied conclusions about the relationship between

product development and employment creation. The findings of this study are congruent with those of Harrison et al. (2014), who showed that product innovation had an insignificant influence on employment in Germany and Spain. Similarly, Kaur and Nagaich (2018) evaluated the influence of product and process innovation on employment in innovative organizations in India, indicating that product innovation activities explained 24.2% of the variance in employment creation but had an overall insignificant effect.

Upon initial assessment, spending on research and development activities displays a surprise tendency, with the coefficient initially looking statistically insignificant and demonstrating a negative link with employment creation. However, upon the incorporation of control variables, the coefficient becomes highly statistically significant, demonstrating a strong negative connection with job growth. This surprise outcome can be explained by the fact that 1094 out of 1151 enterprises in this study reported no spending on research and development (R&D) during the prior fiscal year. This substantial fraction reflects a restricted emphasis on innovation and advances in technology within the business environment, which may help clarify the found negative link between R&D spending and employment growth.

Moreover, the coefficient associated with purchasing fixed assets reveals a positive and highly statistically significant association, both with and without controls. This finding agrees with the research undertaken by Damioli et al. (2024), which likewise reported a positive and significant influence of fixed asset expansion on employment growth. This link might be attributed to the fact that investment in fixed assets, such as machinery, equipment, and infrastructure, boosts enterprises' productive capacity. Consequently, they are better positioned to expand operations and supply expanding demand. The resultant expansion demands the hiring of extra people to operate and maintain the newly acquired assets, hence boosting job creation.

Regarding the presence of a line of credit or loan from a financial institution, the positive and significant coefficient is predictable. Access to credit has a crucial role in promoting corporate expansion and investment, thereby contributing to greater employment. Furthermore, it symbolizes financial stability and development potential, enhancing the firm's resistance to difficulties and ability to embrace chances, thereby supporting employment growth. This finding accords with earlier study (Brixiová et al., 2020; Ayyagari et al., 2016; Dhungana, 2018). Conversely, the negative and highly statistically significant association between access to

financing constraints and employment growth is also projected. Limited access to finance constitutes a considerable obstacle to employment growth for several reasons. Insufficient financial resources hinder small enterprises' potential to invest in operations, hire new personnel, or renovate infrastructure, vital for boosting productivity and generating job prospects. Additionally, low financial availability restricts entrepreneurs' capacity to satisfy working capital needs or fund new ventures that encourage employment development. Moreover, financial constraints impede organizations from weathering economic downturns or unforeseen challenges, typically resulting in reduced employment or layoffs.

Additionally, our study's findings reveal that all factors relevant to infrastructure demonstrate positive coefficients, but only one variable approach statistical significance. Specifically, whether the organization had power outages or not significantly and positively affects job growth. While the significance aligns with multiple earlier research (Adofo, 2020; Fakih et al., 2020; Asmamaw, 2023; Değirmenci, 2016), the unexpected positive coefficient invites additional examination. Out of the 1151 interviewed firms, 1081 firms reported no power interruptions in the last fiscal year, which may explain the positive coefficient.

Moreover, this startling conclusion can be ascribed to numerous variables. Firstly, businesses affected by power outages typically implement tactics to avoid disruptions, such as investing in backup power systems or simplifying production processes to minimize downtime. These improvements can bolster operational efficiency and productivity, thereby driving greater demand for labor to fulfill output targets. Moreover, the necessity to repair or replace damaged equipment resulting from power outages may encourage economic activity in maintenance, construction, and manufacturing sectors, so creating extra employment possibilities. Furthermore, establishments that adeptly navigate and recover from power outages may display resilience and adaptability, attributes that can attract investors and fuel corporate growth, ultimately supporting continuous employment increase over time.

Finally, the association between a submitted application for an electrical connection and employment growth, as well as a submitted application for a water connection and employment growth, were found to be positive yet negligible, consistent with several findings in previous research. For instance, Bayat et al. (2011) state that there is no statistically significant association between electricity and employment. Scott et al. (2013) propose that while availability to

electricity is critical for private sector development, its direct influence on employment creation may be restricted without other essential components such as infrastructure, finance, skills, and capacity. Their analysis underlines that electricity provision alone might not lead to significant employment creation, particularly in communities lacking these basic aspects of private sector development. Additionally, Ugembe et al. (2023) discovered that while electricity usage itself has a positive but insignificant impact on job creation within Micro, Small, and Medium Enterprises (MSMEs), factors like affordability and reliability of electricity supply also significantly influence its overall effect on job creation. Furthermore, Garrison and Paulson (1972) showed that while water availability, as measured by streamflow, positively promotes employment growth in water-oriented manufacturing firms in the Tennessee Valley region, the relevance of this relationship may not hold globally. Although the positive coefficients correspond with the conclusions of this paper, the significant component does not.

Table 4 examines the results by firm sector and reveals the following: Within the manufacturing sector, the major variables found in the Ordered Probit Model offer unique insights into the causes impacting job growth. Firstly, the negative significant coefficient associated with spending on Research and Development (R&D) suggests that while innovation is crucial for the long-term competitiveness of manufacturing firms, increased investment in R&D may initially lead to restructuring or automation processes that could reduce the immediate need for labor. This finding accords with the assumption that technological developments might both enhance productivity and potentially displace particular job roles in the short run (Mckinsey & Company, & Manyika, 2017). On the other hand, the positive significant coefficients for purchasing fixed assets and facing access to finance constraints which aligns with Brixiová et al. (2020) show that expenditures in physical capital and overcoming financial barriers relate to better employment growth in manufacturing enterprises. This underlines the need for capital investment in growing production capacity and updating processes, which sometimes involve extra hiring. Moreover, the positive substantial effect of power outages on employment development reveals a complicated link between infrastructure difficulties and job creation. While power outages may impair operations in the short term, industrial firms may respond by boosting labor capacity during periods of energy availability to fulfill output demands, ultimately driving employment growth.

Looking into the factors that impact employment development in the retail sector, we find that access to credit or loans from financial institutions and overcoming finance-related difficulties are significant. This underlines the vital importance of finance access in supporting retail operations, including inventory management, expansion, and recruiting. Efforts to improve financial access can boost job development by facilitating easier capital flows and investment opportunities. These results illustrate the substantial impact of financial issues on retail employment dynamics, underlining the need for a supportive financial environment to encourage job creation and economic vitality. Lastly, the results show that spending on R&D and purchasing fixed assets are significant determinants of employment growth among sectors other than manufacturing and retail.

5. Conclusion

The pursuit of sustainable economic development and job creation is a fundamental priority for nations globally, particularly in regions such as Saudi Arabia, where fostering an enabling business climate is crucial. In this study, our purpose is to explore the nuanced relationship between the business environment and employment growth in the Kingdom, leveraging insights from the World Bank Enterprise Surveys and building upon previous literature in the topic, while also being the first, to our knowledge, to use this dataset for a study on Saudi Arabia. Our study sets out to solve a crucial gap in existing research by extensively examining the influence of infrastructure, access to finance, and innovation on employment growth in Saudi Arabia. While various research have evaluated the individual effects of these factors, none have studied their individual implications in KSA. Therefore, our research intended to understand their influence on employment dynamics within the Saudi environment.

Drawing upon a sample of 1,151 enterprises from the World Bank Enterprise Surveys, our study found numerous significant findings. Firstly, we noticed that investments in process innovation greatly contributed to employment growth, underlining the relevance of operational efficiency increases in promoting job creation. Additionally, the presence of a line of credit or loan from financial institutions emerged as a positive factor of employment development, underlining the crucial role of accessible finance in supporting corporate expansion and job creation efforts. However, our investigation also shed light on areas requiring attention and development. Despite the positive correlation between infrastructure measures and employment development, the significance of specific variables, such as power disruptions, deserves additional examination.

Furthermore, the inadequate emphasis on research and development activities among assessed firms emphasizes the need for stronger innovation capabilities to stimulate job growth in Saudi Arabia.

Based on our findings, various policy recommendations and avenues for future research arise. Firstly, governments should prioritize programs targeted at building a conducive climate for innovation and technological advancement, hence stimulating employment creation across diverse sectors. Additionally, initiatives to improve access to funds for businesses, particularly small and medium enterprises (SMEs), can stimulate entrepreneurship and expansion, ultimately contributing to employment creation. Furthermore, future research attempts should go deeper into understanding the intricate links between infrastructure development, innovation, and employment dynamics within the Saudi Arabian context. Longitudinal research tracking the change of the business environment and its impact on employment creation over time could give significant insights for policymakers and stakeholders alike.

Annex

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variable					
Employment Growth	1151	2.268	.754	1	3
Independent Variables					
Innovation					
NewProducts	1151	.08	.271	0	1
ImprovedProcess	1151	.06	.237	0	1
RDI	1151	.05	.217	0	1
Access to Finance					
Fixedassets	1151	.13	.337	0	1
Loan	1151	.061	.239	0	1
Accesstof	1151	.108	.31	0	1
Infrastructure					
PowerOutage	1151	.061	.239	0	1
Water	1151	.064	.245	0	1
Electriconnection	1151	.093	.291	0	1
Fim Characteristics					
Firm Size					
size small	1151	.433	.496	0	1
size medium	1151	.385	.487	0	1
size large	1151	.182	.386	0	1
Sector					
sector manuf	1151	.493	.5	0	1
sector retail	1151	.401	.49	0	1
sector other	1151	.107	.309	0	1
Firm Age					
age1	1151	.165	.371	0	1
age2	1151	.835	.371	0	1
Controlling for Year FE					
Year	1151	.6	.49	0	1

Table 2: Collinearity Diagnosis

Variable	VIF	1/VIF
Sector manuf	2.92	0.342433
Sector retail	2.90	0.345161
Size small	2.12	0.472374
Size medium	1.99	0.503363
Electriconnection	1.65	0.606747
Water	1.57	0.637783
Fixedassets	1.30	0.766630
Loan	1.25	0.800690
ImprovedProcess	1.24	0.806982
NewProducts	1.20	0.831894
Year	1.13	0.882098
RDI	1.12	0.893627
Age1	1.10	0.910490
PowerOutage	1.08	0.922146
Accesstof	1.06	0.943498
Mean VIF	**1.58**	

Table 3: Results of the Ordered Probit Model

Employment Growth	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Innovation							
ImprovedProcess	0.525***			0.487***			0.393**
	(0.175)			(0.177)			(0.186)
NewProducts	0.198			0.189			0.104
	(0.146)			(0.146)			(0.151)
RDI	-0.285			-0.287			-0.461**
	(0.175)			(0.177)			(0.180)
Access to Finance							
Fixedassets		0.422***			0.458***		0.425***
		(0.131)			(0.136)		(0.141)
Loan		0.401**			0.380*		0.423**
		(0.195)			(0.196)		(0.207)
Accesstof		-0.332***			-0.339***		-0.350***
		(0.118)			(0.121)		(0.120)
Infrastructure							
PowerOutage			0.471***			0.463***	0.398**
			(0.173)			(0.170)	(0.174)
Water			0.181			0.214	0.146
			(0.215)			(0.215)	(0.212)
Electriconnection			0.187			0.187	0.027
			(0.180)			(0.179)	(0.184)
Firm Characteristics							
Firm Size							
Size_small				-0.178*	-0.182*	-0.201*	-0.167
				(0.105)	(0.105)	(0.104)	(0.105)
Size_medium				-0.029	-0.033	-0.028	-0.044
				(0.106)	(0.105)	(0.105)	(0.106)
Sector							
Sector_manuf				-0.005	-0.026	-0.012	-0.014
				(0.122)	(0.123)	(0.122)	(0.123)
Sector_retail				-0.101	-0.114	-0.114	-0.103
				(0.122)	(0.123)	(0.123)	(0.124)
Firm Age							
Age1				-0.273***	-0.323***	-0.284***	-0.314***
				(0.098)	(0.098)	(0.097)	(0.098)
Controlling for Year FE							
Year				-0.018	0.056	0.041	0.052
				(0.074)	(0.078)	(0.075)	(0.078)
Number of obs.	1151.000	1151.000	1151.000	1151.000	1151.000	1151.000	1151.000
Pseudo R^2	0.008	0.014	0.007	0.013	0.021	0.014	0.030
Log Likelihood	-1187.047	-1179.725	-1187.701	-1180.606	-1171.557	-1179.969	-1159.669

Note: Robust standard errors are in parentheses. ***p<0.01 **p<0.05 *p<0.1.

Table 4: Results of the Ordered Probit Model, by Sector

Employment Growth	Manufacturing	Retail	Other
Innovation			
ImprovedProcess	0.401	0.427	0.058
	(0.250)	(0.320)	(0.620)
NewProducts	-0.067	0.111	0.630
	(0.215)	(0.268)	(0.424)
RDI	-0.425**	-0.300	-2.011***
	(0.210)	(0.371)	(0.776)
Access to Finance			
Fixedassets	0.575***	0.055	1.867***
	(0.196)	(0.239)	(0.630)
Loan	0.341	0.877**	-0.508
	(0.289)	(0.365)	(0.597)
Accesstof	-0.389**	-0.456**	0.145
	(0.189)	(0.183)	(0.390)
Infrastructure			
PowerOutage	0.747***	0.128	0.426
	(0.268)	(0.278)	(0.595)
Water	0.120	0.090	-0.967
	(0.344)	(0.318)	(0.717)
Electriconnection	0.205	-0.138	0.506
	(0.303)	(0.271)	(0.525)
Firm Characteristics			
Firm Size			
Size_small	-0.267*	0.102	-0.592
	(0.146)	(0.174)	(0.397)
Size_medium	-0.246*	0.328*	-0.331
	(0.144)	(0.176)	(0.411)
Firm Age			
Age1	-0.534***	-0.054	0.326
	(0.128)	(0.172)	(0.384)
Controlling for Year FE			
Year	0.024	0.127	-0.087
	(0.115)	(0.126)	(0.225)
Number of obs.	567.000	461.000	123.000
Pseudo R^2	0.051	0.029	0.092
Log Likelihood	-555.887	-465.436	-114.837

Notes: Robust standard errors are in parentheses. ***p<0.01 **p<0.05 *p<0.1.

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