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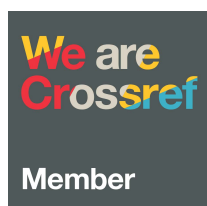
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Does Corporate Social Responsibility Engagement Reduce Earnings Management? Evidence from Cambodian-Listed Companies

Zubir Azhar*

ABSTRACT

This research aims to explore the influence of ethics on financial reporting quality by investigating the correlation between corporate social responsibility (CSR) and accrual-based earnings management (AEM) within a sample of Cambodian non-financial listed companies over the nine years from 2014 to 2022. The study reveals that the level of involvement in AEM is lower in Cambodian firms, which have a higher tendency to engage in charitable activities. The study's findings hold significant implications as they contribute to a deeper understanding of financial reporting practices and CSR initiatives, which may interest stakeholders, including investors, regulatory bodies, and scholars interested in ethical business practices. Furthermore, it offers valuable insights into the ongoing debate surrounding the impact of ethics on the quality of financial reporting, particularly within emerging economies.

Keywords: Corporate social responsibility; Earnings management; Absolute value of discretionary accruals

INTRODUCTION

The topic of financial reporting quality and ethical standards has sparked significant discussion among scholars beyond the business realm (Schwartz, 2004). This study investigates the influence of an anticipated ethical standard, corporate social responsibility (CSR), on financial reporting practices. CSR encompasses various interpretations but generally involves businesses fulfilling their responsibilities to the communities in which they operate (Carroll, 1979).

This study examines the connection between moral principles and financial reporting by juxtaposing two contrasting perspectives—ethical responsibility and opportunistic conduct. On one side, businesses benefit from operating truthfully, reliably, and ethically. Consequently, they strive to uphold stringent ethical norms (Jones, 1995; Garriga & Melé, 2004). Similarly, Kim et al. (2012) state that companies that allocate resources and efforts toward establishing and executing moral initiatives for stakeholder benefit are inclined to produce transparent and credible financial reports.

On the contrary, managers might employ moral principles strategically to veil their opportunistic behavior, aiming to shape stakeholders' perceptions of the organization (Hemingway & MacLagan, 2004; Merkl-Davies et al., 2011). Consequently, a company might utilize moral conduct as a signal to foster the impression of transparency, thereby evading scrutiny from interested parties. This approach aids businesses in legitimizing their activities within society (Merkl-Davies & Brennan, 2007). Consequently, empirical research on the correlation between ethics and earnings quality has yielded varied outcomes in practice.

Chih et al. (2008) and Prior et al. (2008) suggest that companies with a higher tendency to engage in CSR activities are more engaged in aggressive earnings manipulation. However, Hong and Andersen (2011) and Kim et al. (2012) demonstrate that such companies generate high-quality earnings. None of the prior research has explored this issue within Cambodian companies. As far as the researcher knows, this study represents one of the initial practical inquiries, delving into the influence of CSR involvement on earnings management (EM) within the Cambodian context.

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We employ the absolute value of discretionary accruals (ABDA) driven by the modified Jones model as a proxy of AEM across a sample of 8 Cambodian non-financial listed companies during a nine-year period from 2014 to 2022 and found that the firm's engagement in CSR activities positively affects the quality of reported earnings.

This study enriches the literature in several ways. First, it is one of the pioneering studies exploring the relationship between CSR involvement and earnings management (EM) among Cambodian-listed companies. Secondly, its exclusive focus on a single country enables a comprehensive investigation into the influence of ethical standards on earnings quality. This research also offers numerous contributions to Cambodian society. It explains to investors and regulatory agencies why Cambodian companies participate in CSR activities and how this engagement influences the quality of reported earnings. Furthermore, it enables policymakers to draw insights from the behavioral patterns of Cambodian businesses toward promoting accurate reporting practices.

LITERATURE REVIEW

Over the past two decades, global societies have shown growing concern regarding the social and environmental consequences of corporate activities and outcomes. Numerous governments have encouraged businesses to embrace CSR as a feasible corporate approach.

Carroll (1979) stated that the social responsibility of business encompasses the economic, legal, ethical, and discretionary expectations that society has of organizations at any given point in time. According to this widely embraced definition, CSR entails four distinct responsibilities: the economic duty of profit generation, the legal obligation to comply with regulations, the ethical responsibility of conducting moral and rational actions, and lastly, the discretionary responsibility of being a responsible member of society by allocating resources wisely.

According to Garriga and Melé (2004), CSR theories can be divided into four types, each focusing on four fundamental aspects of the regular connection between businesses and the communities in which they operate. First, political theories (Donaldson & Dunfee, 1994; Matten & Crane, 2005) emphasize the impact of businesses on the political system of

the country or region in which they operate. When studying the connection between a corporation and society, such theories focus on the company's social power, and they show that companies seek mechanisms to formalize the company's intent to improve the community. Second, integrative theories (Carroll, 1979; Wood, 1991) contend that society is vital to a company's survival and success. Accordingly, companies should integrate social demands into their strategies and operations to engage with society to gain legitimacy and enhance their well-being. Therefore, companies utilize CSR to achieve social approval, garner societal recognition, and legitimize their actions.

Third, ethical theories (Donaldson & Preston, 1995; Phillips et al., 2003) posit that the relationship between an organization and society is grounded in ethical norms. It is suggested that a company consider CSR an ethical obligation and advocate that this perception should be recognized, prioritizing the commitment to the community over other interests. Finally, instrumental theories (Friedman, 1970; Jensen, 2002) argue that businesses are primarily seen as vehicles for wealth generation, and CSR is regarded as a strategic approach to enhance the company's prosperity.

Managers are encouraged to uphold truthfulness, reliability, and morality in their operations, as advocated by political, integrative, and ethical theories, which emphasize considerable ethical conduct. In contrast, instrumental theories propose that managers may leverage CSR as a strategic tool to enhance shareholder wealth and maximize profits driven by self-interest (Garriga & Melé, 2004; Matten & Crane, 2005). This suggests that managers are driven to participate in CSR initiatives not only by ethical responsibilities but also by managers' opportunism. Consequently, the motivations behind businesses' involvement in CSR initiatives remain elusive, and these incentives may influence the association between CSR and the quality of financial reports.

According to political, integrative, and ethical theories, delivering high-quality earnings information is inherently connected to participating in CSR practices because both aim to meet the demands of stakeholders. Several studies prove that firms with a higher tendency to engage in CSR activities provide high-quality financial reports. For example, Gelb and Strawser (2001) utilized the Council on Economic

Priorities (CEP) rankings for nonbanking US companies from 1989 to 1992. They demonstrated that companies more involved in CSR activities tend to produce more informative and comprehensive financial reports.

Chih et al. (2008) analyzed data from companies in 46 countries included in the FTSE Global Index from 1993 to 2002. They employed three proxies for earnings management (EM): earnings smoothing, earnings aggressiveness, and earnings loss avoidance. Their findings indicated that an increase in CSR is associated with a decrease in earnings smoothness, an increase in earnings aggressiveness, and a reduction in earnings loss avoidance.

Within the US context, Laksmana and Yang (2009) discovered that firms with high CSR ratings exhibit smoother, more predictable, and more sustainable earnings. They utilized corporate citizenship as a metric for CSR, drawing from a sample of U.S.-listed corporations in 2001 and 2002. Similarly, Calegari et al. (2010) found that CSR enhances the quality of earnings. Their analysis was based on a sample of US companies from 1991 to 2008.

In the context of South Korea, Choi and Pae (2011) utilized the ethical commitment index of Korean companies to illustrate that firms demonstrating a higher ethical commitment are less prone to engage in accrual-based earnings management. Likewise, Choi et al. (2013) used the Korea Economic Justice Institute (KEJI) index to measure CSR and observed a negative correlation between CSR ranking and the extent of AEM. This research was conducted on a sample of non-financial South Korean listed enterprises over seven years between 2002 and 2008.

Hong and Andersen (2011) and Kim et al. (2012) expanded the investigation on the relationship between CSR and EM by incorporating Real Earnings Management (REM). Both studies utilized Kinder Lydenburg and Domini (KLD) data as a metric for CSR and examined a sample of US companies. They found that companies committed to CSR are less likely to be involved in REM and/or aggressive AEM.

According to data from 139 companies across 10 Asian nations during six years from 2004 to 2009, Scholtens and Kang (2013) reported that CSR enterprises demonstrate reduced participation in EM. In the same way, Bozzolan et al. (2015) utilized

EIRIS data to investigate whether CSR orientation influences the selection of alternative EM strategies among 1141 publicly traded companies across 24 countries from 2003 to 2009. The modified cross-sectional Jones model was employed to assess AEM, while a comprehensive measure encompassing multiple variables served as a proxy for REM. They indicated that companies with strong CSR inclination are less inclined to engage in REM than AEM.

Gras-Gil et al. (2016) investigated the relationship between CSR and EM within a sample of non-financial Spanish companies from 2005 to 2012. Their findings revealed that CSR initiatives were negatively associated with EM. Furthermore, Alsaadi et al. (2017) presented global findings suggesting that firms with a strong commitment to CSR exhibited a reduced inclination to manipulate their earnings. The study encompassed companies from 10 European Union nations from 2003 to 2013. They gauged AEM using the adjusted Jones model, while data from the Thomson Reuters ASSET4 database served as a measure of CSR involvement.

Gu et al. (2017), employing a comprehensive assessment of corporate social performance among Japanese enterprises, discovered a positive correlation between CSR involvement and the quality of earnings. Similarly, Chen et al. (2020) evaluated the association between CSR and EM within a sample of companies listed on the Shanghai and Shenzhen stock exchanges between 2010 and 2019. Their findings indicate that corporations involved in CSR endeavors prioritize their corporate image, thereby steering clear of EM practices.

Rezaee et al. (2020) investigated the relationship between CSR and the quality of earnings by employing CSR ranking data sourced from Rankins and four metrics to assess earnings quality: absolute value of discretionary accruals, real activities management, earnings persistence, and the ability of earnings to forecast future cash flows. Their study, conducted on a sample of 2580 Chinese listed firms spanning fiscal years 2009–2015, revealed that firms with higher CSR ratings exhibit lower propensity for EM. Additionally, their earnings were more persistent and better predictors of future cash flows.

Gonçalves et al. (2021) examined the connection between EM and CSR among 568 listed companies in the European Union from 2010 to 2018. They employed discretionary accruals, based on the

Modified Jones model, to gauge EM. CSR was represented by the Combined Environmental, Social, and Governance Score retrieved from the ASSET4 database. Their findings revealed an inverse correlation between EM and CSR, indicating that managers in socially responsible companies exhibit more ethical conduct, resulting in superior financial reporting quality.

Across a sample comprising 100 of Spain's most reputable enterprises, Palacios-Manzano et al. (2021) identified a negative impact of CSR activities on EM over six years spanning from 2011 to 2015. Moreover, Ehsan et al. (2022) investigated the link between CSR and EM within 160 nonfinancial firms in Pakistan between 2009 and 2018. They utilized CSR disclosure indices and CSR monetary spending ratio, examining both AEM and REM. Their findings suggested a negative association between CSR and EM, supporting that a long-term perspective primarily influences firms' dedication to CSR.

Gaio et al. (2022) investigated the relationship between EM and CSR, as well as whether the trade-off between AEM and REM is moderated by a company's CSR emphasis, using a dataset comprising 308 listed firms from the European Union (EU) between 2013 and 2019. They proposed a negative association between EM and CSR, aligning with the notion that CSR actions are linked with more ethical behavior. Furthermore, the orientation towards CSR significantly mitigates REM, implying that managers employ less REM to safeguard the company's durable profitability.

More recently, Diem (2023) conducted a study using a dataset comprising 418 companies from Vietnam listed on the stock exchanges of Ho Chi Minh City and Hanoi from 2016 to 2020. The aim was to assess the influence of CSR on EM. Information on CSR was gathered based on the criteria mandated for disclosure according to Circular 96 of the Ministry of Finance. The study utilized discretionary accruals estimated by the Modified Jones Model (Dechow et al., 1995) as a proxy for EM. The findings indicated that CSR exerted a negative effect on EM.

On the other hand, instrumental theories suggest that managers' self-interest may drive them to utilize CSR as a strategic tool to boost shareholder value and improve profits. Additionally, it may be used as a shield to conceal management's involvement in unethical conduct, such as AEM.

Many support this argument. For instance, Prior et al. (2008) provide international validation of a positive correlation between CSR and AEM across a sample of 593 enterprises from 26 countries by employing data collected from the SiRi ProTM database between 2002 and 2004.

Amidu et al. (2016) examined the association between AEM and CSR among a sample of non-financial businesses listed on the Ghana Stock Exchange (GSE) and non-listed firms identified in the Ghana Revenue Authority (GRA) database from 2010 to 2013. They assessed AEM using discretionary accruals and measured CSR through expert evaluation, pollution control performance, and analysis of annual reports and other company publications. The results suggest that Ghanaian companies might employ CSR activities as a façade for engaging in opportunistic behaviors such as AEM.

Uyagu and Dabor (2017) examined the influence of CSR on EM within Nigerian manufacturing enterprises, revealing a positive association between the two variables. Similarly, Jordaan et al. (2018) found that South African enterprises listed on the Socially Responsible Investment (SRI) index tended to involve AEM practices.

Ruwanti et al. (2019) explored this subject using a dataset comprising manufacturing enterprises in Indonesia spanning from 2014 to 2017. Their investigation revealed that companies allocating funds to CSR initiatives are more inclined to engage in EM. Buerthey et al. (2020) explored the correlation between CSR and EM within a sample of non-financial institutions listed on the Johannesburg Stock Exchange over the research period spanning from 2012 to 2015. Their findings revealed a significant positive relationship between CSR and EM, indicating the opportunistic managerial use of CSR initiatives. They gauged CSR performance using ratings from CSRHub, a globally recognized CSR rating institution. Additionally, they estimated the level of discretionary accruals as a proxy for EM, utilizing the cross-sectional model developed by Kothari et al. (2005).

Bansal and Kumar (2021) explored the impact of compulsory CSR expenditure regulations in India on EM among a group of firms listed on the Bombay Stock Exchange over five years following the legislation, from the fiscal year ending March 2015 to the fiscal year ending March 2019. Their findings revealed that companies manipulate accounting

measures to avoid violating the mandatory CSR threshold.

Notably, studies investigating this topic in Cambodia have yet to be conducted. This observation suggests a potential gap in research that could be addressed by examining the relationship between CSR and EM within Cambodian-listed companies. Such research could offer valuable insights into the dynamics of CSR practices and their impact on financial reporting strategies in the Cambodian business context.

Acknowledging the importance of ethical business practices, CSR efforts in Cambodia have gained significant attention. Many companies in the country have initiated CSR projects that have had notable positive impacts on local communities. These initiatives cover various activities, including environmental conservation projects and transformative programs in education and healthcare.

Based on the existing discussions and the gap in research regarding the motivations for Cambodian firms to engage in CSR activities, the paper aims to investigate whether companies participating in CSR activities in Cambodia are more or less likely to engage in AEM. The study proposes the following alternative hypotheses:

H1: Cambodian companies that actively engage in CSR activities are less likely to engage in AEM.

H2: Cambodian companies that actively engage in CSR activities are more likely to engage in AEM.

The first hypothesis is based on the premise that CSR engagement reflects a commitment to ethical practices and transparency, which may extend to financial reporting quality. The second hypothesis suggests that CSR activities might serve as a smokescreen for companies to camouflage their financial manipulations, exploiting the positive image associated with CSR to mask dubious financial practices. These alternative hypotheses represent conflicting perspectives on the relationship between CSR engagement and AEM within Cambodian firms. The study aims to explore and ascertain the dominant viewpoint through empirical analysis and evidence gathered from Cambodian business contexts.

RESEARCH METHODOLOGY

Data and Sample

We retrieved the accounting data for study variables from companies' financial reports. The study's sample involves all nonfinancial Cambodian companies listed on the Cambodian Securities Exchange (CSX) from 2014 to 2022. In line with preceding research, financial firms are omitted due to their exceptional disclosure practices since they are subjected to diverse reporting requirements that make evaluating discretionary accruals problematic (Hong & Andersen, 2011; Kim et al., 2012). There are eight non-financial companies listed on the CSX during the study period. Table 1 illustrates the company name, the year of listing on CSX, and the number of available reports for each company since being listed.

Table 1: Details of companies listed on the Cambodia Securities Exchange

Company name	Year of listing	Number of available reports
JS LAND PLC	2022	1
DBD Engineering Plc.	2021	2
Pestech (Cambodia) Plc.	2020	3
Sihanoukville Autonomous Port	2017	6
Phnom Penh SEZ Plc.	2016	7
Phnom Penh Autonomous Port	2015	8
Grand Twins International (Cambodia) Plc.	2014	9
Phnom Penh Water Supply Authority	2012	9
Total		45

As depicted in Table 1, the ultimate sample consisted of 45 company-year observations. Table 2 delineates all observations categorized by year.

Table 2: Sample distribution by industry and year

Sample distribution by year		
Year	Complete sample	
	N	%
2014	2	4.44
2015	3	6.67
2016	4	8.89
2017	5	11.11
2018	5	11.11
2019	5	11.11
2020	6	13.33

2021	7	15.56
2022	8	17.78
Total	45	100

Variables Measurement

The absolute value of discretionary accruals (ABDA), determined using the modified Jones model (1995), functioned as a proxy for AEM. While there are various approaches to gauge AEM, the modified Jones model is regarded as the most reliable. It has been recognized as a robust model capable of identifying EM by assessing unexpected accruals more accurately than other models. A greater absolute discretionary value signifies a greater EM endeavor (Mojtahedi, 2013). This study relies on this model to quantify the extent of AEM, as it has been extensively utilized in prior research.

To ascertain the absolute value of discretionary accruals, the total current accrual for a company i in year t ($TCA_{i,t}$) is first calculated as follows:

$$TCA_{i,t} = \Delta CA_{i,t} - \Delta cash_{i,t} - \Delta CL_{i,t} + \Delta STDebt_{i,t} - DEP_{i,t} \quad (1)$$

Where:

$\Delta CA_{i,t}$ = change in current assets

$\Delta Cash_{i,t}$ = change in cash and cash equivalent

$\Delta CL_{i,t}$ = change in current liabilities

$\Delta STDebt_{i,t}$ = change in short-term debt

$DEP_{i,t}$ = Depreciation and amortization expense for company i in year t .

An ordinary least squares (OLS) method was then utilized to conduct the following regression for the entire sample companies:

$$\frac{TCA_{i,t}}{TA_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{TA_{i,t-1}} \right) + \beta_1 \left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}} \right) + \beta_2 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \varepsilon_{i,t} \quad (2)$$

Where:

$TA_{i,t-1}$ = Lagged value of total assets for company i .

$\Delta REV_{i,t}$ = change in net revenues

$\Delta REC_{i,t}$ = change in net receivables

$PPE_{i,t}$ = Property, plant, and equipment for company i in year t .

Thirdly, the calculation of the value of the non-discretionary accruals ($NDAC_{i,t}$) for every firm was carried out using the estimates of α_0 , α_1 , and α_2 in the following manner:

$$NDAC_{i,t} = \hat{\alpha}_0 + \hat{\alpha}_1 \left(\frac{1}{TA_{i,t-1}} \right) + \hat{\beta}_1 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}} \right) + \hat{\beta}_2 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) \quad (3)$$

Fourthly, the estimation of discretionary accruals ($DAC_{i,t}$) value was conducted as the residuals of the preceding regression, depicted as follows:

$$DAC_{i,t} = \frac{TCA_{i,t}}{TA_{i,t-1}} - NDAC_{i,t} \quad (4)$$

Finally, ABDA was determined by the absolute value of $DAC_{i,t}$. A higher ABDA indicates a higher level of engaging in AEM practices.

In line with previous studies (Lev et al., 2010; Ramzan et al., 2021; Vo et al., 2023), the level of CSR involvement is assessed by determining the proportion of charitable donations to pre-tax net profit. In terms of control variables, this paper included firm characteristics identified in the literature as associated with AEM, aiming to address the issue of interrelated omitted variables. Firm size (SIZE) serves as a representation of political costs. Previous research has identified a relationship between SIZE and AEM, although the connection remains ambiguous, with earlier studies yielding mixed results (Pincus & Rajgopal, 2002; Roychowdhury, 2006). Dechow et al. (1995) asserted that AEM is affected by the firm's financial performance; hence, the firm's financial performance is another control variable utilized in this investigation.

Leverage (LEV) was included to account for incentives related to debt contracts for AEM. Companies nearing a breach of debt covenants are more motivated to employ AEM (Klein, 2002). Moreover, prior studies have indicated that firms with better growth prospects are more inclined to manage their earnings to meet earnings targets (Skinner & Sloan, 2002). Consequently, firm growth is incorporated into the study regression model.

Regarding Board characteristics, three of these attributes, which are Board size (BSIZE), Board independence (BIND), and Board gender (BGEN), are included in the research regression model. When the number of members on the board increases, it becomes increasingly challenging for them to effectively communicate with each other. Therefore, the effectiveness of the Board's function diminishes with a higher number of members on the board. Dechow et al. (1996) discovered that firms involved in EM tend to have larger Board sizes than those not

involved in such practice.

Independent directors, as highlighted by Fama and Jensen (1983), are detached from management, enabling them to oversee management more effectively. Additionally, Beasley (1996) indicates that such directors on the board reduce the likelihood of financial fraud. Women demonstrate lower propensities for engaging in unethical conduct, deterring managerial opportunism (Zalata et al., 2019). Consequently, including women on boards increases the likelihood of curbing immoral rituals like EM. Arun et al. (2015) also discovered that UK companies with more female board members exhibit improved earnings quality. Table 3 shows the measurement of the research variables.

Table 3: Measurement of the study variables

Variable	Abbreviation	Measurement
Dependent variable		
Earnings management	ABDA	The absolute value of discretionary accruals calculated through the modified Jones model.
Independent variable		
CSR engagement	CSR	The ratio of charitable donations to pretax net income.
Control variables		
Firm size	SIZE	Natural log of total revenue.
Firm performance	ROE	The ratio of net income to total equity.
Leverage	LEV	The ratio of total debt to total equity.
Firm growth	GROWTH	The revenue growth rate.
Board size	BSIZE	Natural log of the number of Board members.
Board independence	BIND	The proportion of independent directors to the total number of Board of Directors.
Board gender	BGEN	The proportion of female directors to the total number of Board of Directors.

Empirical model

After collecting data, a regression equation is analyzed to test the research hypothesis, which is as follows:

$$ABDA_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 ROE_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 GROWTH_{i,t} + \alpha_6 BSIZE_{i,t} + \alpha_7 BIND_{i,t} + \alpha_8 BGEN_{i,t} + \varepsilon_i$$

Where:

$ABDA_{i,t}$ = The absolute value of discretionary accruals calculated through the modified Jones model.

$CSR_{i,t}$ = The ratio of charitable donations to pretax net income.

$SIZE_{i,t}$ = The natural logarithm of total revenue.

$ROE_{i,t}$ = The ratio of net income to total equity.

$LEV_{i,t}$ = The ratio of total debt to total equity.

$GROWTH_{i,t}$ = Revenue growth rate.

$BSIZE_{i,t}$ = Natural log of the number of board members.

$BIND_{i,t}$ = The proportion of independent directors to the total number of board of directors.

$BGEN_{i,t}$ = The proportion of female directors to the total number of board of directors.

STUDY FINDINGS

Descriptive Statistics

The descriptive statistics of research variables are shown in Table 4. The findings reveal that Cambodian listed companies' engagement level does not differ considerably, as ABDA ranges between 0 and 0.366, while its average and standard deviation are 0.046 and 0.078, respectively. Conversely, there is significant variance in the extent of the involvement of the sample companies in philanthropic activities, as the minimum and maximum values of CSR are -0.254 and 0.653, respectively.

Regarding firm characteristics, the average, standard deviation, minimum, and maximum values of FSIZE, ROE, LEV, and GROWTH demonstrate a big difference in the size, financial performance, leverage, and growth of sample companies. Regarding the size of board members, the mean of BSIZE is 0.061, the lowest value of this variable is 1.386, and the highest value is 2.197, illustrating that the board of directors of most Cambodian listed companies contains seven members. There are at least four members and at most nine members on the board of these companies.

It was also noticed that the minimum value of each BIND and BGEN is 0, indicating that some Cambodian

listed companies do not have an independent or female member on their board. In addition, the maximum values of these two variables are 0.163 and 0.097, respectively, exemplifying that the percentage of independent directors on the board of most Cambodian listed companies does not exceed 20% of the total number of board of directors, while the ratio of female directors on these companies is not higher than 10%.

Table 4: Descriptive Statistics

	N	AVERAGE	STD	MIN	MAX
ABDA	45	0.0462	0.0778	0	0.3657
CSR	45	0.2357	0.2371	-0.2541	0.6532
FSIZE	45	18.553	2.9189	0	20.3461
ROE	45	0.0611	0.1381	-0.6358	0.54
LEV	45	1.4404	2.9742	0.1139	13.5248
GROWTH	45	0.0951	0.3726	-1	1.5588
BSIZE	45	1.8586	0.1963	1.3863	2.1972
BIND	45	0.1625	0.0777	0	0.2857
BGEN	45	0.0968	0.098	0	0.4

Pairwise Correlation

As shown in Table 5, pairwise correlation is utilized to understand the relationships among research variables and assess the potential for multicollinearity. Multicollinearity may arise if the coefficient value exceeds 0.8 (Gujarati, 1995). All coefficient values in this study are below 0.80. The largest coefficient, 0.613, is between BGEN and LEV. Hence, multicollinearity is not a significant concern in this investigation.

This table shows that CSR exhibits a consistent and negative relationship with ABDA, suggesting that firms emphasizing CSR are less likely to engage in AEM. Both ROE and BSIZE also show strong negative correlations with ABDA, while BIND and BGEN demonstrate significant positive associations with ABDA. This implies that firms with more robust financial performance, larger board sizes, fewer independent directors, or a lower proportion of female directors tend to avoid AEM practices.

Table 5: Correlation Matrix

	ABDA	CSR	FSIZE	ROE	LEV	GROWTH	BSIZE	BIND	BGEN
ABDA	1								
CSR	-0.3044**	1							
FSIZE	-0.1616	0.1391	1						
ROE	-0.4283***	0.0211	0.2119	1					
LEV	-0.0857	0.2099	-0.0391	0.3146**	1				
GROWTH	0.13	-0.3436**	0.2341	0.384***	-0.0975	1			
BSIZE	-0.2801*	-0.2246	-0.5297***	0.1927	0.1315	-0.0547	1		
BIND	0.5292***	0.1786	-0.0414	-0.1499	0.1173	-0.0518	-0.2286	1	
BGEN	0.4211***	0.05	0.056	-0.4836***	-0.6125***	0.0262	-0.4935***	0.3981***	1

*, **, and *** indicate the level of significance at 0.1, 0.05, and 0.01, respectively

Multivariate Regression Analysis

We utilize panel regression analysis to explore the impact of CSR, alongside control variables, on AEM represented by ABDA. Firstly, a Hausman test is conducted to determine the suitability of random and fixed-effect models. The results in Table 6 indicate that the fixed-effect model is more appropriate, supported by its p-value lower than 0.01.

Table 6: Hausman Test

chi2(14)	41.3
Prob>chi2	0.0000

The regression results detailing the relationship between CSR and ABDA are presented in Table 7. The R-squared value stands at 0.024, suggesting that the variables considered in this model can account for 2% of the ABDA. Additionally, the estimated CSR coefficient was determined to be negative (-0.0385352) and highly significant ($p < 0.01$). This outcome validates hypothesis 1a, indicating that firms with elevated CSR involvement are less prone to earnings manipulation or the use of AEM strategies.

Regarding control variables, solely GROWTH exhibits a notable association with ABDA. The determined

GROWTH coefficient was positively significant (0.0265047, $p < 0.05$), aligning with Skinner and Sloan (2002), who identified a correlation between business expansion and AEM. This indicates that firms with greater prospects for growth are prone to misrepresenting their earnings.

Table 7: The regression results of CSR on AEM

	ABDA
	Fixed effect
	Coef
	t-stat
CSR	-0.0385352***
FSIZE	-0.0058868
ROE	0.0179205
LEV	-0.0087373
GROWTH	0.0265047**
BSIZE	0.0475076
BIND	-0.0882862
BGEN	-0.0679442
Constant	0.0865391
F	5.44
	0.0003
R	0.0236

*, **, and *** indicate the level of significance at 0.1, 0.05, and 0.01, respectively

These results uphold political, integrative, and ethical CSR theories, suggesting that managers of Cambodian-listed companies prioritize honesty, reliability, and ethical conduct in their endeavors, with ethical motivations serving as the primary impetus for their CSR activities. They are also consistent with prior empirical findings by Alsaadi et al. (2017), Chih et al. (2008), Diem (2023), Hong and Andersen (2011), and Kim et al. (2012), which assert that engaging in societal endeavors positively influences the integrity of financial disclosures.

CONCLUSION

This study investigates the relationship between CSR and AEM using data from non-financial companies listed in the CSX over nine years from 2014 to 2022. After controlling for firm-specific characteristics, the findings indicated that companies with extensive CSR engagement produce higher-quality reports, affirming those ethical considerations guide CSR. These endeavors address stakeholder expectations and diminish the incidence of AEM practices.

One limitation of this paper is that the CSR measure

derived from financial statements might not fully encapsulate the true essence of CSR involvement, potentially impacting the accuracy of CSR measurement. Despite this constraint, the study holds significance as there is a paucity of scholarly research on this subject, especially concerning Cambodian businesses.

The results of this study offer valuable insights for regulatory bodies, standard-setters, investors, and scholars interested in business ethics, shedding light on financial reporting, ethical principles, and CSR strategies. This understanding aids in deciphering managerial motivations behind CSR involvement and its effects on deterring EM. Subsequent research could delve into real earnings management, which has enduring implications for a company's sustainability. It is also valid to examine in the future the moderating effect of corporate governance attributes, industry profile, customer sensitivity to social issues, and activist scrutiny in the relationship between CSR and EM in Cambodia.

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Factors Influencing Students' Choice of Accounting Major in Cambodia

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ABSTRACT

Higher education institutions in Cambodia have offered a major in accounting since the private sector was permitted to provide education services. The development of the country, which sees the inflow of foreign companies and the growth of local firms, the full adoption of the accounting standards, the International Financial Reporting Standards (IFRS) by the National Accounting Council (NAC) may have induced the growing demand for professional accountants and the enrollment of students in accounting program. Recently, a major in accounting has attracted increasing interest from students. This study determined factors influencing Cambodian students' decision to major in accounting. Three hundred ninety-four 394 students currently studying accounting were surveyed using the anonymous self-administered questionnaire through Google Forms. The Exploratory Factor Analysis (EFA) was used to construct the variables, and multiple regression was employed to analyze the factors influencing students' choice of accounting major. The results showed that personal interest, school reputation, and career expectations are significant factors. Although female students account for the majority of accounting students, gender was not found to have a significant influence on students' choices. The results suggest that higher education institutions should prioritize strengthening their reputations by offering internationally accredited curricula and programs so that their graduates will be qualified to work in top-class companies, boosting students' interest and expectation in pursuing accounting careers.

Keywords: Accounting major; Factor analysis; Multiple regression; Higher education

INTRODUCTION

Choosing a major to study at a university is an essential yet challenging decision for students as it determines their career path and future, as well as defines who they will become. Students' correct and informed choices will determine the supply of human resources that match the labor market's demand and support the economy's growth and development. Every society and culture has different values and preferences regarding what major or career they wish to pursue for higher education. What major is more respectful, well-paid, or offers more opportunities are differently perceived. Being a medical doctor is prevalent in many Asian cultures, including in Cambodia, whereas being an accountant is not among the most popular careers. The latter's popularity is now increasing due to the rising demand for the skill and a positive image of the profession.

Besides culture, education policy, to a significant extent, has influenced the availability of skills students

can choose to study and its popularity. Before late 1996 when the first private university was licensed to provide education services, a tiny proportion of Cambodian students had a chance to pursue higher education, and the number of majors and skills they could choose needed to be increased.

Due to political and economic systems and ideological changes, Cambodian education policy has undergone several transformations. In the latest shift, specifically in the mid- 1990s, private universities were allowed to provide education services. As a result, the number of private universities and majors have been increasing to fulfill the need of students and the changing labor market, especially the demand for accounting and other skills by the private sector. Moreover, as the country develops, the demand for skills has become more diverse; so, with the growth of the number of private companies, and thus professional majors such as accounting and auditing are increasingly needed. Recently, there have been 128 higher education institutions in Cambodia, spread over 20 provinces and the nation's capital, of which 48 were public and

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80 were private (MoEYS, 2021). Some institutions offer a degree program in accountancy, such as a Bachelor's or Master's, and professional certificates, such as the certificates granted by the Association of Chartered Certified Accountants (ACCA) or the Certified Public Accountants (CPA).

Problem Statement

In the last three decades, Cambodia has performed well in economic growth. According to the World Development Indicators, before the COVID-19 pandemic, Cambodia's average annual GDP growth rate was 7.7 per cent from 1996 to 2019 (World Bank, 2023), enabling the country to graduate from a low-income country to become a lower middle-income country in 2016 (Ly, 2016). As economic growth sustains, many local and foreign companies, including small and medium enterprises (SMEs), started investing in Cambodia. As the number of companies continues to increase, so does the need for qualified professional accountants to support their business operations. Companies need an accountant for their routine business operation and for dealing with government rules and regulations, such as audit and tax compliance. Companies wishing to be listed in the security market, such as the Cambodia Security Exchange (CSX), need professional accountants to prepare transparent and standard accounting reports. Also, foreign companies operating or considering operating in developing countries like Cambodia expect professional staff, such as accountants, to be equipped with skill levels on par with professional staff in their home countries. However, the number of professional accountants in Cambodia is still needs to grow, especially those with internationally recognized professional certificates such as those granted by ACCA and CPA. As the need for the skill is increasing, it is vital to encourage students to major in accounting, thus the need to study factors that influence students' choice of accounting major. As studies pertinent to this topic are very scarce in Cambodia, this research, will contribute to understanding accounting majors in general and how accounting students perceive the skills.

Aims and Objectives

In connection with the above statement, this study has two objectives. First, the study aims at exploring the factors that influence Cambodian students' choice of accounting major, and second, the study aims at examining the relative importance of each factor that students use to choose an accounting major.

LITERATURE REVIEW

The following section reviews the students' choice of accounting as a major and the factors that influenced their decisions to study accounting.

Choice of Accounting

University students decide to choose their major based on many interrelated factors. Enget et al. (2020) and Kim et al. (2002) found that students who chose to study accounting were interested in the future workplace, career opportunities, and abilities. As the majority of accounting students are female, it is widely perceived that gender influences the choice of accounting; however, Malgwi et al. (2005) mentioned that both men and women were equally interested in studying accounting; thus, their gender was not significantly relevant. In Australia, Chinese and local students have different behavior in choosing to study accounting. In the study between Australian and Chinese students, the author found that Australian students chose to study accounting due to its intellectual challenges, creativity, independence, and career option as well as for market conditions of job availability, security, and starting salary. In contrast, Chinese students in Australia have a lower level of creativity (Sugahara et al., 2008). Therefore, the choice of accounting is complex and difficult to generalize.

Gender

According to Miller (2022), women still make up the majority of accountants in some countries, a profession that many still consider male-dominated. For ACCA, approximately half of ACCA's students are female over 40 percent of the members, while in Canada, the Canadian Institute of Chartered Accountants showed that over a quarter of its current membership is female, and the number is still increasing. In comparison, the gender breakdown is 50 percent for males and females.

The studies by Fraser et al. (1978) and Nouri and Domingo (2019) indicate that the women majoring in accounting who were surveyed performed somewhat better in undergraduate accounting courses than men; women in accounting differ, however, in some crucial respects from women in other colleges. They have higher needs for achievement and order and have more endurance than to other college-age women. These traits are desirable for jobs in public accounting. In Accounting education, gender has been recognized as one of the main essential factors,

and female students perform better than male students (Alanzi, 2015; Syukur, 2021).

Turner and Bowen (1999) found a gender gap in choice of major, specifically, the under- representation of females in the sciences and engineering in the 1900s; they suggested that culture, gender, and socialization skills/expectations may lead men and women to have different career-choice preferences. Confirming this result, Taylor (2000) found that the majority of students entering college are men, but women make up the majority of accounting majors. To deeply understand, only two more studies to date have examined the moderating effect of gender on the decision-making of choosing accounting as a major. Leppel et al. (2001) found that female students are more likely to be influenced by a professional father to choose a major and that women from “high” socioeconomic backgrounds are less likely to major in business, so the statements were found to be the opposite for males.

Personal Interest

Previous studies found that a student’s interest in the subject is one of the significant factors that influence students’ choice of a major. According to Dynan and Rouse (1997) and Lewis and Norris (1997), personal interests and professional perceptions were shown to influence course selection, while Fortin and Amernic (1994) identified that interest and aptitude for the subject matter appear to be the driving forces behind the students’ choice of accounting as a major, they have the natural values such as independent in action and solving challenging problems (intellectual stimulation) are also the key factors motivating students’ choice of concentration. In addition, if the students are interested in a field, they are more likely to be successful because interest in a field may produce high motivation. The opposite of this may also be true. Success in a field may trigger interest (Uyar et al., 2011).

Past Achievements

In accounting education, the influence of high school mathematics as a determinant of student performance has also led to conflicting conclusions. Uyar et al. (2011) found that the suitability of abilities also significantly influences on student success, especially in numerical courses. Therefore, the more closely a student’s abilities relate to a field, the more likely he or she will succeed.

In addition, Savolainen et al. (2008) suggested that reading comprehension, vocabulary, and spelling are predictors of past achievement that will influence the student’s choice of major. Additionally, Koh and Koh (1999), Wong and Chia (1996), and Yunker et al. (2009) found a significant relationship between students with a higher degree of proficiency in mathematics and performance in first-year accounting.

School Reputation

School reputation is an essential factor for students when they choose a major to study at a university, according to Kim et al. (2002), who studied the choice of students on business majors covering accounting, finance, general business, management, marketing, management information system, and double major are the primary reasons for major of interest. In addition, there is a positive relationship between a school’s reputation and the choice of students to choose accounting majors at the university (Jackling & Calero, 2006). Also, Ali and Tinggi (2013) mentioned factors influencing students’ decision to accept the offer of accounting as a major include the university’s or college’s reputation. In contrast, according to Rababah (2016), there is no significant relationship between school reputation and students’ choice of accounting. Therefore, school reputation was found to have an inconclusive relationship with students’ choice of accounting major.

Advertisement

Advertisement is quite different from traditional media companies used to communicate with their customers through television, radio, magazine, newspaper, billboard, and others. According to Andrews (2006), advertisements have influenced the student’s choice of major. The study found that media in the form of television, advertisement, the Internet, and others affects students’ behavior. Students usually browse through media to access information about universities, courses offered, and potential fields before choosing their major. Also, Hossain and Sakib (2016) state that social media marketing has positively influenced university students’ choice of major. The significant effect of advertisements on students’ choices has also been confirmed by Binsardi and Ekwulugo (2003), and Dao and Thorpe (2015). Therefore, the literature is consistent that promotional media, like television, are the best ways to promote the choice of a university major to potential students.

Career Expectation

According to Lowe and Simons (1997), compensation, career opportunities, and prestige are the most significant factors influencing students' choice of accounting, while personal normative factors influence students who choose business majors. Francisco et al. (2003) and Simons et al. (2003) also stated that factors such as future job opportunity, income potential, type of profession, earning perks, bonuses, and others have a significant impact on students' choices, while Tan and Laswad (2006) also inferred that the choice of students' major is significantly influenced by prestige and job advancements and scope of opportunities. The students' perceptions regarding job opportunities may influence their field selection. The wider the field offers job opportunities, the more likely students choose that field (Uyar et al., 2011). Ali and Tinggi (2013) concluded that job prospects have the greatest and most significant influence on the student's choice of accepting the offer of accounting as a major.

Social Influence

Social influence is a change in a person's thoughts, feelings, attitudes, or actions from interacting with another person or a group (Rashotte, 2007; Raven, 1964). It happens when others change someone's thoughts, feelings, or actions in their social network (Zhang et al., 2015). Tang and Seng (2016) used the term "guidance factor" comprising of four items: "people in the society," which was the most relevant item of the factor, "academic instructors," "people working in the field," and "government encouragement" in their study on factors influence students' choice of accounting major in Cambodian universities. The results of this research indicated that the guidance factor positively impacted the student's choice of major. Parental influence has been identified as an essential factor affecting students' achievement, future study, and choice of major, particularly in Asian countries (Ali & Tinggi, 2013). In addition, a family group, such as parents and relatives, along with those with influential significance, such as teachers, all impact school selection (Hossler et al., 1999, and Oosterbeek et. al., 1992).

RESEARCH METHODOLOGY

Sampling

The study employed the non-probability sampling method to collect the primary data required for the analysis. The population of the study is Bachelor

of Accounting (BA) students currently studying at higher education institutions in Cambodia. Higher education institutions that offer accounting majors at the BA level were chosen, and students studying at all academic levels (from freshman to senior) were invited to participate in the survey. Concerning accounting majors, some institutions require students to choose accounting as a major since their first year, and institutions allow students to choose it before the beginning of their junior or senior year. For these reasons, the questionnaire was designed so that students currently studying in these two types of higher education institutions would participate in the survey. Since there is no list so that we know the exact number of students who choose the accounting major and the number of institutions that offer accounting majors, and in consideration of the reputation and privacy of each institution, the names of the institutions were not included in the questionnaire. The minimum sample size is 385 based on the calculation using Cochran's (1977) formula to satisfy the sampling requirements of 5 percent sampling error and 95 percent confidence level and statistical techniques used to analyze the data. After cleaning the data, 394 samples were retained for analysis.

Questionnaire

The questionnaire was designed and prepared in Google Forms, an online survey tool, and the link was sent to students who are studying in the accounting field and other related fields that allow them to be transferred into accounting. As aforementioned, the questionnaire was designed in the manner that the earliest possible part of the questionnaire intentionally targets only the two groups of BA students. Students from other related fields, such as BA in economics or BA in business administration, can answer the questionnaire because they are sure they are willing to transfer into accounting majors.

The survey questionnaire includes two main parts: demographic information and items for measuring the constructs, including the choice of accounting major (*CA*), past achievement (*PA*), school reputation (*SR*), personal interest (*PI*), career expectation (*CE*), social influence (*SI*), and advertisement (*AD*). The initially developed questionnaire was pilot tested on a sample of 123 respondents. Some items were rephrased, and some were dropped so that the condition for reliability and internal consistency were met by using the Cronbach alpha and MacDonald omega coefficients.

As a result, the current questionnaire contains 32 items for measuring six constructs: *CA*, *PA*, *SR*, *PI*, *CE*, *SI*, and *AD*. The questionnaire is presented in Appendix 1.

Data Analysis

The questionnaire was sent to BA students in nine higher education institutions, among which three were public. Of the nine institutions, one is located in Siem Reap province; the rest is located in Phnom Penh since most of the higher education institutions in Cambodia are located in the capital Phnom Penh.

Data was then analyzed in two stages: an exploratory factor analysis (EFA) technique and multiple regression analysis. First, EFA, a data reduction method, was utilized to create the constructs based on the literature. After it was determined, the standard multiple regression was used in the second stage to analyze the relationship between a set of independent variables: gender, *PA*, *SR*, *PI*, *CE*, *SI*, and *AD* and the dependent variable *CA*. Multiple regression can address the research problem of two main types: prediction, which involves how well the independent variables can predict the dependent variable, and explanation, which is the examination of the regression coefficients (magnitude, sign, and statistical significance) of each independent variable and tries to come up with a reason for the impact of the independent variable (Hair et al., 2019).

The equation of regression used in the study is expressed mathematically as follows:

$$\hat{CA}_i = \beta_0 + \beta_1 G + \beta_2 PA_i + \beta_3 SR_i + \beta_4 PI_i + \beta_5 CE_i + \beta_6 SI_i + \beta_7 AD_i + \varepsilon_i \quad (1)$$

where,

CA = Choice of accounting major

G = dummy variable representing student's gender (*G*=1 if the student is male, and is zero otherwise)

PA = Past achievement

SR = School reputation

PI = Personal interest

CE = Career expectation

SI = Social influence

AD = Advertisement

ε = error term

RESULTS AND DISCUSSION

Results

Demographic Information and Development of Variables

The primary demographic information, including the age, gender, marital status, and academic level of the respondents, is summarized in Table 1.

Table 1: Demographic information (N = 394)

Variable	Category	Frequency	Percent
Gender	Male	88	22.3
	Female	306	77.7
Age	below 18	2	0.5
	18- 19	122	31.0
	20- 21	168	42.6
	22- 23	87	22.1
	above 23	15	3.8
Marital Status	Single	385	97.7
	Married	9	2.3
Academic Level	Year I	108	27.4
	Year II	125	31.7
	Year III	83	21.1
	Year IV	78	19.8
High school type	Public	269	68.3
	Private	125	31.7
Residence while in high school	Phnom Penh	240	60.9
	Provincial town	106	26.9
Funding source for tuition	Non-provincial town	48	12.2
	Parents	304	77.2
	Self-financing	71	18.0
	Loan	2	0.5
	Scholarship fund	14	3.6
	Others	3	0.8

Source: Author's survey

Table 1 shows that more than 95 percent of students who participated in the survey are between 18 and 23 years old, the typical age cohort for university students. In addition, 77.7 percent of the respondents are female students, while male students account for only 22.3 percent of the sample. This ratio reflects the fact that accounting is more prevalent among female students. Although we do not have the exact data of how much percentage of students are male or female, it is expected that a significantly higher number of students are female in the accounting department. In addition, most students (68.3 percent) of the respondents went the public high school while the rest (31.7 percent) went to private ones, as in Cambodia, public high schools account

for a significant proportion of high schools. Among the respondents, 60.9 percent were Phnom Penh residents while they were in high school. The rests are from the provincial towns (26.9 percent) and non-provincial towns (12.2 percent). Most respondents (77.2 percent) depend on their parents for tuition fees; only a tiny 0.5 percent of the respondents paid their tuition fee by student loan. Unlike in developed countries, student loans in Cambodia are not widely available for students and their parents to use as a source of tuition payment.

For the construction of the variables, the exploratory factor analysis (efa) was performed using the extraction method of the principal component and the rotation method of varimax. two items, p11 and SI3 were deleted because their factor loading was below 0.6. after deleting, the results as presented in table 2.

Table 2: Factor loadings, Cronbach's alpha, and variance explained

Item	CA	PA	SR	PI	CE	SI	AD
CA1	0.834						
CA2	0.896						
CA3	0.806						
CA4	0.797						
PA1		0.802					
PA2		0.816					
PA3		0.757					
SR1			0.787				
SR2			0.859				
SR3			0.859				
SR4			0.832				
PI2				0.876			
PI3				0.826			
PI4				0.842			
PI5				0.809			
PI6				0.885			
CE1					0.852		
CE2					0.807		
CE3					0.852		
CE4					0.798		
CE5					0.808		
CE6					0.860		
SI1						0.883	
SI2						0.913	
SI4						0.870	
AD1							0.809
AD2							0.849
AD3							0.872
AD4							0.880

AD5							0.867
Eigenvalue	2.829	1.883	2.787	3.596	4.130	2.369	3.662
%Variance	69.564	62.750	69.672	71.917	68.837	78.983	73.232
Cronbach's alpha	0.852	0.697	0.853	0.900	0.909	0.867	0.908

Source: Author

Regression Analysis

A multiple regression analysis was conducted to test the hypotheses on the relationships between the choice of accounting (CA) as the independent variable and a set of dependent variables: gender (dummy with male = 1, and 0 otherwise), PI, PA, SR, AD, CE, and SI. The multicollinearity was examined using the variance inflation rate (VIF), and there was no significant issue. The regression results are presented in Table 3.

Table 3: Factors influencing Students' Choice

	Unstandardized Coefficients		Standardized Coefficients		t	ig.	VIF
	B	Standard Error	Beta				
Constant	0.538	0.205		2.623	0.009		
gender	0.050	0.070	0.026	0.716	0.474	1.049	
PI	0.332	0.040	0.394	8.328	0.000	1.777	
PA	-0.041	0.041	-0.039	-1.011	0.313	1.192	
SR	0.261	0.044	0.257	5.914	0.000	1.499	
AD	0.032	0.040	0.038	0.796	0.426	1.800	
CE	0.261	0.055	0.238	4.779	0.000	1.973	
SI	-0.017	0.038	-0.020	-0.455	0.649	1.538	

Note:

Overall model fit $F(7, 386) = 58.49$, $p < .001$, $R^2 = .515$, adjusted $R^2 = .506$

Source: Author

The multiple regression results indicate that only three independent variables significantly impact on the dependent variable, the choice of accounting. The three variables are personal interest (PI) ($\beta = 0.39$, $t = 8.33$, $p < 0.001$), school reputation (SR) ($\beta = 0.26$, $t = 5.91$, $p < 0.001$), and career expectation (CE) ($\beta = 0.24$, $t = 4.78$, $p < 0.001$). Therefore, personal interest is the most impactful factor in the choice of accounting. The other factors, including gender, do not impact the choice of accounting major.

Discussion

This study aims to understand the factors that influence the choice of accounting major for students in Cambodia. The study investigated how the variables: gender, personal interest, past achievement, school reputation, advertising, career expectations, and social influence significantly influence students' choice of accounting as their major.

It is found that personal interest is the most influential factor, followed by school reputation and career expectations, the second and third most influential factors. However, there is no significant relationship between gender, past achievement, advertisement,

or social influence on students' choices. The result of gender is consistent with that of Tang and Seng (2016), whose study revealed that students' choice of accounting major was unrelated to their gender. That is, there is no gender difference in the perception of choosing the accounting major.

In addition, the result of the past achievement variable is consistent with Sharifah and Tinggi's findings (2013). Specifically, they found no significant correlation between students performing well in math in high school and their choices of accounting major.

The social influence factor in this study is accounted for by the recommendations on the major from friends, seniors, and teachers. The results indicated that students' friends, their seniors, and teachers did not influence their decision on the choice of a major at a university. This finding contrasts to the results of some research, such as Awadallah and Elgharbawy (2021) and Hair et al. (2019), which may indicate the social evolution in Cambodia. Students become more dependent financially and socially. Financially, it gradually becomes common for students to find part-jobs while studying at the university. Socially, Cambodian society become open, and many parents listen to the opinion of and allows their children to decide the major they wish to study at the university. Therefore, students can choose the university major they want to pursue with less pressure from family, relatives, and friends, i.e., less social influence.

CONCLUSION AND RECOMMENDATIONS

This study contributes to the ongoing discussion of factors that influence the choice of accounting major in the Cambodian context. Accounting schools should focus on their reputation first to increase the enrollment rate. The focus on reputation will ensure that schools provide a quality education so that students will be equipped with the relevant skills. Also, they can contribute to the growing demand for accounting professionals. When students are equipped with quality skills, they can work in top-class companies, boosting career expectations and encouraging other students' interest in accounting.

In this study, the decision of students from different categories of accounting schools, such as private and public or local, is not differentiated. Several institutions that offer accounting majors in Cambodia are recognized internationally, but others still need to be. Thus, for future research, it may be necessary to

consider comparing students' behavior from private or public universities or other aspects of universities. Otherwise, future researchers may consider comparing the decision of the alums and current students to see if there is any difference between their perception across time and generation.

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Digital Transformation in Cambodian Higher Education and Its Impact on Teaching and Learning Outcomes

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ABSTRACT

This study investigates the impact of digital transformation (DT) on teaching and learning outcomes in higher education institutions (HEIs) in Cambodia. This research examines the implementation, challenges, and effects of DT initiatives using a survey questionnaire distributed to management, academic, and support personnel and students from public and private HEIs. The findings reveal widespread implementation of DT in Cambodian HEIs, with a high level of perceived effectiveness. The positive correlation between DT and improved teaching and learning outcomes, such as student satisfaction, academic performance, and educator effectiveness, supports the hypothesis that DT enhances the quality and delivery of higher education in Cambodia. However, the study also identifies several challenges, including financial constraints, digital literacy, technological infrastructure, institutional leadership support, and resistance to change. Addressing these barriers through targeted strategies and investments is crucial for the successful and sustainable adoption of digital technologies in Cambodian higher education. Additionally, the study confirms the moderating effects of technological readiness, educator competencies, student digital skills, and leadership styles on the relationship between DT and teaching and learning outcomes. Among these factors, student digital skills emerged as the strongest moderator, emphasizing the importance of enhancing digital literacy among students to maximize the benefits of DT.

Keywords: Digital transformation; Higher education; Teaching and learning outcomes; Cambodia

INTRODUCTION

The global trend towards digital transformation has significantly influenced the integration of digital technologies into teaching and learning processes in Cambodian higher education (DT). This shift towards digitalization has been accelerated by the COVID-19 pandemic, highlighting the potential benefits of digital technologies in the education sector (Heng & Doeur, 2022). The implementation of DT in higher education institutions (HEIs) is driven by the need to adapt to technological advancements brought about by the Fourth Industrial Revolution (Alenezi, 2023).

Digital technologies have disrupted traditional teaching and learning models by introducing tools such as learning management systems (LMS), data analytics, online learning, and artificial intelligence (AI). These tools enhance pedagogy, student experience, and educator roles but also present challenges related to justice, ethics, and human relations (Qolamani & Mohammed, 2023). Therefore,

DT in higher education requires not only adopting new technologies but also developing the competencies of educators and students to thrive in a digital education landscape (Mamaeva et al., 2020). Leadership plays a crucial role in facilitating DT, with specific leadership styles, mainly transactional leadership, increasing student engagement in digitally transformed learning environments (Niță & Guțu, 2023).

Learners' digital competencies are critical for developing higher education teaching. Students' self-assessment of their digital competencies highlights the need for technology-supported teaching and learning processes, presenting challenges and opportunities for HEIs (Kamsker et al., 2020). In higher vocational education, DT requires a new teaching mode that includes diversified teaching resources, personalized learning experiences, and interactive learning environments to improve students' learning effects and teachers' teaching quality (Xu, 2023).

Students' perceptions of DT in university teaching are

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crucial for managing cultural change in higher education. The COVID-19 pandemic has prompted a reevaluation of digital education, focusing on resources, professional collaboration, digital pedagogy, and student empowerment, which are vital for developing competencies in future educators (Díaz-Noguera et al., 2020).

DT has significantly impacted teaching and learning outcomes in higher education across various contexts. One notable effect is the shift towards student-centered learning, where digital tools and big data analytics enable more personalized and adaptive learning experiences (Park, 2020). Additionally, integrating digital technologies has led to more dynamic and interactive learning environments, facilitating blended learning and enhancing the overall learning experience (Bui & Nguyen, 2023; Qolamani & Mohammed, 2023).

Despite existing literature on DT in Cambodian higher education, research gaps need to be filled. Specifically, more quantitative research needs to be done into the factors that influence the relationship between DT and teaching and learning outcomes in Cambodian higher education (Shenkoya & Kim, 2023). Additionally, the potential negative consequences of DT for education have not been thoroughly investigated (Shenkoya & Kim, 2023).

To address these research gaps, this study investigates the impact of DT on teaching and learning outcomes in higher education in Cambodia. Survey questionnaires were administered to collect data from stakeholders, including students, academic staff, management, and support staff at public and private HEIs in Cambodia. The collected data were analyzed using descriptive and inferential statistics. The results aim to contribute to the existing literature on DT in Cambodian higher education by providing empirical evidence on its implementation, challenges, and impact on teaching and learning outcomes. The findings will be valuable to policymakers, educators, and stakeholders, aiding in developing effective strategies to promote and support digitalization in Cambodian higher education.

The following section presents the literature review, conceptual framework, and study hypotheses. Section four outlines the research methodology. The fifth section presents and discusses the research findings, and the final section offers concluding remarks.

LITERATURE REVIEW

DT in higher education involves the comprehensive integration of digital technologies into all aspects of HEIs, fundamentally altering their operations, education delivery, and stakeholder interactions. Driven by advancements in the Fourth Industrial Revolution, this transformation encompasses curriculum development, teaching methodologies, administrative processes, and student engagement (Benavides et al., 2020; Shenkoya & Kim, 2023; Alenezi, 2023). HEIs are adopting digital tools and platforms to enhance learning experiences and operational efficiencies, such as online courses, digital learning environments, and data analytics, to support decision-making and improve student outcomes (Shenkoya & Kim, 2023; Abad-Segura et al., 2020). This transformation contributes to sustainable curriculums and practices, promotes innovation, and helps institutions keep pace with technological changes (Shenkoya & Kim, 2023; Abad-Segura et al., 2020).

Implementing DT in HEIs necessitates strategic planning and management. HEIs must develop models and frameworks to effectively integrate digital technologies, build competitive advantages, and meet evolving stakeholder expectations (Mohamed Hashim et al., 2022; Valdés et al., 2021; Bisri et al., 2023). This transformation drives changes in HEIs' business models, requiring innovation and adaptation to the new digital landscape, addressing tensions, and leveraging opportunities presented by digital technologies (Rof et al., 2020). Executive leadership strongly influences effective implementation, which must overcome barriers and maintain a consistent approach (Bisri et al., 2023).

DT presents various challenges for HEIs, including environmental, strategic, organizational, technological, people-related, and cultural barriers (Gkrimpizi et al., 2023; Gkrimpizi & Peristeras, 2022; Rima Aditya et al., 2021). Additional obstacles include digital divides, insufficient preparation for a technology-rich society, and potential conflicts between academic and professional roles (Akour & Alenezi, 2022). Overcoming these challenges requires technological innovations, effective communication, and transforming traditional culture (Díaz-García et al., 2023). Cultural and mental shifts are essential to support technological advancements and ensure a smooth transition to a digitally enabled educational environment (Akhmetshin et al., 2020; Bucăța et al., 2022).

Several key factors influence DT in higher education, including technological readiness, educator competencies, and student digital skills. Robust digital infrastructure

and regulatory frameworks are crucial for a seamless transition from traditional to digital learning environments (Larionov et al., 2021). Universities must ensure that students and educators are well-equipped with the necessary technological tools and resources (Latifah et al., 2022). Educators must develop digital competencies to meet the digital economy's demands and effectively support students in a digital learning environment (Larionov et al., 2021; Latifah et al., 2022). Students must also possess the necessary digital competencies to engage effectively with digital learning platforms and tools, including basic digital literacy, navigating online learning environments, and using digital tools for communication and collaboration. Factors such as socio-economic background, prior training in ICT, and attitudes towards digital technologies can influence students' digital skills (Litiņa & Miltuze, 2023). While students may possess high levels of 21st-century competencies, their readiness for e-learning might be moderate, indicating a need for further development of digital skills (Elçiçek & Erdemci, 2021).

The DT of higher education has influenced teaching and learning outcomes in various ways. The integration of ICT in educational practices has been shown to improve student engagement, particularly in mathematics and science (Valverde-Berrocoso et al., 2022). Using digital technologies in class encourages students to engage in more constructive and interactive activities, positively associated with learning outcomes (Wekerle et al., 2022). Transactional leadership within a digitally transformed environment significantly enhances student engagement (Niță & Guțu, 2023).

The impact of DT on academic performance has been mixed. While some studies report slight performance improvement attributed to the use of ICT, others show positive results in specific curricular areas (Valverde-Berrocoso et al., 2022). Adopting digital learning platforms, blended learning models, and online assessment tools has reshaped traditional teaching methods and influenced student achievement by facilitating personalized and interactive learning experiences (Kumar & Priyanka, 2023). Additionally, using big data and advanced technologies in higher education has been linked to better meeting students' needs and improving learning outcomes (Park, 2020).

Student satisfaction is another critical outcome influenced by DT. The quality of online learning, particularly during the COVID-19 pandemic, has been

a focal point of research. Teacher quality, technical service quality, and overall service quality significantly impact student satisfaction (Jiménez-Bucarey et al., 2021). In Bangladesh, DT activities in private universities have positively influenced student satisfaction and retention (Forid et al., 2022). Furthermore, a systematic review of digital strategies in education underscores the importance of a well-implemented DT for improving educational outcomes and student satisfaction (Bui & Nguyen, 2023). In Cambodian higher education, DT has garnered significant research attention. Studies emphasize the importance of ICT models, emerging technologies, learning theories, professionalizing teachers, and leveraging existing resources (Antepli et al., 2019; Donaher & Wu, 2020). The Cambodian government's vision and initiatives, such as the EduTech roadmap, focus on promoting innovation and entrepreneurship through technology-enhanced learning (Hul, 2022).

Shenkoya and Kim (2023) expanded the literature by examining the effects of DT on higher education in Cambodia by combining a systematic literature review and bibliometric analysis. Their study found that DT in Cambodian higher education has led to the development of sustainable curriculums, digitalization of education, enhancement of innovation, and improved student performance. They also identified future trends, including the advancement of "Education 4.0," increased use of gamification, datafication in decision-making, and AI/augmented intelligence integration. However, the study noted a need for more quantitative research on the relationship between DT and higher education teaching and learning outcomes. Additionally, their study did not consider the negative impacts of DT on education.

Despite the existing literature on DT in Cambodian higher education, a research gap needs to be filled. Specifically, there needs to be more quantitative research that analyzes various factors that may affect the relationship between DT and teaching and learning outcomes in higher education. This lack of quantitative research limits our understanding of DT's specific impacts and effectiveness in Cambodian HEIs. Additionally, the negative impacts of DT on education have yet to be thoroughly examined. By addressing these research gaps, this study can provide more comprehensive insights into the effects of DT in Cambodian higher education and inform strategies and policies to maximize its benefits while mitigating potential drawbacks.

CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

Figure 1 presents the conceptual framework that serves as a roadmap for this study. DT is the independent variable driving changes in teaching and learning approaches and outcomes in HEIs. DT encompasses adopting and integrating digital technologies, such as LMS, data analytics, online learning, and AI, into the educational process (Benavides et al., 2020; Shenkoya & Kim, 2023; Alenezi, 2023).

The successful implementation of DT in HEIs depends on various moderating variables identified in the literature. Technological readiness, including robust digital infrastructure and regulatory frameworks, is crucial for a seamless transition to digital learning environments (Larionov et al., 2021). Educator competencies, such as developing digital skills and pedagogical knowledge to support students in a digital learning environment effectively, also play a crucial role (Larionov et al., 2021; Latifah et al., 2022). Similarly, student digital skills, including basic digital literacy, the ability to navigate online learning platforms, and skills for using digital tools for communication and collaboration, are essential for engaging with technology-enhanced learning (Litiņa & Miltuze, 2023; Elçiçek & Erdemci, 2021).

The literature also highlights the importance of leadership styles in promoting student engagement and enhancing learning outcomes in digitally transformed environments. Transactional leadership has significantly enhanced student engagement (Niță & Guțu, 2023). Additionally, effective leadership is crucial for overcoming barriers and maintaining a consistent approach to DT (Bisri et al., 2023).

Integrating digital technologies in educational practices has improved student engagement, particularly in mathematics and science (Valverde-Berrocso et al., 2022; Wekerle et al., 2022). However, the impact of DT on academic performance has been mixed, with some studies reporting little improvement and others showing positive results in specific curricular areas (Valverde-Berrocso et al., 2022). Adopting digital learning platforms, blended learning models, and online assessment tools has reshaped traditional teaching methods and influenced student achievement by facilitating personalized and interactive learning experiences (Kumar & Priyanka, 2023; Park, 2020).

Student satisfaction is another critical outcome influenced by DT. Factors such as teacher quality, technical service quality, and overall service quality significantly impact student satisfaction with online

and technology-enhanced learning (Jiménez-Bucarey et al., 2021; Forid et al., 2022; Bui & Nguyen, 2023).

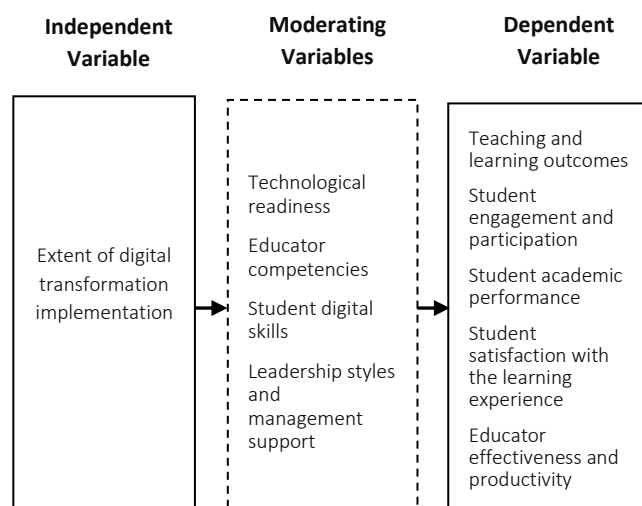


Figure 1. Conceptual Framework

Source: Constructed by the authors

Based on the above conceptual framework, the study intends to test the following hypotheses:

H1: The level of DT implementation in Cambodian HEIs is positively correlated with improved teaching and learning outcomes.

H2: Technological readiness, educator competencies, student digital skills, and leadership styles moderate the relationship between DT and teaching and learning outcomes.

METHODOLOGY

This study employed online surveys to gather data regarding the extent of DT implementation, challenges faced, and perceived impact on teaching and learning outcomes in Cambodian HEIs. The survey questions were developed based on insights from previous studies (Shenkoya & Kim, 2023; Heng & Dœur, 2022; Hul, 2022).

The target population for this study includes academic staff, management, and support personnel, as well as students from public and private HEIs in Cambodia. However, due to data limitations, the actual population size is unknown. The researchers used Zikmund's (2003) methodology to determine a suitable sample size for indeterminate population sizes. Conventional survey research aims for a 95% confidence level and a 5% margin of error (Story et al., 2019; Zikmund, 2003). Using this approach, the minimum required sample size was calculated as follows:

$$n = \frac{(z^2 pq)}{e^2}$$

Where (n) is the sample size, (z) is the z-score for a 95% confidence level (1.96), (p) is the estimated proportion of the population with the characteristic of interest (set to 0.5 for a conservative approach), ($q = 1 - p$), and (e) is the desired margin of error (5%). Substituting these values, the minimum sample size required is 385 respondents.

The study surveyed 981 respondents, including 54 academic staff, 159 management personnel, 117 support staff, and 651 students. This diverse representation ensures comprehensive insights from different stakeholders in Cambodian higher education. Academic staff are likely to focus on the impact of DT on teaching, management personnel on strategic implementation, support staff on operational challenges, and students on the effects of their learning experiences.

The data were collected using a Google Forms questionnaire sent directly to the target respondents. The survey instrument was divided into several sections, covering respondent profiles, DT implementation, impact on teaching and learning outcomes, challenges and barriers, perceived benefits and drawbacks, and moderating factors.

The gathered data were analyzed using appropriate statistical techniques, including descriptive and inferential statistics.

FINDINGS AND DISCUSSION

As shown in Table 1, the respondents are well-represented across different roles within HEIs, with a significant portion being students (38%). This is crucial for understanding the impact of DT on teaching and learning outcomes, as students are the primary beneficiaries. The inclusion of academic staff (25%), management (13%), and support staff (25%) provides a comprehensive perspective on the implementation and adoption of DT across various stakeholders.

Most respondents (83%) are from private institutions, which could influence the findings related to DT, as private institutions may have different resources, priorities, and constraints compared to public institutions (17%).

The range of service years among the respondents indicates a mix of experience levels, from those with less than one year (8%) to those with more than ten years (19%) in the education sector. This diversity can

provide insights from both newer and more seasoned individuals, offering a well-rounded perspective on the challenges and opportunities of DT. The largest group of respondents (35%) has 4-6 years of service, representing mid-career individuals with a significant understanding of the education sector.

The respondents' educational backgrounds are predominantly at the bachelor's (48%) and master's (31%) levels, with a smaller proportion holding doctoral degrees (17%). This distribution offers a comprehensive view of how DT is perceived across different educational attainments, from those with more technical and specialized knowledge (doctoral) to those with a more general understanding of the education sector (bachelor's and master's).

Table 1. Respondents' Profile

Characteristic	Percentage
<i>Position</i>	
Academic staff	25%
Management	12%
Support staff (lecturer's assistant, IT staff, librarian, etc.)	25%
Students	38%
Total	100%
<i>Types of HEIs</i>	
Private	83%
Public	17%
Total	100%
<i>Years of Service</i>	
1-3 years	29%
4-6 years	35%
7-10 years	8%
Less than 1 year	8%
More than 10 years	19%
Total	100.00%
<i>Education Level</i>	
Bachelor's degree	48%
Doctoral degree	17%
High school	4%
Master's degree	31%
Total	100%

Source: Survey results

As shown in Table 2, the extent of implementation and overall effectiveness of DT in Cambodian HEIs varies across different groups within the institution. Respondents were asked to rate the extent of implementation and overall effectiveness of DT in their respective HEIs on a scale of 1 to 5.

Academic staff rated the extent of DT implementation at

4.33, indicating a high level of integration into their work environment. Management rated it slightly lower at 4.00, reflecting robust implementation but suggesting some areas for improvement in their adoption or perception of DT. Support staff rated the highest at 4.67, showing they feel the DT initiatives are thoroughly implemented, likely due to their direct involvement in the technical and operational aspects. Students rated the extent of DT implementation at 4.28, which is high but slightly lower than other groups, suggesting that while they recognize the presence of DT initiatives, they may not feel as fully integrated or impactful as other groups.

Regarding the overall effectiveness of DT, academic staff rated it at 4.33, indicating they find the DT initiatives highly effective in enhancing their teaching and learning processes. Management also rated it at 4.33, showing they perceive the DT initiatives as effective in achieving institutional goals and improving operations. Support staff's rating of 4.33 is consistent with other groups, suggesting they find the DT initiatives effective in their roles. However, students rated the overall effectiveness at 3.94, the lowest among all groups. This indicates that students feel the DT initiatives are less effective than other groups, highlighting a potential area for improvement in how DT impacts their learning experience.

Table 2. Extent of DT Implementation and Overall Effectiveness

Stakeholder	Extent of DT implementation	Overall effectiveness of DT
Academic staff	4.33	4.33
Management	4.00	4.33
Support staff	4.67	4.33
Students	4.28	3.94
Overall	4.35	4.19

Source: Survey results

Furthermore, the survey results revealed the digital tools utilized by all Cambodian HEI stakeholders, including LMS, video conferencing platforms, and online assessment and feedback tools. Many stakeholders cited using mobile learning apps and collaborative platforms like Google Workspace and Microsoft 365. A few respondents mentioned emerging technologies such as virtual reality (VR) and augmented reality (AR). Although not widely adopted, VR/AR's potential for immersive learning experiences is recognized. Adopting these technologies will likely depend on cost, equipment availability, and the creation of relevant educational content.

Table 3 highlights the diverse challenges encountered by Cambodian HEIs when implementing their DT initiatives. The survey results identify several

challenges faced by Cambodian HEIs in implementing DT for teaching and learning, including technological infrastructure (C1), digital literacy and competencies of faculty and staff (C2), digital literacy and competencies of students (C3), availability of financial resources (C4), institutional leadership and management support (C5), and resistance to change and cultural barriers (C6). These challenges are rated on a scale of 1 to 5, with 1 being "not a challenge at all" and 5 being "a major challenge."

Table 3. Challenges and Barriers of Digital Transformation in Cambodian HEIs

Stakeholder	C1	C2	C3	C4	C5	C6
Academic staff	3.08	2.67	2.58	2.64	2.30	2.17
Management	3.17	3.17	3.00	3.00	2.17	2.83
Support staff	2.65	3.00	2.83	3.12	2.76	2.59
Students	3.25	3.17	3.64	3.36	2.91	2.82
Overall	2.98	2.98	2.98	3.04	2.61	2.57

Source: Survey results

Technological infrastructure (C1) is perceived as a moderate challenge across all groups, with students rating it the highest at 3.25. Academic staff and management also see it as a significant challenge, with ratings of 3.08 and 3.17, respectively. Support staff rate it slightly lower at 2.65, indicating some variability in perceptions of technological readiness.

Regarding digital literacy and competencies of faculty and staff (C2), management and students both rate this challenge at 3.17, suggesting a recognition of the need for improved digital skills among faculty and staff. Academic staff rate it lower at 2.67, indicating they may feel more confident in their digital competencies.

Concerning digital literacy and competencies of students (C3), students rate this as the highest challenge at 3.64, indicating significant awareness of their limitations in digital skills. Support staff and management also recognize this challenge, with ratings of 2.83 and 3.00, respectively.

Regarding the availability of financial resources (C4), students rate this challenge the highest at 3.36, reflecting their perception of financial constraints impacting DT initiatives. Support staff and management also see financial resources as significant challenges, with ratings of 3.12 and 3.00, respectively. Academic staff rate it slightly lower at 2.64.

Institutional leadership and management support (C5) are perceived as less of a challenge overall, with

academic staff rating it the lowest at 2.30. Students rate it higher at 2.91, suggesting some dissatisfaction with leadership support. Support staff and management rate it at 2.76 and 2.17, respectively.

Management perceives resistance to change and cultural barriers (C6) as more significant challenges, with a rating of 2.83. Students and support staff also recognize this challenge, with ratings of 2.82 and 2.59, respectively. Academic staff rate it the lowest at 2.17, indicating they may be more open to change.

Table 4 presents DT's perceived benefits and drawbacks in Cambodian HEIs based on existing literature. The benefits include improved student engagement and motivation (B1), enhanced quality of teaching and learning (B2), and better access to educational resources and information (B3). The drawbacks include increased workload and stress for faculty and staff (D1), the creation of a digital divide and inequalities among students (D2), and compromised personal touch and face-to-face interaction in teaching and learning (D3). Respondents were asked to rate each benefit/drawback on a scale of 1 to 5, with one being "Strongly disagree" and five being "Strongly agree."

Regarding the perceived benefits, the survey results reveal a strong consensus among stakeholders on the positive impact of DT. Academic and support staff rated the enhanced student engagement and motivation (B1) highly, with an average rating of 4.48, indicating strong agreement. However, management and students showed slightly lower levels of agreement, rating it at 3.83 and 3.94, respectively.

Similarly, the study found a strong consensus on the improved quality of teaching and learning (B2). Academic staff, support staff, and students all rated this aspect very highly, with an average rating of 4.53, reflecting strong agreement. Management also acknowledged the benefits, though to a lesser degree, with a rating of 3.83.

The most remarkable finding was the stakeholders' overwhelming agreement on the improved access to educational resources and information (B3). Academic staff, in particular, rated this benefit the highest at 4.83, followed by students (4.56), support staff (4.50), and management (4.33), indicating a shared perception of enhanced access.

Table 4. Perceived Benefits and Drawbacks of Digital Transformation in Cambodian HEIs

Stakeholder	B1	B2	B3	D1	D2	D3
Academic staff	4.42	4.50	4.83	2.75	2.83	2.92
Management	3.83	3.83	4.33	2.83	2.67	3.17
Support staff	4.55	4.58	4.50	2.83	2.73	3.25
Students	3.94	4.50	4.56	3.19	3.12	3.38
Overall	4.19	4.44	4.58	2.93	2.89	3.20

Source: Survey results

In contrast, the perceived drawbacks of DT were viewed with more moderate concerns. Academic staff, management, and support staff rated the increased workload and stress for faculty and staff (D1) at an average of 2.80, suggesting a moderate level of concern. Students, however, expressed greater concern, rating it at 3.19.

Regarding creating a digital divide and inequalities among students (D2), the stakeholders again expressed moderate concern, with average ratings of 2.74. Students indicated a slightly higher level of concern at 3.12.

The most significant drawback identified was the compromised personal touch and face-to-face interaction in teaching and learning (D3). Support staff and students rated this aspect the highest, at 3.25 and 3.38, respectively, reflecting moderate to high concern. Management and academic staff also expressed notable concern, with ratings of 3.17 and 2.92, respectively.

The correlation results presented in Table 5 provide insights into the relationships between the study's independent variable (extent of DT implementation) and dependent variables (student engagement and participation [Y1], student academic performance [Y2], student satisfaction with the learning experience [Y3], educator effectiveness and productivity [Y4], and the overall impact of DT on teaching and learning outcomes [Y5]). The correlation coefficients between the extent of DT implementation (X) and the dependent variables (Y1 - Y5) are positive, indicating a positive relationship between these variables.

The strongest positive correlation (0.213936) is found between DT implementation and student satisfaction with the learning experience (Y3). This indicates that while there is a positive relationship, it is relatively weak. When digital tools and technologies are effectively integrated into the learning environment, students are more satisfied with their overall learning experience. Enhancing the quality and accessibility of digital resources can further increase student satisfaction.

A positive relationship (0.177853) between DT

implementation and educator effectiveness and productivity (Y4) suggests that digital tools and technologies help educators become more effective and productive. Although this correlation is weak, providing ongoing training and support for educators can enhance this positive impact.

The correlation for student academic performance (Y2) is also positive (0.147481), indicating that digital initiatives positively impact academic outcomes, though the effect is not very strong. Continued focus on integrating digital resources and personalized learning approaches can help improve academic performance.

In contrast, the correlation between student engagement and participation (Y1) is the weakest among the outcomes (0.114785), indicating a relatively modest positive relationship with the extent of DT implementation. This implies that while DT efforts contribute to increased engagement and participation, the effect is relatively modest. Enhancing digital tools and interactive platforms could further boost student involvement.

The overall impact on teaching and learning outcomes (Y5) shows a weak positive correlation (0.161999) with the extent of DT implementation. This suggests that while DT efforts generally improve teaching and learning outcomes, the effect is not strong. Continued investment in digital initiatives and addressing barriers can maximize the overall impact.

Table 5. Correlation Results

	Y1	Y2	Y3	Y4	Y5
X	0.114785	0.147481	0.213936	0.177853	0.161999
M1	0.219189	0.174972	0.129904	0.142573	0.101706
M2	0.215199	0.209203	0.063161	0.089151	0.114405
M3	0.311469	0.307001	0.196688	0.247640	0.149278
M4	0.212617	0.321999	0.239983	0.261601	0.098571

Source: Authors' calculations

The moderating effects of technological readiness (M1), educator competency with digital tools (M2), student digital skills (M3), and leadership styles and management support (M4) were also analyzed, as these factors can influence the relationship between DT implementation and the observed teaching and learning outcomes.

The correlation coefficients between the moderating variables (M1 – M4) and the dependent variables (Y1 – Y5) are positive, indicating a positive relationship between these variables. The magnitudes of the correlation coefficients vary, with some being stronger than others.

Student digital skills (M3) show the strongest correlations with student engagement and participation (Y1, $r = 0.311469$), student academic performance (Y2, $r = 0.307001$), and educator effectiveness and productivity (Y4, $r = 0.247640$). This suggests that enhancing students' digital literacy and competencies can significantly improve their learning experiences and academic performance. Initiatives focused on developing students' digital skills should be a priority in DT strategies.

Leadership styles and management support (M4) also show strong correlations with student academic performance (Y2, $r = 0.321999$) and educator effectiveness and productivity (Y4, $r = 0.261601$). This indicates that effective leadership can be crucial in championing the DT agenda, securing necessary resources, and fostering a culture of innovation and continuous improvement.

In contrast, the correlations for technological readiness (M1) and educator competency with digital tools (M2) are relatively weak. This implies that while these factors are important, their direct influence on teaching and learning outcomes is more limited. Having the necessary technology or providing training to educators may not be enough to drive significant improvements in outcomes. Other factors, such as pedagogical approaches, learning design, and integrating digital tools into the curriculum, may play a more crucial role.

The weak correlation between leadership styles and management support with the overall impact of DT on teaching and learning outcomes (Y5, $r = 0.098571$) indicates that these factors, while important for creating an enabling environment for DT, have a less pronounced direct impact on outcomes.

The study investigated two hypotheses related to the impact of DT on teaching and learning outcomes in Cambodian HEIs.

H1 states that the level of DT implementation in Cambodian HEIs is positively correlated with improved teaching and learning outcomes. The correlation results support this hypothesis, showing positive relationships between DT implementation and various outcomes, including student engagement and participation (0.114785), academic performance (0.147481), satisfaction with the learning experience (0.213936), educator effectiveness and productivity (0.177853), and the overall impact on teaching and learning (0.161999). Though relatively weak, these correlations indicate that DT initiatives are positively associated with improved teaching and learning outcomes, particularly

in terms of student satisfaction and educator productivity.

These findings align with existing literature on the impact of DT in higher education. Studies have shown that integrating ICT into educational practices can improve student engagement, especially in mathematics and science (Valverde-Berrocso et al., 2022; Wekerle et al., 2022). Using digital technologies in the classroom encourages students to engage in more constructive and interactive activities, positively associated with learning outcomes (Wekerle et al., 2022). Additionally, adopting digital learning platforms, blended learning models, and online assessment tools has been linked to improved student achievement by facilitating personalized and interactive learning experiences (Kumar & Priyanka, 2023).

The positive correlation between DT implementation and student satisfaction (0.213936) aligns with previous studies. Researchers have highlighted the importance of teacher quality, technical service quality, and overall service quality in influencing student satisfaction, particularly in online learning during the COVID-19 pandemic (Jiménez-Bucarey et al., 2021). Studies in Bangladesh have also found that DT activities in private universities positively influence student satisfaction and retention (Forid et al., 2022). Furthermore, a systematic review of digital strategies in education underscores the importance of well-implemented DT for improving educational outcomes and student satisfaction (Bui & Nguyen, 2023).

The positive correlation between DT implementation and educator effectiveness and productivity (0.177853) contributes to the existing literature on the impact of DT in higher education. Researchers have highlighted the importance of transactional leadership within a digitally transformed environment in significantly enhancing student engagement (Niță & Guțu, 2023), closely related to educator effectiveness and productivity.

H2 states that technological readiness, educator competencies, student digital skills, and leadership styles moderate the relationship between DT and teaching and learning outcomes. The findings support this hypothesis, with student digital skills (0.149278) showing the strongest moderating effect, followed by educator competency with digital tools (0.114405), technological readiness (0.101706), and leadership styles and management support (0.098571). These

results indicate that these factors moderate the relationship between DT and teaching and learning outcomes, with student digital skills particularly influential.

The literature review underscores the importance of these factors in successfully implementing DT in higher education. Researchers have emphasized the crucial role of robust digital infrastructure, regulatory frameworks, and well-equipped students and educators in facilitating the transition to digital learning environments (Larionov et al., 2021; Latifah et al., 2022). Additionally, the literature highlights the significance of leadership and management support in driving effective DT (Bisri et al., 2023). The findings of this study align with these insights and provide empirical evidence on the moderating effects of these factors in the context of Cambodian higher education.

CONCLUSION

This study investigates the impact of DT on teaching and learning outcomes in HEIs in Cambodia. The findings provide valuable empirical evidence on the implementation, challenges, and impact of DT initiatives in the context of Cambodian higher education.

The results indicate that Cambodian HEIs have widely implemented DT initiatives with a high perceived effectiveness. This suggests a strong commitment to integrating digital tools and technologies across various aspects of HEI operations, including teaching, learning, and administrative processes. The positive correlation between the extent of DT implementation and improved teaching and learning outcomes, such as student satisfaction, academic performance, and educator effectiveness, supports the first hypothesis (H1). This underscores the potential of DT to enhance the quality and delivery of higher education in Cambodia.

The study also identified several challenges HEIs face in implementing DT, including financial constraints, digital literacy and competencies of faculty, staff, and students, technological infrastructure, institutional leadership support, and resistance to change. Addressing these barriers through targeted strategies and investments will be crucial for the successful and sustainable adoption of digital technologies in Cambodian higher education.

Furthermore, the findings confirm the moderating effects of technological readiness, educator competencies, student digital skills, and leadership styles on the relationship between DT and teaching and learning outcomes, as hypothesized (H2). Among these

factors, student digital skills emerged as the strongest moderator, highlighting the importance of enhancing digital literacy and competencies among students to maximize the benefits of DT. Ensuring adequate support and training for educators and students to develop their digital capabilities will be essential for realizing the full potential of DT in Cambodian HEIs.

This study has limitations. Though representative of different stakeholder groups, the data were primarily from private HEIs, which may not fully capture the experiences of public HEIs in Cambodia. Future research should aim for a balanced representation of both public and private HEIs to understand better the actual state of DT in Cambodian higher education and its impact on teaching and learning outcomes. Additionally, in-depth case studies of successful DT initiatives could highlight best practices, critical success factors, and effective implementation strategies. Comparative studies between HEIs with varying levels of DT maturity could provide deeper insights into the conditions and factors that enable or hinder the successful integration of digital technologies in Cambodian higher education.

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An Empirical Study of Interdependency among the Identified Innovation Factors

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ABSTRACT

Innovation is the need of the hour for an organization to stay ahead of the competition. It's a critical factor that can make or break an organization's success. The factors influencing innovation, whether tangible or intangible, are complex and multifaceted. The factors that drive innovation need further research as proper tools are unavailable to determine the quantum of influence the factors have on innovation. Building on their previous research, the authors identified key factors that significantly influence innovation through a comprehensive literature review. This study, however, took a different approach, conducting an empirical investigation using a survey as a measuring tool. The study then performed statistical analysis on the data, identifying and shortlisting the factors that play a crucial role in driving innovation within an organizational context. The study employed a statistical analysis, including a large sample z-test for proportions and hypothesis testing for each of the 25 factors. This approach led to the shortlisting of 13 factors that significantly influence innovation. Furthermore, the study used Correlation analysis to understand the interdependency among the innovation factors, adding another layer to the research. Further research may be directed toward devising a mathematical model for the innovation index for use as a measuring tool to assess an organization's innovation potential.

Keywords: Innovation; Interdependency; Technology; Competition; Organizational Structure

INTRODUCTION

Innovation is recognized as an important driver of economic growth (Romer, 1990; Grossman & Helpman, 1994; Grönlund et al., 2010; Bloom & Van Reenen, 2002; Bosworth & Collins, 2003). Despite exceptional interest and plenty of empirical outcomes, researchers still need to understand the factors that create innovation and how innovation creates growth. An empirical measure of innovative activity that clearly explains these mechanisms and factors has yet to be developed.

Innovation is generally the result of out-of-the-box thinking by people motivated to create something different and new. This thinking differently may lead to bringing out a new product or a change in the service or process that is carried out routinely. In the course of innovation management, restructuring and changes in the technological front may be required. Innovation generates a new idea and "brings it to the market." It is imperative that innovation should lead

to add value and should have a positive influence on society.

While business efficiency is a crucial aspect of any enterprise, it alone cannot sustain competition and growth. On the other hand, innovation is a vital driver of revenue growth and wealth creation. In today's business landscape, strategic planning is significantly influenced by an organization's innovation capability, highlighting the economic potential of innovative work.

As studies have shown, competition and demand are key drivers of innovation. Unless used in the public domain, an invention remains beneficial only to the inventor. However, when an invention creates new or improved products, services, and processes that are useful to society and significantly alter how things operate, it is termed innovation.

As in today's competitive landscape, survival is only possible with innovation, this has become the cornerstone of any organization's success and profitability. Keeping this in mind, the primary purpose of this empirical research is to examine the factors that influence innovation in organizations and the level of interdependency among them.

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The study is organized into five sections. The introductory section offers a broad perspective on the study, setting the stage for the subsequent sections. The second section thoroughly examines the pertinent literature, comprehensively understanding the factors influencing organizational innovation. Section three outlines the research methodology. Section four offers valuable insights into the methods employed and the results obtained, contributing to the empirical findings of the research. Finally, the concluding section summarizes the key findings from the study, providing a deeper understanding of the implications and significance of the findings. In addition, this section presents the future scope of the study.

LITERATURE REVIEW

Innovation, a complex and multidimensional activity, cannot be measured with a single indicator or directly (Milbergs, 2004). Its success hinges on a multitude of factors that complement each other. This intricate nature of innovation, with its complex multiplicity feature, cannot be adequately captured with a single measurement. The market's demand dictates the rate of investment and the release of new products, a crucial driver of innovation.

It's a well-established fact that both tangible and intangible factors play a significant role in innovation. However, the influence of intangible assets, which are not present in physical form, is not straightforward

to measure. This necessitates the use of indirect measurement options, leading to the formulation and characterization of substitution methods.

Japanese success in technology and science is predominantly due to its citizens' creative attitude and high-level education (Dauda, 2010). Sternberg and Lubart's (1999) 'Investment Theory' suggests that the inclination to innovate requires converging several characteristics, such as personality, thinking styles, intellectual abilities, knowledge, motivation, and environment.

"Geneplore" and the "Componential" replica give the significant of research at the personal echelon, and earlier scholarly articles can be segregated into the link between innovation and six features: personality, knowledge, cognitive ability, behavioral abilities, motivation, emotion and mood states.

Although researchers have tried to find any dependency between intelligence and innovation capabilities, they have yet to reach a conclusive finding. Most of the scholarly articles in this scope can be segregated into four categories, envisaging innovation:

1. General Intelligence
2. A Tinge of Geniuses
3. Mental Processes and Cognitive Abilities
4. Intelligence judged by the observer

A summary of the characteristics that may positively influence innovation is provided in Figure 1.

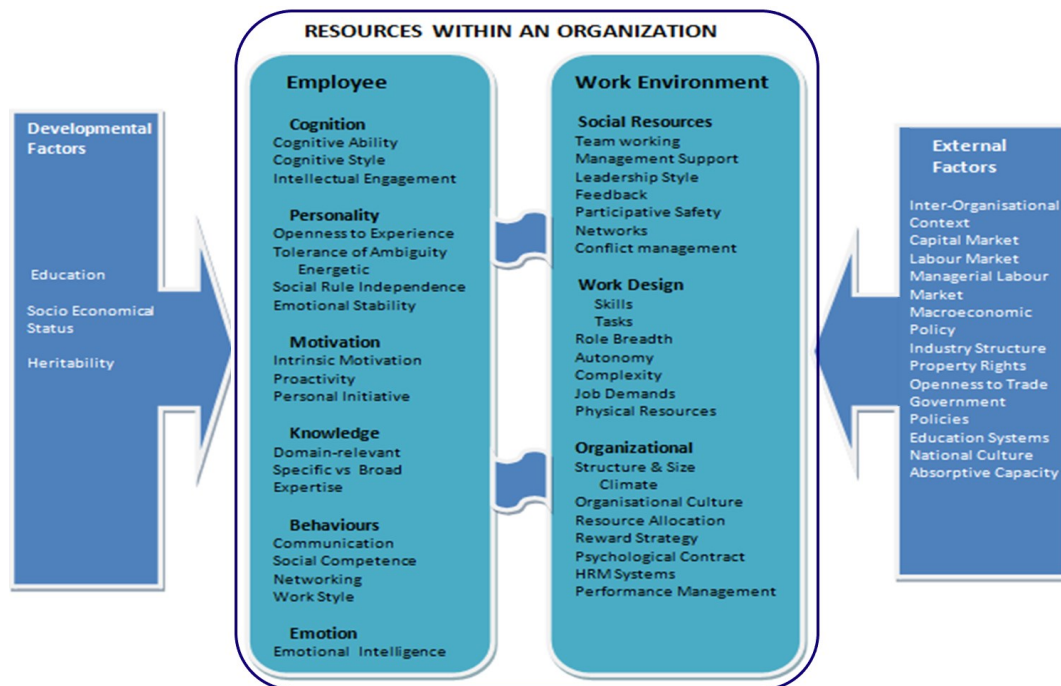


Figure 1: Innovation in organization: People pertinent resources for innovation in organizations (Patterson et al., 2009).

Simon (1991) suggests that the learning process in organizations involves both existing and newly employed members, as the new members may bring knowledge previously unavailable in the organization. An organization's innovative edge is significantly determined by the skills and knowledge of its employees (Nelson & Winter, 1985). Education contributes to building an individual's expertise, which may be presented through drawings, books, articles, presentations, and others. However, a good education is not the principal component of building an enhanced individual knowledge level.

Acha et al. (2007) and Loasby (2002) point out that the more an employee enhances his knowledge in his specialization, the more the organization benefits. Therefore, employee knowledge must be enhanced across their functional areas. Knowledge gained and accumulated through working experience is tacit, as gaining it is not only due to education. This tacit knowledge is difficult to formalize or communicate (Polanyi, 1966; Nonaka et al., 1994; Nonaka & Takeuchi, 1995). The advantage of an individual's tacit knowledge is proved during the actions and activities undertaken while working on a specific task or project. Practical knowledge is the basic foundation of tacit knowledge (Nelson & Winter, 1985). In the view of Nonaka et al. (1994) and Nonaka and Takeuchi (1995), the dominant forces that motivate individuals to enhance their knowledge are their intention and freedom in the given environment. Thus, individuals are the starting point and significant source contributing to organizational knowledge and learning.

The significant factors contributing to learning and innovation in organizations include education and training, communications among departments, creative thinking, a platform to showcase expertise, intentions and freedoms, and intensity of efforts. Therefore, organizations need a suitable positive working environment for all the above processes.

Patterson et al. (2000) emphasize individual initiative, social proficiency, and proactivity as contributors to employee behaviors associated with innovation. Studies have indicated that extrinsic rewards and the most needed intrinsic motivation may contribute to innovation. These include bonuses, pay increases, recognition, awards, and promotions (Abbey & Dickson, 1983; Eisenberg & Thompson, 2011).

According to Manso (2011), innovation that needs to be tested earlier is likely to fail, and relating failure to

pay hikes or having a negative impact on career growth will hamper the innovative environment in the organization. Instead, a robust, tolerant approach to failure and some reward for having the intention to contribute to innovation will substantially help the organizations achieve long-term success.

According to Patterson et al. (2009), such organizations are most active in bringing about innovation, which positively promotes and compensates the individual or team responsible for innovation. Organizations that devote time to brainstorming sessions to showcase their employees' creative ideas also successfully promote innovation.

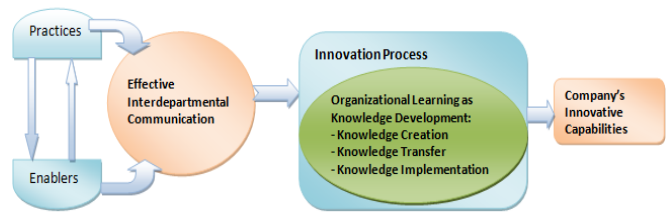


Figure 2: Conceptual framework for interdepartmental communication (Kovalenko, 2009)

Organizations need to learn to be successful in innovations, and there are different ways to learn (Bessant & Tidd, 2007). These happen through R&D, ideas acquired from outside the organization, interactions with suppliers, partners, and customers, and reviewing the documents of previous projects.

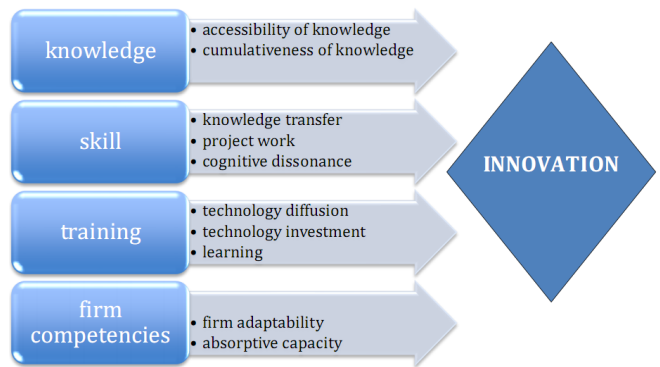


Figure 3: A model of interlinkages between components of skill systems and innovation (Jones & Grimshaw, 2012)

RESEARCH METHODOLOGY

Our study, grounded in a comprehensive literature review, has identified 25 distinct factors that shape innovation. These factors, both tangible and intangible, are complex and multidimensional. The degree of influence each factor exerts on innovation varies, adding further nuance to our understanding.

This empirical study, a collaborative effort with the Information Technology (IT) industry, was made possible by the valuable insights of IT professionals. Their perceptions about the influence of each factor on innovation were crucial to our understanding. The study analyzed the responses from 1,023 IT professionals from 213 representative IT companies with the help of a large sample z-test for proportion. Further, the study tested the hypothesis for the influence of each of the 25 factors on innovation. Based on the result of the hypothesis, which was dependent on the outcome of the z-test performed on the responses received for each of the 25 factors, the factors that significantly influence innovation were filtered. Thus, 13 factors have been filtered to influence innovation significantly. Further, using a correlation analysis, the study examined interdependency among these 13 innovation factors. One factor was compared with all the other factors to arrive at the inference.

RESULT AND FINDINGS

Analysis of the Responses

After repeated follow-ups, we received 1,213 responses to the Survey Form distributed to IT professionals. However, we could select only 1,023 entries, as others were incomplete. These respondents work in 213 different companies.

Large Sample Test for Proportions

A large sample z-test for proportions was conducted on the responses received to see which factors significantly influence innovation.

The equation calculates the Z value for each factor. A significant proportion of 70 percent is considered positive and is, hence, accepted for the analysis.

$$Z = \frac{\hat{P} - P}{\sqrt{\frac{P \times Q}{n}}}$$

Hence, $H_0: P = P_0$ Vs. $H_1: P > P_0$, where P is the proportion of respondents who opined positively towards the influence of the specific factor on innovation in the population, i.e., $P_0 = 0.7$ and n is the sample size which is 1,023. We reject H_0 if the calculated value of $Z > Z_{\alpha}$, where α is the level of significance and the value of Z_{α} can be obtained from

the tables of the area under the standard normal distribution, and it is 1.64.

For each factor, we formulated a hypothesis $H_0: P = 0.7$ Vs. $H_1: P > 0.7$ and concluded that the parameter significantly influences innovation if H_0 is rejected, where P is the proportion of respondents who opined positively about the influence of the specific factor on innovation in the population.

Table 1 presents the 13 factors where the null hypotheses were decisively rejected, underscoring their significant influence on innovation.

Table 1: List of the key factors

Factor	Name of the factors
A1	Experience of an employee influences the innovation
A2	Attitude of an employee influences innovation
A3	Team spirit of an employee triggers innovation
A4	Incentives motivate employees to be more innovative
A5	Working with other innovators promotes innovation
A6	Organizational structure influences the innovation level of employees
A7	Freedom to experiment given in the workplace contributes to the innovative skills of an employee
A8	The support for R & D promotes innovation
A9	Regular training for the employees enhances their innovative skills
A10	Free Environment promotes innovation
A11	The opportunity influences innovation
A12	Intense competition influences innovation
A13	The technology change necessitates innovation

Interdependency between Identified Key Factors

According to the statistical analysis of the data received, 13 factors influence innovation in the IT sector. The study analyzed the interdependency among these innovation factors.

Correlation analysis was used to understand the interdependency among the innovation factors. Accordingly, one factor was compared with all the

other factors, and the results are tabulated as shown in Table 2.

The correlation coefficient value of 0.3 is considered a cut-off value for checking the relationship between the key factors.

Table 2: Interdependency between the key factors

Fact- ors	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13
A1	1.000												
A2	0.120	1.000											
A3	0.265	0.282	1.000										
A4	0.297	0.148	0.286	1.000									
A5	0.183	0.190	0.169	0.133	1.000								
A6	0.206	0.148	0.152	0.221	0.166	1.000							
A7	0.160	0.125	0.156	0.097	0.155	0.303	1.000						
A8	0.176	0.092	0.165	0.068	0.192	0.306	0.519	1.000					
A9	0.284	0.071	0.237	0.234	0.366	0.092	0.107	0.132	1.000				
A10	0.119	0.222	0.163	0.163	0.475	0.180	0.234	0.165	0.359	1.000			
A11	0.216	0.149	0.164	0.154	0.273	0.151	0.155	0.130	0.212	0.239	1.000		
A12	0.141	0.106	0.187	0.156	0.179	0.136	0.147	0.183	0.125	0.120	0.263	1.000	
A13	0.251	0.107	0.116	0.186	0.222	0.228	0.306	0.320	0.197	0.149	0.307	0.243	1.000

As shown in Table 2, the critical factors “experience of an employee influences the innovation” (A1), “attitude of an employee influences innovation” (A2), “team spirit of an employee triggers innovation” (A3), and “incentives motivate employees to be more innovative” (A4), had no robust relationship between the other factors. Whereas the key factor, “working with other innovators promotes innovation” (A5), had a stronger relationship with the key factors, “regular training for the employees enhances their innovative skills” (A9) ($r = 0.366$) and “free environment promotes innovation” (A10) ($r = 0.475$). Similarly, the factor “organizational structure influences the innovation level of employees” (A6) had a good relationship with “freedom to experiment given in workplace contributes to the innovative skills of an employee” (A7) ($r = 0.303$), and “the support for R & D promotes innovation” (A8) ($r = 0.306$).

The key factor, “freedom to experiment given in workplace contributes to the innovative skills of an employee” (A7), had a better relationship between “the support for R & D promotes innovation” (A8) ($r = 0.519$), as well as a good relationship between “the technology change necessitates innovation” (A13) ($r = 0.306$). Similarly, the critical factor “the support for R & D promotes innovation” (A8) has a more substantial relation to the factor “the technology change necessitates innovation” (A13) ($r = 0.320$). The critical factor, “regular training for the employees enhances their innovative skills” (A9), shows a good relationship between the factors, “free environment promotes innovation” (A10) ($r = 0.359$).

As Table 2 shows, the key factor “free environment promotes innovation” (A10) does not show any relationship between the other key factors except “working with other innovators promotes innovation” (A5). The factor “the opportunity influences innovation” (A11) has a good relationship only with “the technology change necessitates innovation” (A13) ($r = 0.307$). In contrast, the critical factor “intense competition influences innovation” (A12) has no relationship with any key factors.

Overall, the key factors “experience of an employee influences innovation,” “attitude of an employee influences innovation,” “team spirit of an employee triggers innovation,” “incentives motivate employees to be more innovative,” and “intense competition influences innovation” do not show any relationship between any of the key factors.

Figures 4, 5, and 6 compare A1 and A2, A6 and A7, and A11 and A12 respectively.

A comparison between the key factors, “experience of an employee enhancing his innovation skills” and “attitude of an employee influences innovation,” is graphically represented in Figure 4. As shown, among the respondents who strongly agreed that the “experience of an employee enhances his innovative skills,” 299 strongly agreed, 130 moderately agreed, and 28 were neutral about the critical factor “attitude of an employee influences innovation.” Similarly, among the respondents who moderately agreed that the “experience of an employee enhances his innovative skills,” 179 strongly agreed, 109 moderately agreed, and 51 were neutral about the key factor “attitude of an employee influences innovation.”

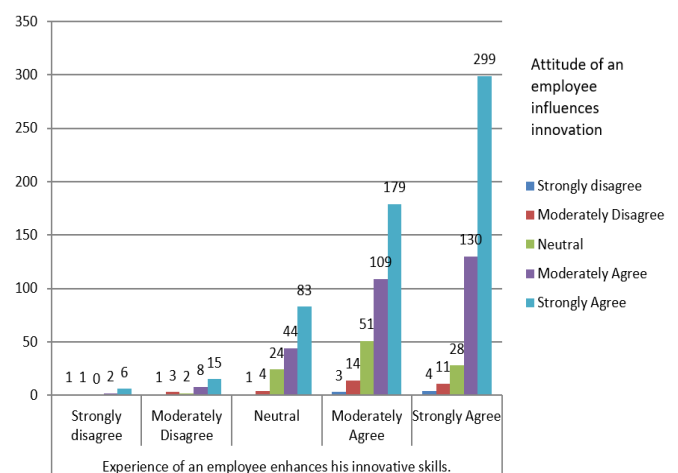


Figure 4: Chart comparing “experience of an employee” and “attitude of an employee enhancing innovation skills”

A comparison between the key factors, “organizational structure influences the innovation level of an employee” and “freedom to experiment in the workplace contributes to the innovative skills of an employee,” is graphically represented in Figure 5. As shown, among the respondents who strongly agreed that “organizational structure influences the innovation level of an employee,” 339 strongly agreed, and 50 moderately agreed about the critical factor “freedom to experiment given in workplace contributes to the innovative skills of an employee.” Similarly, among the respondents who moderately agreed that “organizational structure influences the innovation level of an employee,” 235 strongly agreed, and 109 moderately agreed about the critical factor “freedom to experiment given in workplace contributes to the innovative skills of an employee.”

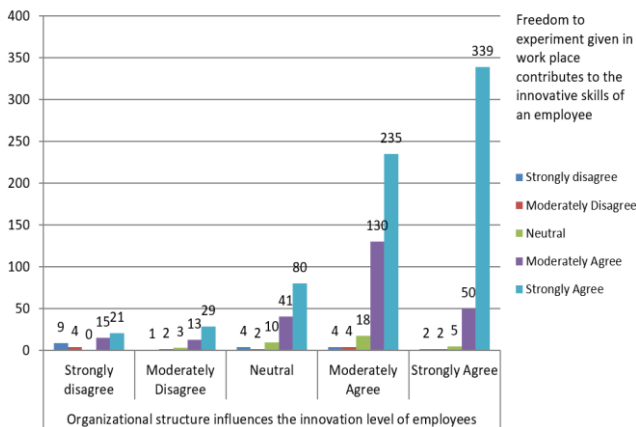


Figure 5: Chart comparing “organizational structure influences the innovation level of employees” and “freedom to experiment in workplace contributes to the innovation skills of an employee”

A comparison between the key factors, “opportunity influences innovation” and “intense competition influences innovation,” is graphically represented in Figure 6. As shown, among the respondents who strongly agreed that “opportunity influences innovation,” 247 strongly agreed, 141 moderately agreed, and 45 were neutral about the key factor “intense competition influences innovation.” Similarly, among the respondents who moderately agreed that “opportunity influences innovation,” 94 strongly agreed, 218 moderately agreed, and 88 were neutral about the key factor “intense competition influences innovation.”

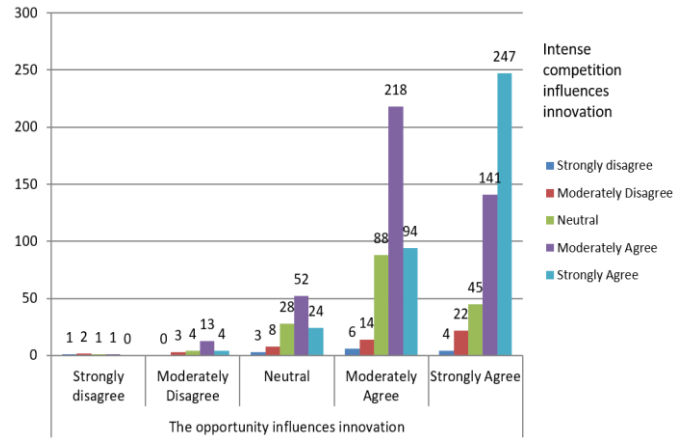


Figure 6: Chart comparing “opportunity influences innovation” and “intense competition influences innovation”

CONCLUSION AND FUTURE SCOPE OF THE STUDY

Conclusion

Innovation is essential and responsible for driving the economy. It is also necessary for an organization to stay ahead of the competition and survive in the business. Many instances exist in which conglomerates that did not innovate have not survived or could not hold on to their positions in the market in terms of revenue, products, market share, etc.

Despite much interest in innovation, researchers needed help understanding the mechanism by which innovation takes place. They also needed to learn the paradigm of innovation. An in-depth literature review identified two major factors, tangible and intangible, responsible for innovation. Thus, it was clear that not only tangible factors like R & D facilities and other infrastructure are solely responsible for innovation, but many other factors also contribute to it. These factors are not simple but complex. Tangible and intangible factors pertain to people working in the organization concerning the organization's management and the external environment.

It is essential to know which of the various factors significantly influences innovation. Thus, the study identified 25 factors. An instrument in the form of a survey with all 25 factors as items was sent to IT professionals working in the cross-section of the IT industry, and their opinion was sought.

By applying a large sample z-test for proportions and testing the hypothesis for each of the 25 factors, 13 factors were shortlisted to influence innovation significantly. The study tested the hypotheses for all 25 factors, and it rejected the null hypotheses of 13 factors, and they were identified as having a significant influence on innovation. Thus, applying the statistical processes to the responses received from the IT professionals, their perception of each factor was assessed, and the result was obtained. This clearly indicated the factors an organization must look upon and give importance to. The 13 factors identified were dependent on each other. Correlation analysis was used to understand the interdependency among the innovation factors. Accordingly, one factor was compared with all the factors, and the results were tabulated.

Future Scope of the Study

The study noted that the innovation capability of different organizations varies as specific processes are followed to increase or retain it. Thus, within the purview of each of the 13 factors, a few particular practices were listed for an organization to become innovative.

The innovation index tool is a continuation of this research, which has 13 factors as main components and 36 practices and attributes as sub-components. These practices and attributes are the main essence of the innovation index, which is created to indicate an organization's innovation capability.

A mathematical model is devised for the innovation index, which will be used as a measurement tool to assess an IT organization's innovation potential.

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Comparative Analysis of Egypt's National Competitiveness: An Evaluation Using International Economic Indicators

Karim Hamza  *

ABSTRACT

This study aims to assess Egypt's national competitiveness, using international economic indicators and benchmarks to help policymakers set strategies for improvement. The study utilized a comparative analysis method by employing specific international indicators and benchmarks, namely the Global Competitiveness Index (GCI) of the World Economic Forum, the Global Innovation Index (GII) of the World Intellectual Property Organization, and the Ease of Doing Business of the World Bank. These outcomes were compared with those of three primary regional groups: Middle East and North Africa (Arab Countries), Lower Middle-Income countries, and Sub-Saharan African countries. Despite Egypt's progressive economic development, the country still performs weakly in international economic indicator rankings compared to the selected regions. However, this also suggests significant potential for improvement in Egypt's national competitiveness. Further in-depth analysis is needed to assess Egypt's national competitiveness by examining the outcomes of these indicators using Porter's Diamond model. This will provide a more comprehensive understanding of Egypt's national competitiveness performance and inform strategies for enhancing its national competitiveness.

Keywords: National competitiveness; International indicator benchmark; Egypt; Economic reform; Developing countries

INTRODUCTION

Egypt has implemented various economic development programs despite its political, economic, and social challenges, particularly from 2011 to 2016. While these programs contributed to general economic improvement, they have not fully optimized Egypt's national competitiveness. Consequently, Egypt continues to encounter challenges in maintaining a favorable position in international economic indicators, particularly those related to competitiveness and economic development (EIU, 2021; World Bank, 2020).

This study aims to assess Egypt's modern economic performance for 2019 and 2020, identify the country's strengths and weaknesses, and understand the key

drivers necessary to improve and develop national competitiveness. This study sheds light on Egypt's national competitiveness elements by comparing Egypt's economic performance with international benchmarks such as the Global Competitiveness Index, Global Innovation Index, and Ease of Doing Business.

The study compares Egypt's economic performance with that of other countries in the region using a quantitative comparative analysis. The paper is structured into four main parts:

1. Providing an overview of Egypt's economic development, including its main economic performance indicators and elements.

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2. Analyzing Egypt's economic performance in international benchmarking related to National Competitiveness, primarily focusing on the Global Competitiveness Index of the World Economic Forum (WEF), Global Innovation Index of the World Intellectual Property Organization (WIPO), and Ease of Doing Business of the World Bank, to identify the strengths and weaknesses of its national competitiveness elements.
3. Comparing Egypt's economic performance with three main regional groups: Middle East and North Africa (Arab Countries), Lower Middle-Income countries, and Sub-Saharan African countries.
4. Providing an initial assessment of Egypt's national competitiveness performance compared to the targeted regions.

EGYPT'S MACROECONOMIC PERFORMANCE

Egypt is classified as an emerging market economy by the International Monetary Fund (IMF) and is considered one of the "CIVETS" and "Next 11" countries. This indicates that Egypt has a dynamic and diverse economy, a young growing population, a geo-strategic location, and the potential to catch up with leading developed economies (EUROMONITOR, 2008; Economist Intelligence Unit (EIU), 2010; Vavra, 2018).

Table 1: Comparing economic groups

Group	Advanced economies	Growing economies	Emerging markets	
Name	G7	BRICS	CIVETS	N11, or "Next 11"
Countries	- Canada - France - Germany - Italy - Japan - United Kingdom - United States - European Union	- Brazil - Russia - India - China - South Africa - Saudi Arabia - UAE Egypt (2024) - Ethiopia - Argentina	- Colombia - Indonesia - Vietnam - Egypt - Turkey - South Africa	- Bangladesh - Egypt - Indonesia - Iran - Korea - Mexico - Nigeria - Pakistan - Philippines - Turkey - Vietnam
Organized by	Participating countries	Participating countries	Economist Intelligence Unit	Goldman Sachs

Source: Author's interpretation

Egypt was one of the few emerging market countries that experienced a positive growth rate in 2020. As a result of the government's swift and prudent policy response, coupled with the International Monetary Fund's (IMF) support, the Egyptian economy showed resilience in the face of the pandemic (IMF, 2021). However, Egypt still faces high public debt and significant financing needs. Therefore, Egypt needs to reduce the role of the state in the economy, ensure a suitable business environment for all firms, improve the business environment, increase Egypt's integration into global trade by reducing trade barriers, ensure predictability of customs procedures to unleash Egypt's enormous growth potential, and reduce poverty and improve inclusiveness (IMF, 2021).

Egypt's Gross Domestic Product (GDP) growth rate was steady until 2014, before the Egyptian pound devaluation in 2016. After the currency devaluation in 2016, the economy suffered a strong hit due to high inflation and interest rates. The GDP started to recover its growth by 2018 due to the increase in foreign investment and IMF support (IMF, 2021).

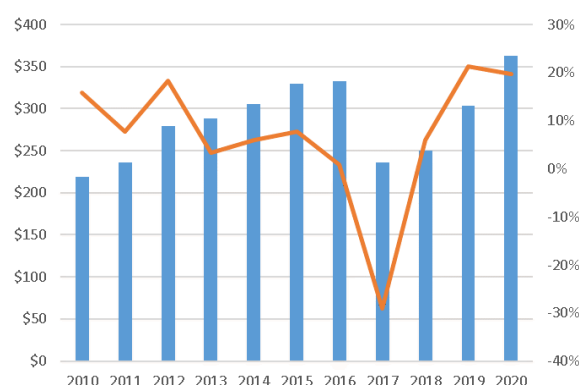


Figure 1: Egypt's GDP in billion and growth rate

Source: Data extracted by the author from the World Bank dataset for GDP 2020 ranking.

<https://datacatalog.worldbank.org/dataset/gdp-ranking>

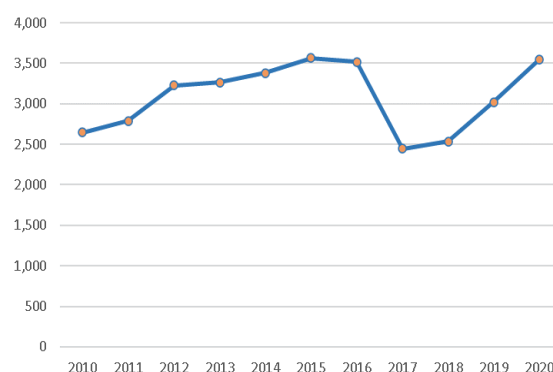


Figure 2: Egypt's GDP per capita growth rate in USD
Source: Data extracted by the author from the World Bank dataset for GDP per capita 2020 ranking.
<https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

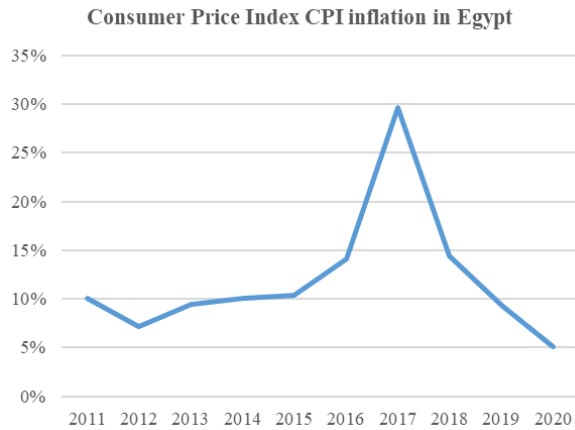


Figure 3: Consumer Price Index (CPI) inflation in Egypt
Source: Data extracted by author from the Central Bank of Egypt (Central Bank of Egypt, 2021).

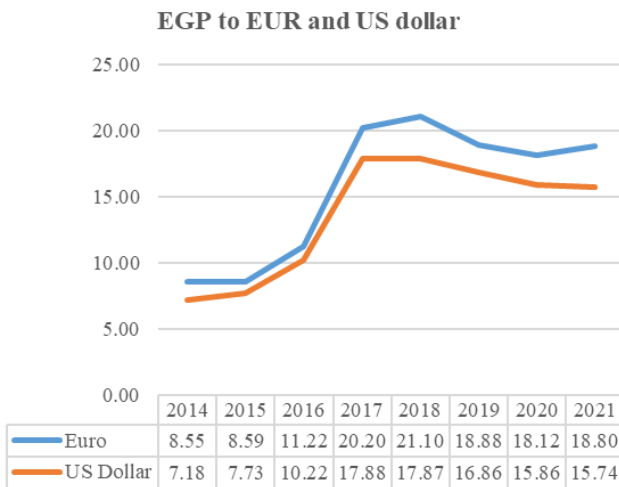


Figure 4: EGP to EUR and US Dollar
Source: Data extracted by the author from the Central Bank of Egypt (Central Bank of Egypt, 2021).

In terms of ranking, Egypt's GDP was 363 billion in 2020, according to World Bank data, which ranked 31st globally (2020). It is the third highest in the Arab countries after Saudi Arabia's 700 billion, the United Arab Emirates' 421 billion, and the second largest in Africa after Nigeria's 432 billion (World Bank, 2020).

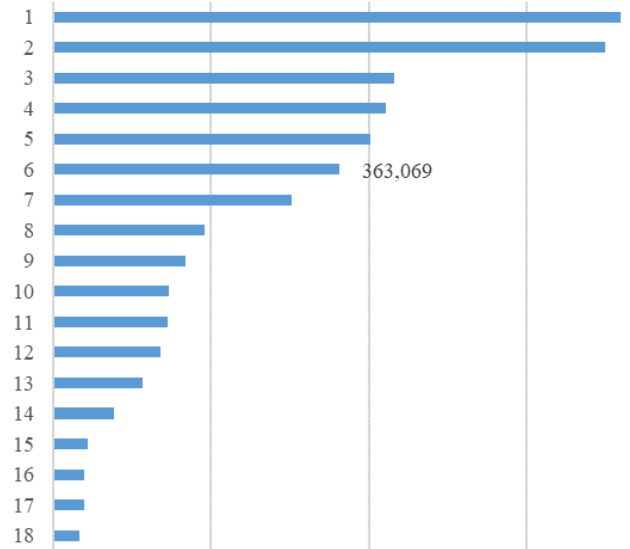


Figure 5: Egypt's GDP in 2020 compared to selected countries in the region
Source: Data extracted by the author from the World Bank dataset for GDP 2020 ranking.
<https://datacatalog.worldbank.org/dataset/gdp-ranking>

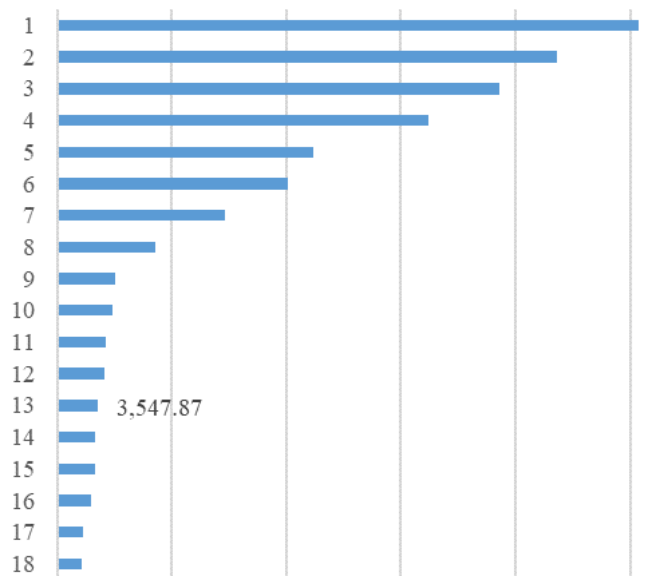


Figure 6: Egypt's GDP per capita in 2020 compared to selected countries in the region
Source: Data extracted by the author from the World Bank dataset for GDP per capita 2020 ranking.
<https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

From a foreign trade perspective, Egypt has a large structural trade deficit. Oil and gas remain the country's leading export earners. Suez Canal transit fees provide about US\$5 bn a year in foreign currency inflows, and the current account fluctuates, usually registering a modest deficit (Central Bank of Egypt, 2021).

Table 2: Major exports and imports in 2019

Major exports 2019	% of total	Major imports 2019	% of total
Food	11.8	Oil & natural gas	17.3
Cotton & other textiles	9.9	Chemicals	9.5
Chemicals	8.6	Vehicles	6.6

Leading markets 2020	% of total	Leading suppliers 2020	% of total
UAE	10.7	China	14.8
Saudi Arabia	6.4	US	6.7
Turkey	6.2	Saudi Arabia	6.5
US	5.5	Germany	5.8

Source: Data extracted by the author from the Central Bank of Egypt (Central Bank of Egypt, 2021).

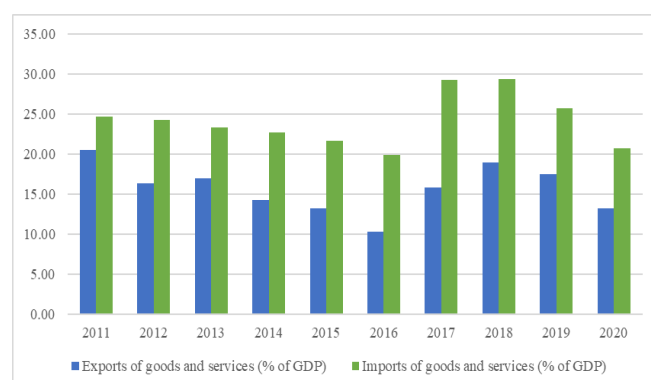


Figure 7: Exports and Imports of goods and services (% of GDP)

Source: Data extracted by the author from the Central Bank of Egypt (Central Bank of Egypt, 2021).

The Foreign Direct Investment (FDI) in Egypt During July/December 2019/2020 registered a net inflow of US\$ 5.0 billion, up by 18.5 percent, compared to the same period of the previous fiscal year (Central Bank of Egypt, 2020). The increase in investment inflows was attributed to the hike in FDI flows from Italy by US\$ 512.3 million to US\$ 2.8 billion (against US\$ 2.3 billion). Luxemburg came next with an increase of US\$

329.4 million to US\$ 84.3 million (against negative US\$ 245.1 million in the period of comparison), then the Netherlands with a rise of US\$ 192.6 million to US\$ 685.0 million (against US\$ 492.4 million). Also, investment flows from the Arab countries during the reporting period rose by US\$ 261.4 million, owing to the increase in investment flows from the UAE to register US\$ 981.1 million (against US\$ 565.3 million) and Qatar (US\$ 275.7 million against US\$ 176.4 million). Investment flows from the United States increased by US\$ 115.2 million to US\$ 745.8 million in July/December 2019/2020 (against US\$ 630.6 million in the same period of the previous fiscal year) (Central Bank of Egypt, 2021).

Table 3: Geographical Distribution of FDI in Egypt (US\$ million)

During July/Dec.	2018/2019	2019/2020*	Change + (-)	Rate
Net Flows of FDI in Egypt (A+B)	4184.7	4958.5	773.8	18.5
A- Total Inflows	8008.2	9160.9	1152.7	14.4
USA	630.6	745.8	115.2	18.3
EU Countries	4713.9	5447.3	733.4	15.6
Arab Countries	1666.8	1928.2	261.4	15.7
Other Countries	996.9	1039.6	42.7	4.3

Source: Data extracted by the author from the Central Bank of Egypt (Central Bank of Egypt, 2021).

Geographic Influence on Competitiveness

Egypt is located in the heart of the Europe, Middle East, and Africa region (EMEA), which gives it strategic access to Europe and Africa, as well as Arab countries. Egypt is considered an African and Arab country at the same time, and it has always had strategic agreements with European countries, especially Germany, France, and Italy, and with the European Union in general (WorldData, 2021).

Egypt's Land area is 997,739 sq km, of which only 5 percent is inhabited and cultivated territory; the current Population is 101.4m (end-2020, CAPMAS estimate) (General Authority for Investment and Free Zones, 2021). The Climate is moderate throughout the year (temperature degrees: Summer 29°-35°, Winter 15°-25° C). The main language is Arabic, and

English and French are common languages (General Authority for Investment and Free Zones, 2021).

The Suez Canal has always been Egypt's biggest geostrategic asset, and its fast-growing ports on the Mediterranean and the Red Sea are becoming increasingly important trade hubs connecting Europe and Africa. In addition, Egypt's extended coastlines are around 2,450 km long across the Mediterranean Sea and the Red Sea with five principal harbors (Alexandria, El Dekheila, Damietta, Port Said, El Sukhna, and Suez) (Maritime Transport Sector, 2021). Around 10 international airports cover most of the major cities in Egypt (WorldData, 2021), in addition to 193,841 km of road network and 9,570 km of railway network. The Egyptian authorities are working on a mega program to upgrade all the country's road and transportation networks (General Authority for Investment and Free Zones, 2021).

Workforce and Human Capital

Egypt's population is rapidly expanding, with a yearly growth rate of approximately 2 percent, currently standing at around 102 million (World Bank, 2020). This places Egypt at the 14th position in the global rank, the highest among Arab countries, and the third in Africa, following Nigeria and Ethiopia. Notably, 46 percent of Egypt's population falls within the 15-44 age group, and the current labor force is estimated to be around 29 million (EIU, 2021).

Table 4: Egypt's labor force 2019

Population	102,399,678 (September 2021)
Population average Growth Rate	2.65 % (2014-2018)
Age Structure:	0-14 years: 33.8% 15-44 years: 46% 45-59 years: 12.5% 60 years and over: 7.7%
Labor Force	29.1 (Q2, 2021)
Universities	41 Universities (23 Public, and 18 Private)
Internet Users	72.76 million (July 2021)
Mobile Users	100.78 million (July 2021)
Fixed Lines Users	10.84 million (July 2021)

Source: ILO, 2021

Table 5: Egypt's labor-related indicators (2021)

Indicator	Total	Men	Women
Labor force participation rate (%)	42.2	67.3	15.6
Employment-population ratio (%)	38.9	64.1	12.2
Share of agriculture (%)	21.1	21.1	21.1
Share of industry (%)	28.5	32	9.3
Share of services (%)	50.1	46.6	69.1
Share of managers, professionals and technicians (%)	29.6	26.1	49.1
Share with advanced education (%)	18	15.3	29.9
Unemployment rate (%)	7.8	4.8	21.6
Average monthly earnings of employees, local currency	360	5607.4	5282.6
Average weekly hours worked per employed person	46.2	47.1	41.2

Source: ILO, 2021

COMPARATIVE ANALYSIS OF EGYPT'S ECONOMIC COMPETITIVENESS

Assessing national competitiveness and benchmarking is crucial for countries like Egypt, especially considering its challenges in achieving sustainable economic development. The competitiveness provides valuable insights into the country's economic strengths and weaknesses, helps identify areas for improvement, and informs policymaking decisions to enhance overall competitiveness (Berger & Bristow, 2009).

Like many developing countries, Egypt has implemented various economic development programs to address its socio-economic challenges. However, despite these efforts, the country struggles to achieve optimal national competitiveness. Therefore, understanding Egypt's position in the global economic landscape is essential for identifying strategic priorities and fostering sustainable economic growth (Berger & Bristow, 2009; Rudra, 2008).

Comparative analysis allows for evaluating Egypt's economic performance relative to other countries and regions, providing an unbiased perspective on its national competitiveness position. By benchmarking against global standards and best practices, Egypt can identify its economy's main strengths and weaknesses

and develop targeted strategies to improve national competitiveness.

This study employs several widely recognized assessment methods and indexes to measure Egypt's national competitiveness:

- **Michael Porter's Single Diamond Model:** This model serves as a reference for developing indexes to measure national competitiveness. It examines factors such as factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry (Porter, 1990). The author will use it in a further study.
- **Global Competitiveness Index (GCI):** Developed by the World Economic Forum, the GCI measures the microeconomic and macroeconomic foundations of national competitiveness, including institutions, infrastructure, macroeconomic environment, health, education, and innovation capability (WEF, 2014).
- **Global Innovation Index (GII):** Created by the World Intellectual Property Organization, the GI assesses a country's innovation performance, including indicators related to institutions, human capital and research, infrastructure, market sophistication, business sophistication, and knowledge and technology outputs (WIPO, 2020).
- **Ease of Doing Business Score:** Developed by the World Bank, this score measures the ease of doing business in a particular economy based on factors such as starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency (World Bank, 2020).

Table 6: Comparing the main national competitiveness assessment models

Model	Diamond model	Global Competitiveness Index (GCI)	Global Innovation Index (GII)	Ease of Doing Business (EDB)
Author	Michel Porter	World Economic Forum (WEF)	World Intellectual Property Org. WIPO)	World Bank
Year	1990	2005	2007	2016
Component	• Firm strategy, structure & rivalry • Demand conditions • Related supporting industries • Factor conditions • Government	Stage 1: Factor Driven • Pillar 1- Institutions • Pillar 2- Infrastructure • Pillar 3- Macroeconomic environment • Pillar 4- Health & primary education Stage 2: Efficiency Driven • Pillar 5- Higher education & training • Pillar 6- Goods market efficiency • Pillar 7- Labor market efficiency • Pillar 8- Financial market development • Pillar 9- Technological readiness • Pillar 10- Market size Stage 3: Innovation Driven • Pillar 11- Business sophistication • Pillar 12- Innovation	1 Institutions 1.1. Political environment 1.2. Regulatory environment 1.3. Business environment 2 Human capital and research 2.1. Education 2.2. Tertiary education 2.3. Research & development (R&D) 3 Infrastructure 3.1. ICTs 3.2. General infrastructure 3.3. Ecological sustainability 4 Market sophistication 4.1. Credit 4.2. Investment 5 Business sophistication	1. Starting a business procedure 2. Dealing with construction permits procedures 3. Getting electricity procedures 4. Registering property procedures 5. Getting credit 6. Protecting minority investors 7. Paying taxes 8. Trading across borders 9. Enforcing contracts 10. Resolving insolvency 11. Employing workers 12. Contracting with the government

Model	Diamond model	Global Competitiveness Index (GCI)	Global Innovation Index (GII)	Ease of Doing Business (EDB)
			5.1. Knowledge workers 5.2. Innovation linkages 5.2.2. State of cluster development 5.3. Knowledge absorption 6 Knowledge & technology outputs 6.1. Knowledge creation 6.2. Knowledge impact 6.3. Knowledge diffusion 7 Creative outputs 7.1. Intangible assets 7.2. Creative goods and services 7.3. Online creativity	
Limitation	- Focus on specific industry or firm - Government factor is not clear - Human factor is not clear - International prospective is not clear		Focus only on innovation	Focus mainly on institutional regulations
Factors	Physical factors	- Physical factors - Human factor	- Physical factors - Human factor	- Physical factors - Human factor
Context	Domestic context	- Domestic context - International context	- Domestic context - International context	- Domestic context - International context
Score Calculation				
Countries	Not defined	141	132	190

Source: Author's interpretation

Egypt's Global Competitiveness Index (GCI)

Since 2005, the World Economic Forum has published The Global Competitiveness Report annually, which ranks the most competitive nations worldwide. The report assesses competitiveness using the GCI, a comprehensive tool that measures the microeconomic and macroeconomic foundations of national competitiveness (World Economic Forum, 2014; Schwab, 2009).

As defined by the WEF, competitiveness encompasses the institutions, policies, and factors determining a country's productivity level. This, in turn, influences

the country's prosperity, investment returns, and GDP growth rates (World Economic Forum, 2014 and 2015; Schwab, 2009).

The GCI evaluates a country's progress across various factors influencing productivity and competitiveness. It comprises 12 pillars categorized into three development stages:

- Stage 1- Factor Driven: Countries compete based on factor endowments such as skilled labor and natural resources. Key pillars at this stage include institutions, infrastructure, the macroeconomic environment, and health and primary education.

- Stage 2- Efficiency Driven: With increasing competitiveness, countries focus on improving productivity and product quality. This stage emphasizes higher education and training, goods market efficiency, and technological readiness.
- Stage 3- Innovation Driven: In this stage, countries compete through innovation and unique product offerings, and business sophistication and innovation are the critical pillars.

Table 7: Three stages of national competitiveness development (Global Competitiveness Index)

Stage 1 Factor Driven	Stage 2 Efficiency Driven	Stage 3 Innovation Driven
• Pillar 1- Institutions • Pillar 2- Infrastructure • Pillar 3- Macroeconomic environment • Pillar 4- Health & primary education	• Pillar 5- Higher education & training • Pillar 6- Goods market efficiency • Pillar 7- Labor market efficiency • Pillar 8- Financial market development • Pillar 9- Technological readiness • Pillar 10- Market size	• Pillar 11- Business sophistication • Pillar 12- Innovation

Source: World Economic Forum, 2014

Over the period from 2017 to 2019, Egypt has shown mixed performance in its global competitiveness, with some areas witnessing improvement while others experienced fluctuations. The country's overall Global Competitiveness Index (GCI) rank remained relatively stable, indicating some progress in enhancing competitiveness. Notably, Egypt demonstrated consistent improvement in institutional quality and infrastructure, which are fundamental pillars for fostering a conducive business environment and attracting investments. However, challenges persist, particularly in maintaining macroeconomic stability, as indicated by fluctuations in the corresponding pillar's

score over the years. Nevertheless, Egypt's positive trajectory in innovation capability suggests the potential for driving productivity and competitiveness in the global economy. Continued efforts to address challenges in macroeconomic stability while further enhancing institutional frameworks and innovation ecosystems can contribute to sustained progress in Egypt's global competitiveness and promote long-term economic growth (World Economic Forum, 2019).

Table 8: Egypt's Global Competitiveness Index (GCI 2017-2019)

	2017	2018	2019
Global Competitiveness Index - Rank	94	94	93
Global Competitiveness Index – Score	53.17	53.59	54.54
1st pillar: Institutions	45.48	48.09	51.33
2nd pillar: Infrastructure	69.62	70.49	73.05
3rd pillar: ICT adoption	38.85	40.55	40.57
4th pillar: Macroeconomic stability	59.23	50.98	44.72
5th pillar: Health	67.99	68.86	65.02
6th pillar: Skills	50.92	52.75	54.20
7th pillar: Product market	48.21	48.20	50.74
8th pillar: Labor market	43.86	46.37	49.50
9th pillar: Financial system	53.39	52.25	56.11
10th pillar: Market size	71.52	72.80	73.57
11th pillar: Business dynamism	53.14	54.07	56.08
12th pillar: Innovation capability	35.86	37.66	39.62

Source: Author's data interpretation from Global Competitiveness Index 4.0

<http://reports.weforum.org/global-competitiveness-index-2017-2018/countryeconomy-profiles/#economy=EGY>
<https://www.weforum.org/reports/global-competitiveness-report-2019>

When comparing Egypt's GCI score in 2019 with other Arab countries, Egypt ranks moderately among its peers. It holds a GCI score 54.54, positioning it in the lower range among the listed Arab nations. Notably, Egypt performs relatively well in pillars such as infrastructure and market size, indicating strengths in physical and market-related aspects. However, challenges persist in areas like macroeconomic stability and innovation capability, where Egypt falls behind compared to other Arab countries. Despite efforts to strengthen institutions and skills development, Egypt's performance in these areas remains moderate (World Economic Forum, 2019).

Moreover, Egypt's GCI scores exhibit a similar pattern when compared to the EMEA region and lower-middle-income countries. While Egypt's infrastructure pillar score surpasses the EMEA region's average, it lags in several other pillars, including macroeconomic stability and innovation capability. This suggests a need for further reforms and investments to address structural challenges and enhance Egypt's competitiveness on both regional and global scales. Efforts to improve institutional quality, foster innovation, and enhance macroeconomic stability can play a crucial role in bolstering Egypt's overall

competitiveness and driving sustainable economic growth in the future (World Economic Forum, 2019).

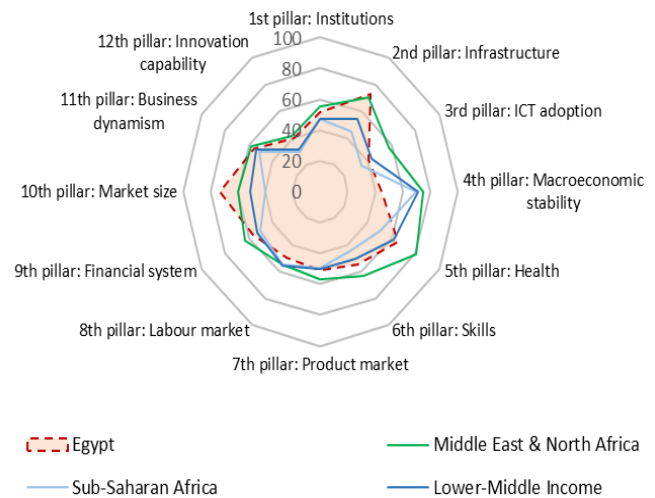


Figure 8: Egypt's GCI 2019 to the Middle East & North Africa, Sub-Saharan Africa, and Lower- Middle-Income average

Source: Data extracted by the author from the GCI data set (<https://www.weforum.org/reports/global-competitiveness-report-2019>)

Table 9: Egypt's GCI score in 2019 compared to Arab Countries

Series name	GCI	1 st pillar: Institutions	2 nd pillar: Infrastructure	3 rd pillar: ICT adoption	4 th pillar: Macro-economic stability	5 th pillar: Health	6 th pillar: Skills	7 th pillar: Product market	8 th pillar: Labor market	9 th pillar: Financial system	10 th pillar: Market size	11 th pillar: Business dynamism	12 th pillar: Innovation capability
UAE	75.01	73.26	88.49	91.87	100.00	72.18	70.61	71.74	66.16	73.84	70.34	69.27	52.34
Qatar	72.87	63.22	81.64	83.78	98.64	88.60	70.54	66.85	63.38	81.34	60.45	65.96	50.03
Saudi Arabia	70.03	63.19	78.06	69.30	100.00	82.25	75.35	64.92	56.62	70.68	76.27	53.12	50.55
Bahrain	65.38	62.90	78.39	67.19	68.30	86.90	68.71	65.11	66.43	71.33	46.26	64.31	38.72
Kuwait	65.10	55.58	68.37	69.57	100.00	96.08	61.33	57.86	54.35	71.61	60.11	56.09	30.30
Oman	63.61	62.35	80.50	58.11	67.41	80.68	71.54	63.12	55.75	63.90	55.86	62.82	41.24
Jordan	60.94	59.82	67.45	51.04	69.85	86.65	67.15	55.83	57.71	71.62	48.81	56.56	38.78
Morocco	60.01	60.02	72.63	46.20	90.00	72.33	48.62	55.99	51.48	67.46	60.46	59.80	35.12
Tunisia	56.41	52.97	62.74	50.92	65.65	85.34	59.60	52.44	46.43	55.72	53.50	58.97	32.64
Lebanon	56.29	44.39	61.27	46.66	66.51	82.05	64.23	51.21	54.40	64.71	48.56	53.00	38.48
Algeria	56.25	45.53	63.79	52.72	71.20	82.76	59.07	45.79	47.10	50.05	66.47	56.20	34.38
Egypt	54.54	51.33	73.05	40.57	44.72	65.02	54.20	50.74	49.50	56.11	73.57	56.08	39.62

Source: Global Competitiveness Index, 2019

Table 10: Egypt's GCI average score 2019 compared to EMEA Region and Lower-Middle Income

GCI 2019	GCI 4.0 2019	1 st pillar: Institutions	2 nd pillar: Infrastructure	3 rd pillar: ICT adoption	4 th pillar: Macro-economic stability	5 th pillar: Health	6 th pillar: Skills	7 th pillar: Product market	8 th pillar: Labor market	9 th pillar: Financial system	10 th pillar: Market size	11 th pillar: Business dynamism	12 th pillar: Innovation capability
Middle East & North Africa	61.44	55.45	70.54	57.60	75.26	80.77	62.94	56.74	54.84	63.70	59.94	58.23	41.31
Egypt	54.54	51.33	73.05	40.57	44.72	65.02	54.20	50.74	49.50	56.11	73.57	56.08	39.62
Sub-Saharan Africa	47.25	46.92	45.01	34.26	69.43	50.83	44.28	49.28	54.59	50.80	40.36	51.81	29.44
Lower-Middle Income	51.95	47.25	54.51	42.80	70.95	62.20	50.63	50.35	55.01	53.31	51.20	53.76	31.42

Source: Global Competitiveness Index, 2019

Egypt's Global Innovation Index 2020

lower range among the listed Arab nations. Notably, Egypt performs relatively well in pillars such as infrastructure and market size, indicating strengths in physical and market-related aspects. However, challenges persist in areas like macroeconomic stability and innovation capability, where Egypt falls behind compared to other Arab countries. Despite efforts to strengthen institutions and skills development, Egypt's performance in these areas remains moderate (World Economic Forum, 2019).

Innovation Input Sub-Index:

- Institutions: Political, regulatory, and business environment
- Human Capital & Research: Education, research, and development
- Infrastructure: Information and communication technologies (ICTs), ecological sustainability
- Market Sophistication: Credit, investment, trade, competition, and market scale
- Business Sophistication: Public/private/academic partnerships, competitive pressure, efficiency gains, and economies with high-tech content

Innovation Input Sub-Index:

- Knowledge and Technology Outputs: Creation, impact, and diffusion of knowledge
- Creative Outputs: Intangible assets, creative goods, and services

In 2020, Egypt performed better in innovation outputs than inputs, ranking 104th in innovation

inputs and 82nd in innovation outputs (WIPO, 2020). Although Egypt improved its rank in innovation inputs compared to previous years, its position in innovation outputs declined. Egypt ranks 14th among the 29 lower-middle-income economies (WIPO, 2020; WIPO, 2021). Conversely, Egypt excels in knowledge and technology outputs but faces institutional challenges. While performing above the lower-middle-income group average in infrastructure and knowledge and technology outputs, Egypt lags below the regional average across all GII pillars (WIPO, 2020; WIPO, 2021).

Table 11: Egypt's Global Innovation Index (GII 2016-2021)

Indicator	Type	2016	2017	2018	2019	2020	2021
Global Innovation Index	Rank	107	105	95	92	96	94
Global Innovation Index	Score (0-100)	26	26	27.2	27.5	24.2	25.09
Institutions	Score (0-100)	39	40.4	44.3	47.9	48.6	49.3
Human capital & research	Score (0-100)	27.3	26.9	22.9	19.7	21.5	21.8
Infrastructure	Score (0-100)	38.3	38.4	37.9	36.8	31.5	33.5
Market sophistication	Score (0-100)	34.2	36.7	38.8	41	39.3	40.9
Business sophistication	Score (0-100)	20	21	19.5	21.2	18.7	18
Knowledge & technology outputs	Score (0-100)	18.5	17	21.1	22.1	19.7	19.4
Creative outputs	Score (0-100)	21.8	21.6	22.1	21.1	13.4	15.5

Source: Data extracted by the author from the World Bank TcData360 https://tcdata360.worldbank.org/indicators/3aa2eb70?indicator=40712&viz=line_chart&years=2013,2020

Egypt's performance in the Global Innovation Index (GII) for 2021 indicates a mixed picture compared to other Arab countries. With a GI score of 25.09, Egypt falls behind several peers, positioning it in the region's lower range of innovation capability. Specifically, Egypt lags in various pillars, such as institutions, human capital and research, and creative outputs, suggesting challenges in fostering an environment conducive to innovation and knowledge creation (WIPO, 2020; WIPO, 2021).

Institutional quality, a critical factor for innovation, ranks relatively low for Egypt compared to countries like the United Arab Emirates and Bahrain. Similarly, Egypt's performance in human capital and research is moderate, indicating a pressing need for further investment in education, research, and development. This investment is crucial to enhance Egypt's innovation capacity (WIPO, 2020; WIPO, 2021).

While Egypt shows some strength in infrastructure and market sophistication, its performance in business sophistication, knowledge and technology outputs, and creative outputs is below par compared to regional peers. These findings underscore the urgent need to foster a robust ecosystem that supports entrepreneurship, research and development,

and creative endeavors. This is crucial to enhance Egypt's innovation potential and overall competitiveness in the global arena. Efforts to improve institutional quality, invest in human capital, and promote a culture of innovation are essential for Egypt to harness its full innovation capacity and drive sustainable economic growth in the future (WIPO, 2020; WIPO, 2021).

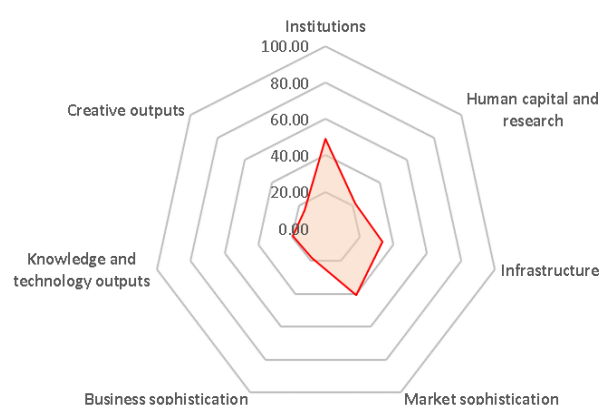


Figure 9: Egypt's Global Innovation Index 2020

Source: Data extracted by the author from the World Intellectual Property Organization (WIPO), publication (https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020/eg.pdf)

Table 12: Egypt's GI index scores compared to Arab countries in 2021

Country	GII 2021	Institutions	Human capital & research	Infrastructure	Market sophistication	Business sophistication	Knowledge & technology outputs	Creative outputs
United Arab Emirates	43.03	78.36	49.94	58.11	56.72	47.20	22.22	33.76
Saudi Arabia	31.84	53.26	45.72	45.12	51.93	21.14	19.64	20.87
Qatar	31.49	66.00	29.83	52.31	43.19	19.95	16.80	24.65
Tunisia	30.68	61.38	42.66	34.23	40.69	16.53	23.98	20.55
Kuwait	29.90	57.72	31.36	49.56	41.44	18.75	22.07	17.99
Oman	29.41	62.32	37.87	45.05	43.16	20.18	11.73	22.47
Morocco	29.26	61.57	27.51	36.31	41.86	18.05	20.08	22.83
Bahrain	28.82	69.37	26.30	50.49	44.33	21.11	15.80	14.82
Jordan	28.32	64.36	26.25	30.13	49.74	21.94	18.02	18.29
Lebanon	25.12	50.14	24.95	30.38	42.01	25.44	14.13	17.18
Egypt	25.09	49.33	21.76	33.54	40.90	18.05	19.38	15.55
Algeria	19.87	52.54	29.83	31.84	23.69	14.70	8.12	10.31

Source: Data extracted by the author: <https://www.globalinnovationindex.org/analysis-indicator/>

Egypt's Ease of Doing Business

The World Bank's Doing Business index evaluates the regulatory environment for small and medium-sized enterprises (SMEs) in 190 economies worldwide. The index focuses on various aspects of business regulation that can impact the ease of doing business for domestic firms, particularly those in each country's largest business city (World Bank, 2020).

The Doing Business report covers 12 key areas of business regulation, each of which plays a crucial role in shaping the business environment:

- **Starting a Business:** Measures the procedures, time, and cost required for entrepreneurs to establish a new business entity.
- **Dealing with Construction Permits:** Evaluates the procedures and requirements for obtaining construction permits, which are essential for initiating construction projects.
- **Getting Electricity:** Assesses the procedures and reliability of electricity supply, including the time and cost involved in obtaining an electricity connection.
- **Registering Property:** Examines the procedures and requirements for registering property ownership, which are essential for establishing legal ownership rights.
- **Getting Credit:** Evaluates the legal framework and practices for accessing credit, including the depth and breadth of credit information available to lenders.
- **Protecting Minority Investors:** Assesses the legal protections and transparency measures in place to safeguard the interests of minority shareholders in companies.
- **Paying Taxes:** Examines the tax regime and administrative procedures for calculating, filing, and paying taxes, including the complexity and cost of tax compliance.
- **Trading Across Borders:** Evaluates the efficiency and cost of importing and exporting goods, including customs procedures, documentation requirements, and border compliance.

- **Enforcing Contracts:** Assesses the efficiency and effectiveness of the judicial system in resolving commercial disputes and enforcing contractual obligations.
- **Resolving Insolvency:** Examines the legal framework and procedures for resolving insolvency and restructuring financially distressed businesses.

The Doing Business index can provide insights into the regulatory environment for businesses, highlighting areas where reforms are needed to improve the ease of doing business and promote economic growth and entrepreneurship. Countries can use the findings of the Doing Business report to identify areas for policy reform and benchmark their performance against global standards (World Bank, 2020).

Over the period from 2016 to 2020, Egypt has shown a mixed performance in its Ease of Doing Business rankings and scores. While the country has made significant progress in certain areas, such as starting a business, accessing credit, and protecting minority investors, with noticeable improvements in scores over the years, challenges persist in other aspects, like enforcing contracts and facilitating international trade. Notably, improvements in getting electricity and paying taxes reflect ongoing efforts to streamline administrative processes and enhance the business environment. However, stagnant scores in areas like trading across borders suggest a need for further reforms to boost efficiency and reduce trade barriers. Overall, Egypt's journey in improving its Ease of Doing Business highlights progress and areas requiring continued attention to foster a more conducive environment for business growth and investment (World Bank, 2020).

Table 13: Egypt's Ease of Doing Business, 2016 -2020

Egypt Ease of Business Rank					114
DB Score	54.89	55.56	55.82	58.5	60.1
DB Year	2016	2017	2018	2019	2020
Starting a business	81.04	81.06	84.11	83.8	87.8
Dealing with construction permits	71.23	71.37	71.77	70.8	71.2
Getting electricity	71.48	71.24	71.41	71.5	77.9

Registering property	54.3	54.96	55	55	55
Getting credit	50	50	65	65	65
Protecting minority investors	51.67	55	58.33	62	64
Paying taxes	51.37	50.67	52.73	52.6	55.1
Trading across borders	42.23	42.23	42.23	42.2	42.2
Enforcing contracts	42.75	42.75	42.75	40	40
Resolving insolvency	39.51	38.89	42.27	42.3	42.2

Source: Data extracted by the author from the Doing Business Report (World Bank, 2020)

In 2020, Egypt's Ease of Doing Business scores compared to other Arab countries varied across different indicators. "Starting a business" in Egypt was relatively favorable compared to other nations, with a score of 87.8, placing it in the upper half of the rankings. However, challenges were evident in areas such as registering property, where Egypt scored 55.0, indicating room for improvement compared to countries like the United Arab Emirates, Bahrain, and Morocco, which scored significantly higher (World Bank, 2020).

Egypt's performance was moderate regarding getting credit and protecting minority investors, with scores of 65.0 and 64.0, respectively. While these scores were higher than those of some countries like Algeria and Lebanon, they lagged behind the top performers in the region. Egypt also faced challenges in enforcing

contracts and resolving insolvency, with scores of 40.0 and 42.2, respectively, indicating areas needing attention to improve the legal and regulatory framework for business operations (World Bank, 2020).

Overall, Egypt's Ease of Doing Business score in 2020 was 60.1, positioning it in the middle ranks of the Arab countries. While Egypt demonstrated strengths in starting a business and aspects related to credit and investor protection, there are clear opportunities for enhancement in areas like property registration, contract enforcement, and insolvency resolution to further improve the business environment and attract investment (World Bank, 2020).

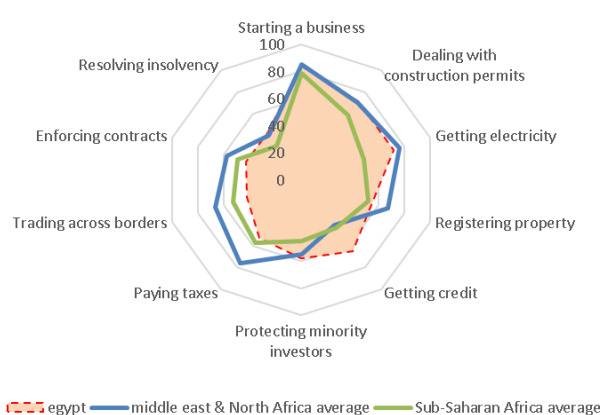


Figure 10: Egypt's ease of doing business 2020 to the Middle East & North Africa, and Sub-Saharan Africa average

Source: Data extracted by the author from the Doing Business Report (World Bank, 2020)

Table 14: Egypt's Ease of Doing Business scores compared to Arab countries in 2020

Economy	Starting a business	Ease of dealing with construction permits	Ease of getting electricity	Ease of registering property	Ease of getting credit	Strength of minority investors protection	Ease of paying taxes	Ease of trading across borders	Ease of enforcing contracts	Ease of resolving insolvency	Overall ease of doing business score
United Arab Emirates	94.8	89.8	100.0	90.1	70.0	80.0	85.3	74.1	75.9	49.3	80.9
Bahrain	89.6	83.1	79.7	86.2	55.0	66.0	100.0	78.7	63.8	58.2	76.0
Morocco	93.0	83.2	87.3	65.8	45.0	70.0	87.2	85.6	63.7	52.9	73.4
Saudi Arabia	93.1	78.3	91.8	84.5	60.0	86.0	80.5	76.0	65.3	0.0	71.6
Oman	93.5	75.2	87.1	73.0	35.0	56.0	90.2	84.1	61.9	44.0	70.0
Jordan	84.5	60.3	80.5	66.4	95.0	50.0	78.7	79.0	55.6	39.7	69.0
Qatar	86.1	84.2	83.6	96.2	45.0	28.0	99.4	71.5	54.6	38.0	68.7
Tunisia	94.6	77.4	82.3	63.7	50.0	62.0	69.4	74.6	58.4	54.2	68.7
Kuwait	88.4	71.9	81.9	75.1	45.0	66.0	92.5	52.6	61.4	39.2	67.4
Egypt	87.8	71.2	77.9	55.0	65.0	64.0	55.1	42.2	40.0	42.2	60.1
Lebanon	78.2	53.7	62.7	59.4	40.0	44.0	67.5	57.9	50.8	29.1	54.3
Algeria	78.0	65.3	72.1	44.3	10.0	20.0	53.9	38.4	54.8	49.2	48.6

CONCLUSION

Examining Egypt's national competitiveness performance through international indicators like the Global Competitiveness Index, Global Innovation Index, and Ease of Doing Business highlights positive aspects and areas that need attention. Despite facing challenges stemming from political transitions and socio-economic fluctuations, Egypt has demonstrated resilience and a significant potential for growth (Berger & Bristow, 2009; Huggins & Izushi, 2009). Egypt's promising prospects are underscored by its dynamic economy, strategic geographic location, and sizable market size, as reflected in its GCI ranking of 31st globally and second in Africa. Its classification as an emerging market economy and inclusion in groups like "CIVETS" and "Next 11" further underscores its promising economic landscape (Vadra, 2018).

President El-Sisi's economic reforms have contributed to notable GDP growth and improved competitiveness, as reflected in favorable rankings for business startup processes and infrastructure development. However, sustaining this success requires structural reforms, including addressing high public debt and enhancing institutional effectiveness. Streamlining regulatory processes, reducing the state's role in the economy, and enhancing global trade integration are essential for long-term growth and poverty reduction (Shokr, 2017; Dahshan, 2015).

Comparative analysis using frameworks like Michael Porter's Diamond Model reveals persistent challenges in institutional quality, innovation capability, and labor market efficiency. While progress has been made in infrastructure and market size, areas like ICT adoption and business sophistication require targeted interventions to meet global standards (Berger & Bristow, 2009; Huggins & Izushi, 2009).

Enhancing institutional effectiveness, regulatory streamlining, and innovation promotion are critical for sustaining Egypt's economic momentum and competitiveness. Leveraging strengths like a young and skilled labor force while addressing identified weaknesses through comprehensive policy reforms will be key in positioning Egypt as a leading global economy (EUROMONITOR, 2008; Economist Intelligence Unit (EIU), 2010; Vadra, 2018; Dahshan, 2015; World Bank, 2020).

Further in-depth analysis, mainly using Porter's Diamond model, is crucial to evaluate Egypt's national competitiveness performance. This analysis will help

develop economic policies to improve Egypt's overall competitiveness and foster sustainable growth and development.

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