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Analysis of Angola's Socio-Economic Indicators and The Digital Transformation Process

Konstantīns Dinārs[1*], Inna Stecenko[2], Boriss Mišņevs[3]

[1,2,3]Transport and Telecommunication Institute, Lauvas 2, Riga, LV-1019, Latvia

ABSTRACT

Digital transformation is a key factor in the sustainable economic development of developing countries. The objective of this study is to analyze the key socioeconomic, institutional, and technological factors influencing the development of the IT sector in Angola. The methodology includes statistical data analysis, PEST analysis, expert assessment of factors using the Delphi method, and an analysis of the public sector's digital maturity based on the GovTech Maturity Index (GTMI). The study's results indicate that the main drivers of IT industry development are government digital transformation policy, the development of telecommunications infrastructure, and increased internet penetration. The findings can be used in developing pricing models for IT products and strategies for digital economy development.

KEYWORDS: IT, Projects, Management, Pricing, Product, Angola

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1. INTRODUCTION

The digital transformation of the global economy has significantly altered the role of information technology in the socioeconomic development of countries. Modern digital platforms, fintech solutions, e-government systems, and cloud infrastructures are becoming the foundation for economic growth and the modernization of national economies.

In the digital economy, information technology is no longer a supporting tool but is becoming a key factor in increasing productivity and competitiveness. Digital technologies play a particularly significant role in developing countries, where digitalization is seen as a mechanism for economic diversification and improving the effectiveness of public administration.

The Republic of Angola is a shining example of an economy undergoing active digital transformation. The country has traditionally relied on the oil sector, but in recent years, the government has made significant efforts to develop the digital economy, telecommunications infrastructure, and electronic government services.

According to the World Bank, Angola's gross domestic product will reach approximately $100 billion in 2024, with economic growth reaching 4.4% thanks to the development of non-oil sectors [25].

At the same time, the country's economy remains vulnerable to fluctuations in global oil prices and macroeconomic risks.

The development of the IT industry is an important component of digital transformation. However, the development of the information technology market in developing countries is accompanied by significant institutional and economic constraints. One of the most challenging tasks is the development of effective pricing models for IT products and projects.

Pricing in the information technology sector is highly complex compared to traditional economic sectors. This is due to several IT product characteristics:

1. High proportion of intellectual labor.
2. High technological uncertainty.
3. Fast dynamics of customer demands.
4. High difficulty in estimating development costs.

As a result, many IT companies face problems with project underestimation, budget overruns, and declining margins.

Therefore, studying the factors influencing socio-economic indicators in the context of Angola's digital transformation is of significant scientific and practical interest.

1.1. Problem Statement

Despite the rapid development of digital technologies, the problem of developing effective pricing mechanisms for IT products remains understudied, especially in the context of developing countries.

In most cases, IT companies use traditional pricing models based on direct software development costs. However, such models fail to consider institutional and macroeconomic factors that significantly influence the cost of IT projects.

The Angolan market is characterized by the following characteristics:

1. High macroeconomic instability.
2. Exchange rate fluctuations.
3. The economy's dependence on the oil sector.
4. Limited digital infrastructure.
5. A shortage of qualified personnel.

These factors significantly complicate the planning and implementation of IT projects.

Furthermore, the development of Angola's digital economy is accompanied by rapid growth in internet users. According to DataReportal, internet penetration in the country reached 39.3% of the population in 2024, with the number of users exceeding 14.6 million [12]. By 2025, internet penetration has grown to 44.8% of the population [13].

The growth of digital infrastructure is increasing demand for IT products and digital services, necessitating the development of more effective pricing models.

Therefore, a comprehensive analysis of the factors influencing IT pricing in the context of Angola's digital transformation is needed.

1.2. Objective

The purpose of this study is to analyze the factors influencing IT product pricing in Angolan IT companies amid the digital transformation of the economy.

To achieve this goal, the following objectives were formulated:

1. Analyze institutional documents for Angola's digital development.
2. Investigate the country's socioeconomic indicators.
3. Assess the level of digital transformation of the economy.
4. Identify key factors influencing IT product pricing.
5. Develop recommendations.

1.3. Significance of Study

The scientific significance of this study lies in its development of theoretical understanding of IT product pricing mechanisms in the context of digital transformation in developing economies (similar in socio-economic status to the Republic of Angola).

Most research on IT project pricing is conducted using data from developed countries. However, the conditions of emerging markets differ significantly.

This study of the Angolan market allows for a broader understanding of digitalization processes in African countries and identifies factors limiting the development of the IT industry.

The practical significance of this study lies in the potential application of the findings: It companies, Government agencies, investors, educational institutions.

2. LITERATURE REVIEW

In scientific literature, the problem of IT project pricing is examined within the framework of various economic and managerial approaches.

Classical pricing theories view price as the result of the interaction of supply and demand [7].

Modern research emphasizes the strategic nature of price formation and the influence of market structure [8].

In the field of software development, development cost estimation models such as COCOMO II [5] are widely used.

Furthermore, research demonstrates the effectiveness of machine learning methods for forecasting IT project costs [1].

Another important approach is value-based pricing, proposed by Kotler and Keller [6].

A separate area of research involves the use of artificial neural networks (ANN) to forecast IT project parameters. Neural networks allow for the consideration of nonlinear relationships between project parameters, making such models more accurate than traditional statistical methods. For example, Dinars, et al. (2024) proposed an approach to forecasting IT project completion times using artificial neural networks. The authors analyze project parameters and demonstrate that the use of ANN models significantly improves the accuracy of IT project completion time forecasting. The results demonstrate the potential of using machine learning methods to analyze IT project parameters and make management decisions in software development [2].

3. METHODOLOGY

The research methodology is based on a combination of theoretical and empirical methods: Analysis of scientific literature,

Economic and statistical analysis, PEST analysis, CAGR (Compound Annual Growth Rate) method, Expert methods.
The research methodology was based on national and international statistical databases: World Bank (WB), International Telecommunication Union (ITU), African Development Bank (ADB), International Monetary Fund (IMF), DataReportal, Sustainable Development Goals (SDG) Angola 2023, Angola 2050.

3.1 Analysis of policy documents regulating IT development in Angola

When studying the development of an IT pricing model, it is important to consider the regulatory and strategic framework that determines the development of Angola's digital economy. State strategic documents shape the institutional environment that influences the development of the IT market, the investment climate, and the pricing conditions for digital products and services.
In recent decades, information technology has become a key factor in the socioeconomic development of countries. Seeking to diversify the economy and reduce dependence on the oil sector, the Angolan government has developed several strategic programs aimed at developing digital infrastructure, innovation, and human capital. The key strategic documents guiding the development of the country's digital economy are the UN Sustainable Development Goals (SDGs) and the national strategies "Angola 2030" and "Angola 2050."
The Sustainable Development Goals (SDGs), adopted by the UN General Assembly in 2015, are a set of 17 interrelated goals aimed at achieving sustainable economic and social development by 2030. In the context of digital transformation, SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 17 (Partnership for Sustainable Development) are of particular importance. These goals are directly linked to the development of digital infrastructure, an innovative economy, and international cooperation in the field of information technology.
Research shows that investments in the digital economy contribute to increased productivity and competitiveness of national economies, particularly in emerging markets [3], [19]. At the same time, implementing the Sustainable Development Goals requires significant financial resources. The OECD estimates that the annual investment required to achieve the SDGs is US$5–7 trillion, while official development assistance remains significantly below the required level [18].
At the national level, the implementation of the Sustainable Development Goals is reflected in the strategic document "Angola 2030," approved by Presidential Decree No. 181/23. This strategy aims to diversify the economy, develop human capital, modernize infrastructure, and implement digital technologies. Key priorities of the program include developing digital infrastructure, supporting innovation, and increasing the level of technological development of the economy. The scientific literature highlights that digital transformation is one of the key factors for sustainable economic growth and job creation in developing countries [4].
The "Angola 2030" strategy is viewed as an intermediate stage in the country's long-term development and is linked to the larger "Angola 2050" strategic document, which defines the long-term trajectory of the country's socioeconomic development. This strategy is focused on sustainable economic growth, improving the population's quality of life, and integrating the country into the global economy [9].
The "Angola 2050" strategy places particular emphasis on the development of the digital economy and the IT sector as a key driver of innovation. This strategy predicts a significant increase in the contribution of information and communications technology to the national economy. According to forecasts, the ICT sector could grow from $19 billion in 2020 to $161 billion by 2050, reflecting the growing importance of digitalization in the country's economic development.
In parallel with the development of strategic programs, the state is developing a regulatory framework for the digital economy. The main regulatory institutions in the field of information technology are the Ministry of Telecommunications, Information Technology, and Social Communications (MINTTICS) and the Angolan Communications Regulatory Agency (INACOM). In 2022, the National Digital Transformation Strategy (2022–2027) was presented, aimed at developing e-government, digital competencies, and an innovation ecosystem.
Furthermore, the country has several legislative acts regulating the digital economy, including the Personal Data Protection Act (Lei de Proteção de Dados) (PDA) and cybersecurity regulations. These documents form the legal basis for the operation of digital services and information systems.
An important area of state policy is the development of international cooperation in the digital economy. Angola’s participation in the African Continental Free Trade Area (AfCFTA) opens new opportunities for the export of digital services and the development of a regional IT solutions market.
Thus, an analysis of strategic documents shows that the Angolan government views digital transformation as a key factor in economic diversification and sustainable development. The development of the IT sector, digital infrastructure, and an innovative economy is seen as the foundation for long-term economic growth and increased competitiveness.
At the same time, the existing regulatory framework requires further improvement. High administrative barriers, tax burdens, and limited access to investment may hinder the development of IT companies and reduce the attractive investment of the digital sector. Therefore, important future policy areas include simplifying regulatory procedures, stimulating innovation, and expanding international cooperation in digital technologies.

3.2 Analysis of Angola's socio-economic indicators and Digital Transformation Processes

The development of the IT sector in the context of digital transformation directly depends on the macroeconomic environment, demographic structure, institutional factors, and the level of digital infrastructure development. To identify the key factors influencing the development of the Angolan IT market, a comprehensive analysis of socioeconomic indicators was conducted, including statistical analysis, PEST analysis, and expert assessment methods.

One of the key factors driving the development of the digital economy is demographic dynamics and consumer market growth. Angola's population is experiencing steady growth, increasing from approximately 33.4 million in 2020 to approximately 39 million in 2025. The young age structure of the population creates long-term potential for the development of digital services, e-commerce, and mobile financial technologies.

Population dynamics of Angola (2020–2025)

Demographic dynamics are a key factor in the development of the digital economy and IT market. Angola's population has demonstrated steady growth in recent years. According to international statistical sources, the population increased from 33.45 million in 2020 to approximately 39.04 million in 2025, representing a compound annual growth rate of approximately 3–3.4%. This high population growth rate creates a significant domestic market for digital services and information technology [20] [21].

To forecast the population size, the work used the extrapolation method with a constant average annual growth rate of 3.47%, which allows us to obtain a stable demographic forecast until 2030.

To calculate the forecast, the author used the following formula: $Pn = Pn - 1 * (1 + 0{,}0347)$, where Pn is the population in year n, Pn−1 is the population in the previous year, and 0.0347 is the 3.47% annual growth rate.

The results with the population dynamic and author forecasting are displayed in Figure 1.

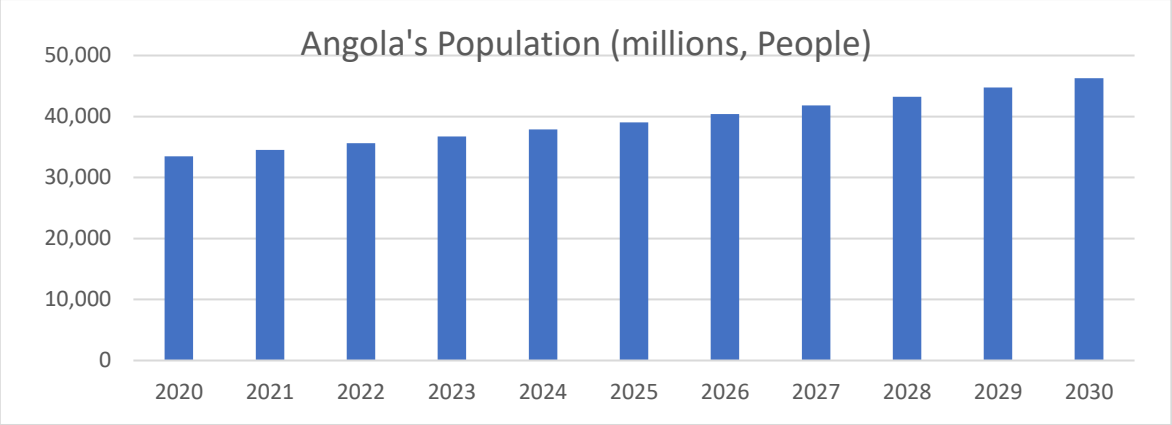


Figure 1. Angola's population with the author's forecast till 2030.

Population growth creates additional demand for digital services and contributes to the expansion of the domestic IT solutions market. The increasing share of the urban population accelerates the digitalization of the economy and increases the need for telecommunications infrastructure development.

The country's economic development also has a significant impact on the development of the IT market. After an economic downturn associated with falling oil prices and the impact of the COVID-19 pandemic, Angola's economy is gradually recovering. The key indicators of the populations in Angola are displayed in Figure 2.

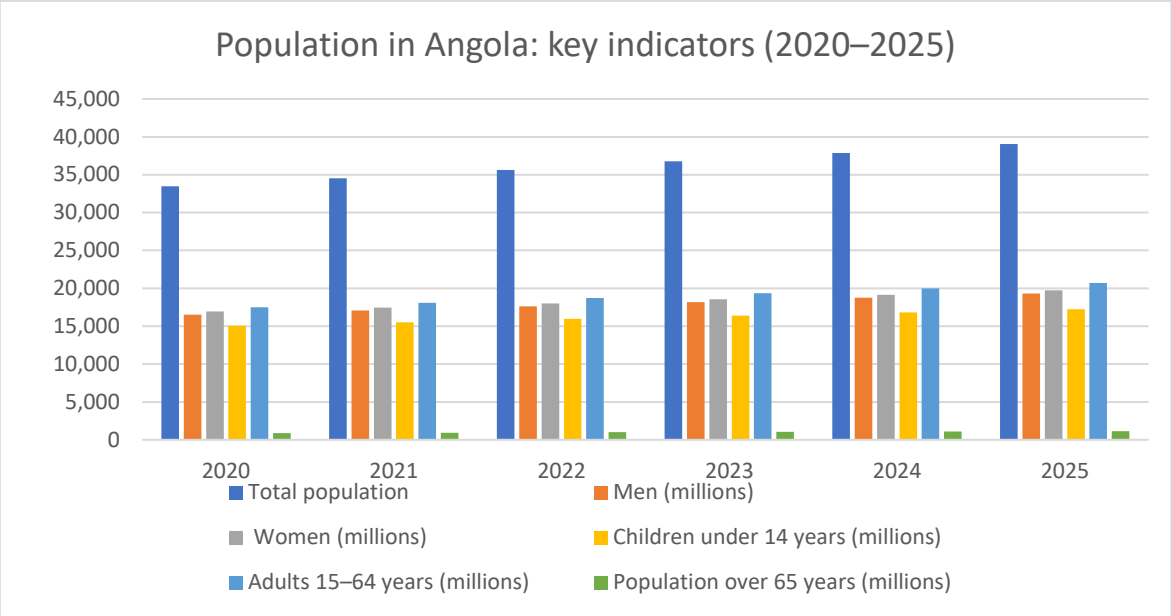


Figure 2. The key indicators of the populations in Angola.

Geographical distribution of the population of Angola (2020–2025)

Angola's population structure is characterized by a significant concentration of residents in large cities and coastal regions. The largest urban center is Luanda, home to a significant portion of the country's urban population. At the same time, the rural population remains highly concentrated, particularly in the central and eastern regions of the country. On average, approximately 40–45% of the population lives in rural areas, creating additional challenges for the development of digital infrastructure and telecommunications [10]. The population's geographic distribution significantly influences the development of the IT market, as digital infrastructure and internet access are significantly better developed in large cities. The geographical distribution of the population in Angola (2020–2025) is displayed in Figure 3.

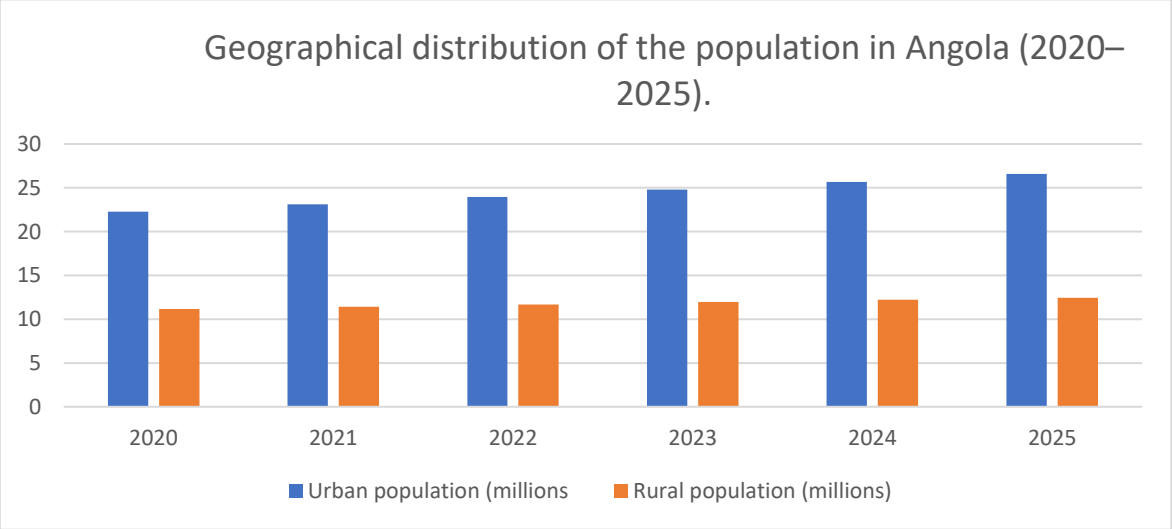


Figure 3. The geographical distribution of the population in Angola (2020–2025).

Education: Angola's School Enrollment

The development of the education system plays a key role in building human capital and training specialists for the digital economy. Angola has seen a steady increase in the number of students in secondary education [26]. This increase in school and university enrollment is driven by demographic growth and increased access to educational institutions. The increase in enrollment facilitates the development of digital competencies and the creation of human resources for the IT industry. However, the level of digital skills among the population remains relatively low. Approximately 39% of workers possess basic digital competencies—a key constraint to the development of the digital economy. Numbers of students and schoolchildren in Angola are displayed in Figure 4.

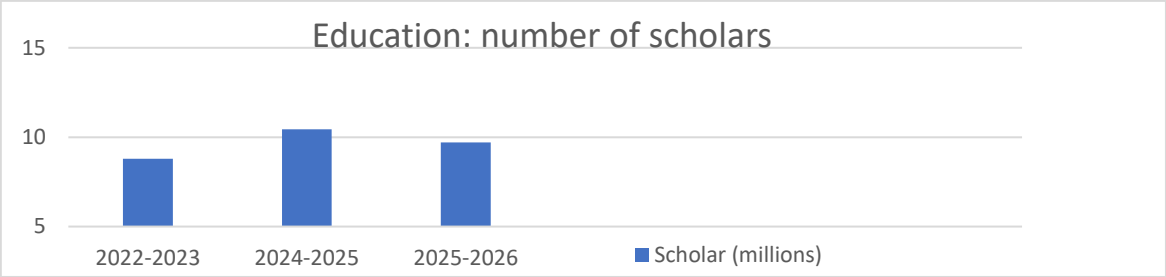


Figure 4. Numbers of students and schoolchildren in Republic Angola.

GDP Dynamics in Angola (2020–2025)

Gross domestic product growth creates favorable conditions for increased investment in digital infrastructure, telecommunications development, and the implementation of e-government technologies.

At the same time, wages are gradually increasing, which is influencing the cost structure of IT companies and generating effective demand for digital services.

Table 1. Angola's GDP (2020–2025 and forecast to 2030, calculated by the author). The table was created by the author based on sources [27] with the author's forecast.

Year	GDP (USD billion)	Annual growth (%)
2020	48.5	-31.6
2021	66.51	37.1
2022	104.4	56.9
2023	84.82	-18.8
2024	80.4	-5.3
2025	85.6	7.68
2026	91.14	7.68
2027	97.07	7.68
2028	103.33	7.68
2029	110.02	7.68
2030	117.12	7.68

Table 1 shows that Angola's economy demonstrated high nominal GDP volatility between 2020 and 2024. Following a sharp decline in 2020 (-31.6%) caused by the impact of the COVID-19 pandemic and the decline in global oil prices, a significant recovery was observed in 2021-2022 (+37.1% and +56.9%, respectively). However, nominal GDP declined again in 2023-2024 (-18.8% and -5.2%), reflecting the economy's continued dependence on the commodity sector, exchange rate fluctuations, and external market conditions.

Therefore, linear, sustainable growth cannot be described for the period under review; the dynamics are cyclical in nature and are largely determined by external factors. The data are displayed visually in Figure 5.

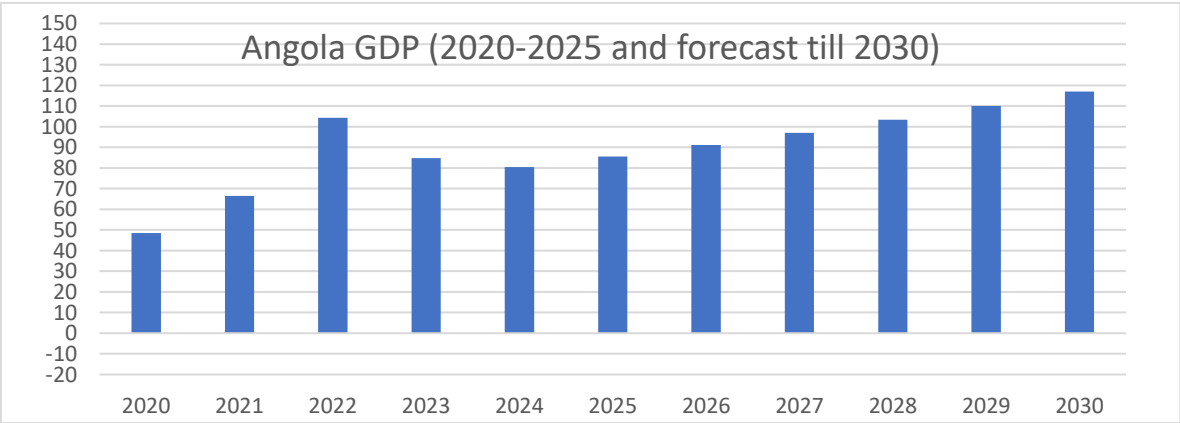


Figure 5. Angola's GDP data (2020–2025) and the author's forecast for the end of 2025–2030. The graph was constructed by the author based on Table 2.1

To construct the forecast, the average annual GDP growth rate method was used based on data for 2021–2025. The author calculated

the average GDP growth rate over the period using the following formula: $(-31{,}6 + 37{,}1 + 56{,}9 - 18{,}8 - 5{,}2) / 5 = 7{,}68\%$ (scenario assumption)
To calculate the GDPn forecast, the author uses the formula: $(\text{GDPn} = \text{GDP n} - 1 * (1 + \text{r})$,where r — 0.0768.

Average Salary Dynamics in Angola (2022–2025)
Rising household incomes are fueling the expansion of the digital services market, including mobile payments, online banking, and government digital services.
One of the most important factors in digital transformation is internet penetration. Figure 6 displays the average and minimum salary in Angola (2020–2025) and the forecast for salary growth in Angola for 2026–2030.

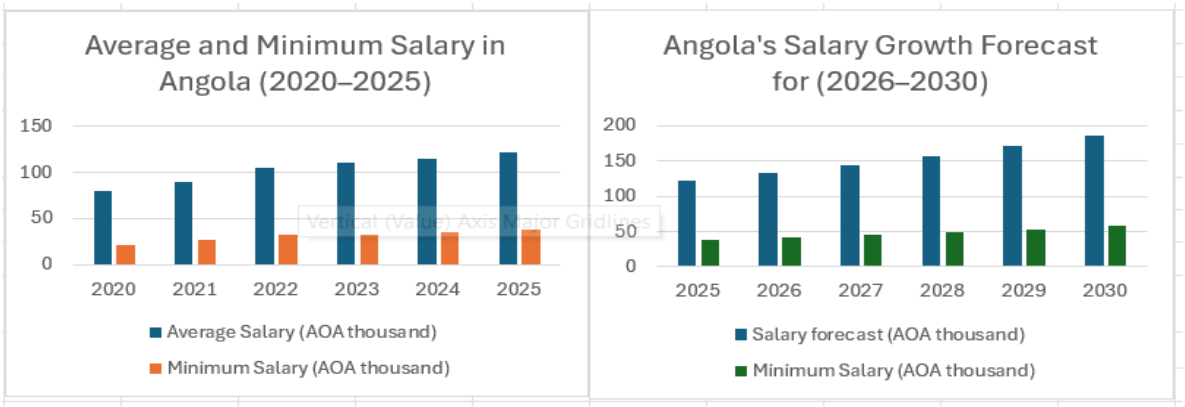


Figure 6. The average and minimum salary in Angola (2020–2025) and the author's forecast for salary growth in Angola for 2026–2030

To calculate the wage forecast for 2026–2030, the author used an exponential growth model, assuming a constant annual growth rate. This forecast does not consider the inflation rate, as it is extremely difficult to predict: $Wt = \text{Wt} - 1 * (1 + r)$
Wt is the forecast average wage in year t, Wt-1 is the previous year's wage, r is the average annual growth rate (in our case, 8.79% or 0.0879).

To calculate the r value, the author uses the CAGR formula: $r = \left(\frac{W\text{final}}{W\text{initial}}\right)^{1/n} - 1$ where: Wfinal = value in the last year (2025) = 122,000 kwanzas, Winitial = value in the first year (2020) = 80,000 kwanzas, n = number of years = 5
This means that, on average, for each year from 2020 to 2025, the average salary in Angola grew by 8.79%. To calculate the average salary forecast the exponential growth method was chosen for the 2026–2030 income forecast, as it most accurately reflects the dynamics of income growth at a stable annual rate without considering difficult-to-predict factors such as inflation. Using the CAGR formula provides an objective estimate of the average growth rate over the analyzed period and makes the forecast comparable with the country's official economic indicators.

Internet Penetration Rate in Angola
Expanding internet access is a key driver of digital economic development and is fueling demand for IT solutions in the banking and public sectors. Figure 7 displays a comparison of average internet speeds (Angola vs. Africa). The chart was prepared by the author based on available open-source data and the author's experiment.

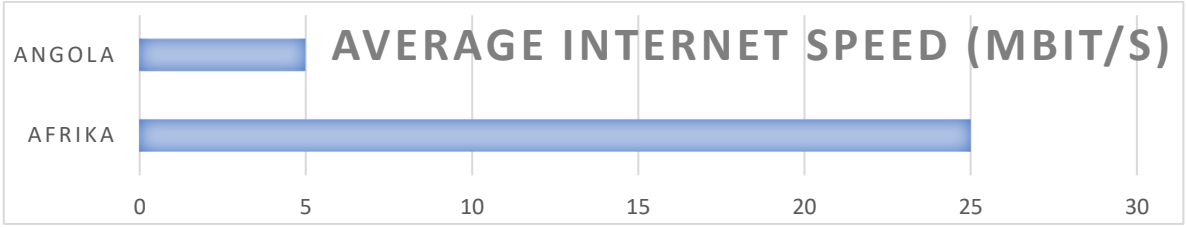


Figure 7. Comparison of average internet speeds (Angola vs. Africa).

Investment Distribution in 2024
In 2024, the investment structure of the Angolan economy remained heavily oriented toward commodity sectors, primarily the oil and gas sector [16], [17]. The main investment areas included: mining, infrastructure, energy, the agricultural sector, and telecommunications.

Despite the country's attractive investment, the inflow of foreign direct investment is constrained by several institutional factors, including legal uncertainty, corruption risks, foreign exchange restrictions, and high logistics costs. The Angolan government is taking measures to improve the investment climate, including liberalizing foreign exchange policy and introducing a single-window system for investors.

Investment Distribution in 2025

In 2025, investment activity in the Angolan economy demonstrated a gradual recovery after a period of economic instability. The share of the oil and gas sector in the investment structure has declined, while investment has increased in infrastructure projects, agriculture, telecommunications, digital technologies.

The increase in investment is linked to the implementation of the national strategy, Plano Nacional de Desenvolvimento 2023–2027, aimed at diversifying the economy and developing digital infrastructure [22], [23].

Angola's Macroeconomic Factors (2023–2025)

Angola's macroeconomic environment is characterized by a gradual economic recovery following the crisis associated with falling oil prices and the impact of the COVID-19 pandemic. Key macroeconomic factors: GDP growth following the economic downturn, gradual decline in inflation, currency instability of the national currency (the kwanza), economic diversification, increased investment in infrastructure [14], [15].

Economic reforms are aimed at reducing the economy's dependence on the oil sector and developing new industries, including information technology and the digital economy.

Key Drivers of IT Growth in Angola (2024–2025)

The analysis showed that the development of Angola's IT sector is driven by several key factors [11], [24].

The main causes of growth in the sector are:

1. Development of telecommunications infrastructure. Mobile penetration is approximately 63%, and mobile internet penetration is approximately 33%
2. Growth in internet users in 2024, approximately 10.95 million people had internet access, representing 33.6% of the country's population.
3. Expansion of digital services. Mobile payments, e-commerce, and digital financial services are growing.
4. Government support for digital transformation. The Digital Transformation Program (2023–2027) is being implemented, including tax incentives, Government Network (GovNet) development, and support for educational initiatives.
5. Development of the startup ecosystem. Technology clusters are emerging in the country, including Luanda Bita Tech Park, but the sector faces a shortage of venture capital funding.
6. New Digital Business Models Development of Pay-As-You-Go (PAYG) models and subscription services in the fintech and edtech sectors.

All these factors form the foundation for the growth of Angola's digital economy and contribute to the expansion of the information technology market.

PEST Analysis of IT Sector Development Factors in Angola

A PEST analysis was conducted to assess the impact of the external environment on the development of the information technology market. PEST analysis is used to structure external macroenvironmental factors (political, economic, social, and technological) that determine the conditions for the functioning and development of an industry. In this study, PEST analysis was applied to assess the socioeconomic environment in which the IT industry in the Republic of Angola is developing, as well as to identify factors that can directly impact the operational sustainability and profitability of IT companies implementing digital transformation projects. Political factors reflect the institutional predictability of business operations, the quality of IT sector regulation, and the sustainability of government support for digitalization. Economic factors characterize macroeconomic stability, the investment climate, and parameters of effective demand (including inflation dynamics and structural features of the economy). Social factors determine the quality of human capital (education level and digital literacy), demographic trends, and the degree of society's readiness to implement digital solutions. Technological factors reflect the infrastructural foundation of the digital economy (the availability and quality of internet infrastructure), the pace of development of electronic government services, and the limitations of the technological ecosystem.

Table 2 displays external factors influencing the IT industry in Angola.

Table 2. Key external factors influencing the IT industry in Angola. The table was compiled by the author during the PEST analysis.

No	Category	Factor	Explanation
1	Political	Government development	Determines digital transformation

		strategy	priorities, the volume of public funding for IT projects, and institutional support for the industry.
		Impact on growth	Reflects the impact of public policy on economic activity, the investment climate, and the development of the digital economy.
		Institutional environment	Characterizes the level of regulatory stability, transparency of the legal system, and predictability of business conditions.
2	Economic	Macroeconomic structure	Determines the economy's dependence on the raw materials sector, the level of diversification, and resilience to external price shocks.
		Investment environment	Determines the availability of capital, the level of foreign direct investment inflow, and the potential for financing IT projects.
		Impact on socio-economic growth	Reflects the contribution of macroeconomic dynamics (GDP, inflation, employment) to the demand for digital services and IT solutions.
3	Social	Demographics	Determines the potential size of the domestic market, the structure of consumer demand, and the talent pool for the IT sector.
		Social indicators	Characterizes the level of education, digital literacy, access to healthcare, and the overall quality of human capital.
		Impact on growth	Reflects the influence of social factors on technology adoption, the level of digital service consumption, and the formation of an innovative environment.
4	Technological	Digital infrastructure	Determines the availability and quality of internet connectivity, telecommunications networks, and the technical foundation of the IT industry.
		Government digitalization	Characterizes the development of electronic government services and the degree of integration of digital solutions into public administration.
		Technological constraints	Reflects infrastructural and technological barriers, including low innovation activity and dependence on imported solutions.

To create Table 2, the author selected 12 key factors (three in each category) that most fully describe the socioeconomic conditions for the development of Angola's IT sector and simultaneously identify key barriers and opportunities for growth in the digital industry in the medium term. Factor selection was based on an analysis of their relevance to the IT market, their ability to explain demand/investment/project cost dynamics, and their practical applicability for subsequent quantitative and expert ranking.

The PEST analysis shows that the development of the IT sector in Angola is determined by a combination of political reforms, economic transformation, and technological development of infrastructure.

Data Collection on Factors Influencing IT Sector Development

To identify key factors influencing IT market development, data from international organizations, government programs, and industry research were analyzed.

To analyze, the author took the 12 selected factors from open-source available data, such as reports from international organizations and analytical reviews. The research base was formed by analyzing official statistics, international databases, and scientific sources on the socioeconomic development and digital transformation of developing countries. The author selected and interpreted the data based on their relevance for assessing the macroenvironment for the development of the IT sector in the Republic of Angola. Political and institutional factors were analyzed through an assessment of the state's digitalization strategy, IT sector regulation, and the level of institutional stability. Economic parameters were examined in terms of macroeconomic dynamics, investment activity, and structural features of the economy that influence the operating conditions of IT companies and the demand for digital solutions. Social factors were assessed through indicators of demographics, education, digital literacy, and human capital development. The technological environment was analyzed based on the level of development of telecommunications infrastructure, internet accessibility, and the implementation of digital government services.

Assessing the level of influence of factors using the Delphi method

After compiling, the author conducted an expert assessment of their influence on the development of the IT industry using the Delphi method. This method was chosen because, when analyzing macro factors and institutional constraints, a significant portion of the assessments is predictive in nature and cannot always be fully supported by statistics over a short period of time. The Delphi method allows for the aggregation of expert judgments, mitigating the influence of individual cognitive biases, and ensuring the consistency of the final assessment through iterative refinement of positions.

To quantitatively assess the impact of these factors, the Delphi method was used, which involves conducting expert surveys and reaching a consensus among industry specialists. Experts from the following fields participated in the study: IT project management, government digital programs, the financial sector, and digital transformation consulting. Results are displayed in Table 3.

Table 3. **Results of the Delphi method expert assessment. The table was compiled by the author based on the results obtained.**

No	Factor	Category	Rating (1-3 points)
1	Government development strategy	Political	3
2	Impact on growth	Political	3
3	Institutional environment	Political	3
4	Macroeconomic structure	Economic	2
5	Investment environment	Economic	3
6	Impact on socio-economic growth	Economic	3
7	Demographics	Social	2
8	Social indicators	Social	2
9	Impact on growth	Social	2
10	Digital infrastructure	Technological	3
11	Government digitalization	Technological	3
12	Technological constraints	Technological	2

According to the results obtained, the factors that shape the institutional and macroeconomic foundations for digital economy development received the highest influence (3 points): government development strategy, the impact of government policy on economic growth, the institutional environment, macroeconomic structure, the investment environment, the impact of macroeconomic dynamics on socioeconomic growth, digital infrastructure, and government digitalization. The high scores for these factors indicate that political and institutional conditions and macroeconomic stability are the key drivers of Angola's IT sector development. Government policy and institutional stability determine the predictability of the regulatory environment and the investment climate, while the development of digital infrastructure and e-government forms the technological foundation of the industry. A medium level of influence (2 points) was received by social and restrictive technological factors: demographics, social indicators, the impact of social factors on growth, and technological constraints. Their impact is long-term and is associated with the development of human capital, the adaptation of technologies, and the elimination of infrastructural barriers. Thus, the results in Table 3 confirm that the development of Angola's IT sector is primarily determined by the quality of the institutional environment, macroeconomic stability, and the level of digital infrastructure, while social factors form the basis for long-term competitiveness. The Delphi method was used to conduct an expert assessment under conditions of high uncertainty and interdisciplinary factors. Its use allowed us to systematize expert opinions, reduce subjectivity, and improve the validity of conclusions. The advantages of the method include the anonymity of expert assessments and the possibility of multi-stage adjustments, while limitations include the time required and the dependence of results on the qualifications of the expert group.

Determining the probability of change using an expert assessment method

Determining the likelihood of changes in environmental factors is the next step in the PEST analysis, following the assessment of their influence. While the current significance of factors was determined in Table 3, this step analyzes the likelihood of their change in the medium term (2026–2030).

Given the transformation of Angola's digital economy, characterized by institutional reforms and structural changes in the IT sector, forecasting the dynamics of factors using solely statistical methods is difficult. Therefore, the study utilized an expert method for assessing the likelihood of change.

Eighteen experts participated in the survey: 12 specialists who participated in the previous stage of factor impact assessment using the Delphi method, and six independent experts with experience in IT projects, financial analysis, and public administration. Each factor was rated on a scale of 1 to 5, where 1 indicated no significant change and 5 indicated a high probability of significant transformation. To enhance the reliability of the results, measures were taken to minimize bias, including anonymity of assessments, separation of the impact and likelihood assessment stages, and the involvement of independent experts. The results are presented in Table 4.

Table 4. Results of determining the probability of change. The table was compiled by the author based on the results obtained.

No	Factor	Category	Score in points
1	Government development strategy	Political	4
2	Impact on growth	Political	4
3	Institutional environment	Political	3
4	Macroeconomic structure	Economic	3
5	Investment environment	Economic	4
6	Impact on socio-economic growth	Economic	4
7	Demographics	Social	2
8	Social indicators	Social	3
9	Impact on growth	Social	3
10	Digital infrastructure	Technological	5
11	Government digitalization	Technological	5
12	Technological constraints	Technological	4

The highest probability of change (4-5 points) was noted for technological and investment factors: digital infrastructure (5), government digitalization (5), investment environment (4), government development strategy (4), and the impact of macroeconomic dynamics on growth (4). This reflects the active phase of Angola's digital transformation and the modernization of its telecommunications infrastructure. The lowest probability of change is characteristic of demographic factors (2 points) due to their inertial nature. The institutional environment and macroeconomic structure received moderate scores (3 points), as their transformation requires a longer period.

Assessing the probability of changes in factors

The significance of each factor is calculated using the formula: $\text{Significance Score} = \frac{\text{Factor Impacta}}{\sum\text{Influence}} * n$, where "Factor Impact" is assessed on a scale of 1 to 3 points, "Average Expert Assessment of the Probability of Change" is assessed on a scale of 1 to 5 points, and “n” is the Average Expert Assessment of the Probability of Change. The results of the change probability assessment and the data conversion to a descending matrix are shown in Table 5.

Table 5. The results of the change probability assessment and data transformation into a descending matrix format. The table was compiled by the author based on the results obtained.

Factor	Factor Impact	Average Expert Assessment	Significance Assessment
Digital Infrastructure	3	5	0,179
Government Digitalization	3	5	0,179
Government Development Strategy	3	4	0,143
Impact on Growth (Government Policies)	3	4	0,143
Investment Environment	3	4	0,143

Impact on Socioeconomic Growth	3	4	0,143
Technological Constraints	2	4	0,095
Institutional Environment	3	3	0,107
Macroeconomic Structure	2	3	0,071
Social Indicators	2	3	0,071
Impact on Growth (Social Factors)	2	3	0,071
Demography	2	2	0,048

The significance of factors was calculated as the product of their influence strength and the average expert assessment of the probability of change, followed by normalization of the results and presentation of the data in matrix form. This approach allowed us to assess both the current strength of the factors' impact on Angola's IT sector and the likelihood of their transformation in the medium term.

The following groups of factors were assigned the highest overall significance: government development strategy and the impact of government policy on growth, institutional environment, investment environment, and macroeconomic structure, as well as digital infrastructure and government digitalization. These factors form the institutional, economic, and technological foundation for the functioning of the country's IT market.

Social factors (demographics, social indicators, and the impact of social factors on growth), as well as technological constraints, received lower overall significance, which is explained by their inertial nature and longer-term impact on the development of the industry.

Thus, the development of Angola's IT sector in the short and medium term depends largely on the quality of institutional governance, the investment climate, and the level of development of digital infrastructure.

The results obtained enable us to identify key areas for development in the IT sector and to incorporate these factors into pricing strategies for IT products.

3.2. Assessing the digital maturity of the Angolan public sector: Digital Maturity Index (GTMI)

In the context of digital transformation, the level of digital maturity in the public sector is a key factor influencing the development of the digital economy and the effectiveness of IT projects. Government institutions shape the regulatory and infrastructural environment that determines the degree of risk, transaction costs, and attractive investment of digital initiatives. In this context, the digital maturity of the state directly impacts the development and pricing of IT products targeted at the public sector.

Digital maturity refers to a state's ability to effectively implement digital technologies, develop electronic government services, manage government data, and facilitate interaction between government institutions, citizens, and businesses. Internationally, the GovTech Maturity Index (GTMI), developed by the World Bank, is used to assess the level of digital transformation in the public sector.

GTMI is a comprehensive system for assessing the digital maturity of government institutions and covers 197 countries. The GTMI 2025 version analyzes 48 indicators grouped into four main areas:

1. Core Government Systems — the development of core government information systems and digital infrastructure.
2. Public Service Delivery — the level of development of electronic government services.
3. Digital Citizen Engagement (DCEI) - the involvement of citizens and businesses in digital interactions with the government.
4. GovTech Enablers (GTEI) - the institutional and regulatory conditions for the development of a digital government (World Bank, GovTech Maturity Index 2025 Update).

According to the GTMI 2025 classification, the Republic of Angola is classified as Significant GovTech Maturity (Group B), indicating the existence of a basic digital public administration architecture, though institutional and infrastructural limitations remain.

This status reflects the country's transitional stage of digital transformation. Angola is implementing projects in e-government, digital identification, financial sector modernization, and the development of public digital services. However, challenges remain related to limited interdepartmental integration of information systems, a shortage of qualified personnel, and dependence on external technology providers.

From an institutional economics perspective, the level of digital maturity influences the transaction costs and risks of digital project implementation. Higher levels of digital maturity help reduce the uncertainty of requirements, shorten the implementation time for digital solutions, and increase the predictability of contractual obligations (Williamson, 1985). Thus, using the GovTech Maturity Index allows for a more accurate consideration of the institutional characteristics of Angola's digital transformation when analyzing the IT market and developing pricing models for digital products.

4. RESULTS AND DISCUSSION

The results of the study demonstrate that the development of the IT sector in the Republic of Angola is determined by a combination of institutional, macroeconomic, demographic, and technological factors. A comprehensive analysis of socioeconomic indicators, PEST analysis results, and expert assessments allowed us to identify key drivers of the country's digital economy. Demographic analysis indicates stable population growth in Angola, which increased from 33.4 million in 2020 to approximately 39 million in 2025. The young age structure of the population creates long-term potential for the development of digital services, mobile technologies, e-commerce, and fintech solutions. At the same time, urbanization processes are increasing the concentration of economic activity in large cities, particularly Luanda, facilitating the development of telecommunications infrastructure and digital services. Economic analysis shows that the macroeconomic environment remains an important factor in the development of the IT market. Despite the economy's continued dependence on the oil sector, the Angolan government is taking steps to diversify the economy and develop new industries, including information technology and digital services. The state strategic programs "Angola 2030" and "Angola 2050" consider digital transformation as one of the key instruments for sustainable economic growth and increasing the competitiveness of the national economy.

The results of the PEST analysis revealed that political, institutional, and technological factors have the greatest impact on the development of the IT sector. Specifically, government digitalization policy, the development of e-government, and the modernization of telecommunications infrastructure shape the institutional conditions for the functioning of the digital economy. At the same time, economic and social factors, including income levels, demographic trends, and the development of the education system, determine the long-term potential for human capital formation and demand for digital services. An expert assessment of these factors using the Delphi method allowed us to quantify their influence on the development of the IT market. The results showed that the most significant factors are the government's digital development strategy, the level of development of telecommunications infrastructure, and the investment environment. These factors shape the institutional and technological conditions for the implementation of digital projects and the adoption of information technology in the economy. An additional analysis of the digital maturity of the public sector based on the GovTech Maturity Index showed that Angola is classified as a Significant GovTech Maturity country, demonstrating the presence of a basic digital government architecture and the development of e-government services. The country is implementing projects in the areas of e-government, digital identification, and financial sector modernization. However, limitations remain related to interdepartmental integration of information systems, a shortage of qualified personnel, and dependence on external technological solutions. These results confirm that Angola's digital economy is in a transitional stage of development. On the one hand, the government is actively implementing digitalization programs and investing in the development of telecommunications infrastructure. On the other hand, structural constraints persist, including institutional risks, macroeconomic volatility, and limited access to investment resources. In terms of the formation of pricing models for IT products, the identified factors have a direct impact on the cost parameters of digital projects. Macroeconomic instability, institutional constraints, and the level of digital maturity in the public sector create additional risks for IT project implementation, which must be considered when developing pricing models and digital project management strategies. Thus, the study results confirm that the key drivers of Angola's IT market development are government digital transformation policy, the development of telecommunications infrastructure, and the creation of a favorable investment environment.

5. LIMITATION

Despite the results obtained, the study has several limitations.

1. First, statistical data on Angola's IT sector remains limited and fragmented, making it difficult to conduct a more detailed quantitative analysis. In particular, the availability of data on IT company revenues, investment volumes, and the structure of the digital market remains limited.
2. Second, the study relies on expert assessments obtained using the Delphi method. Although this method is widely used in academic research to assess uncertainty factors, the results of expert surveys may contain subjective elements.
3. Third, the dynamic nature of digital transformation processes can lead to rapid changes in the institutional environment and technological factors. This means that some of the study's findings may require refinement as the country's digital economy develops.
4. Finally, the analysis focuses primarily on the public sector and institutional factors of digital transformation, while the private sector and startup ecosystem require more detailed research

6. CONCLUSION

The study revealed that the development of Angola's IT sector is determined by a complex interplay of macroeconomic, institutional, and technological factors. Demographic growth, digital infrastructure development, and government digital transformation policies are creating favorable conditions for the development of the digital economy.

A PEST analysis and expert assessment of factors allowed us to identify key drivers of IT market development, among which government policy, telecommunications infrastructure development, and access to investment resources are particularly significant.

An analysis of the digital maturity of the public sector revealed that Angola is in a transitional stage of digital transformation. The existence of basic digital architecture for public administration creates the conditions for the further development of e-government and digital services, but institutional and personnel constraints continue to impact the pace of digitalization.

The findings confirm that the institutional environment and the level of digital maturity of public administration are important factors influencing the implementation of IT projects and the formation of pricing strategies in the information technology sector. Thus, the development of Angola's digital economy requires a comprehensive approach that includes institutional reforms, infrastructure development, and enhancing digital competencies.

7. RECOMMENDATIONS

Based on the analysis, several priority areas for the development of Angola's IT sector can be identified.

First, it is necessary to continue developing digital infrastructure, including expanding access to high-speed internet and modernizing telecommunications networks. This will help narrow the digital divide between urban and rural areas and increase the availability of digital services.

Second, human capital development is an important area. Improving the population's digital literacy and training IT specialists are key to the sustainable development of the digital economy.

Third, it is necessary to improve the institutional and regulatory framework for the digital sector. Simplifying administrative procedures, developing public-private partnership mechanisms, and supporting innovative companies can help attract investment in the IT industry.

Fourth, it is advisable to expand international cooperation in digital transformation, including participation in regional digital initiatives and developing the export potential of digital services.

Implementing these recommendations will accelerate the development of Angola's digital economy, enhance the competitiveness of the national IT sector, and create favorable conditions for the implementation of digital projects.

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