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## Assessing the Role of Fintech in the Economic Growth and Development in Rwanda (2018-2023)

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*Assessing, Role, FinTech,  
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### ABSTRACT

The study entitled “Assessing the Role of FinTech in the Economic Growth and Development in Rwanda (2018-2023)” was conducted to assess the validity of one hypothesis, which was divided into two hypotheses: there is no significant role of FinTech in economic growth of Rwanda and the second is there is no significant role of FinTech on economic development of Rwanda. The study has used only secondary data. The indicators for hypotheses testing were assumed 3 indicators for the independent variable and two indicators under the dependent variable (see the conceptual framework). Data were collected from the National Institute of Statistics (NISR), which reported national accounts, World Bank data, and global economy data. Data analysis was performed with the support of Ms. Excel and Statistical Package for Social Scientist version 20 (SPSS). Data was presented in the form of descriptive statistics and inferential statistics (linear regression model). The conclusion of the study relies on the acceptance or failure to accept study hypotheses. The main study hypothesis was divided into hypotheses for easy data analysis, which has simplified and led to the provision of two hypotheses: one for the role of FinTech on the economic growth of Rwanda and the second on the role of FinTech on the economic development of Rwanda. Data analysis generally has concluded by rejecting both null hypotheses, and the results made the study conclude that there is the significant role of FinTech in economic growth and development of Rwanda. However, going from indicator to indicator, there is insufficient evidence to confirm the correlation between the growth of several FinTech start-ups in Rwanda and the economic growth and development of Rwanda as the correlation between these variables remains negative. In another case for all three variables, the coefficient table has provided no statistically significant relationship as all p-values are less than a 5% level of significance. This means that, for assessing the determinants of economic growth and economic development, there is a need to select more indicators or variables rather than choosing three indicators only as it is in this study.

### INTRODUCTION

Fintech, something else called web back or computerized monetary incorporation, essentially alludes to an amalgamation of back and data innovation. It constitutes installment and settlement, hazard administration, organizing channels, and asset assignment capacities. Fintech has extended significantly within the monetary industry much obliged to the quick extension of the Web, data innovation, versatile phones, and advanced advances. The budgetary administrations industry around the world has been changed by technology-enabled monetary services known as FinTech. This troublesome innovation is reshaping money-related items, trade models, markets, and indeed the concept of cash itself, offering better approaches to gathering and utilizing information, making modern venture resources, and expanding inventive administrations. The progressing digitization of money related administrations and cash makes openings to construct more inclusive and proficient monetary administrations and advance financial improvement. To form it happen a recent World Bank report, Fintech and long Haul of Back, investigates the emotional changes within the budgetary administrations industry and

underscores the require for policymakers and financial regulators to address unused challenges and back dependable advancement (Kireyeva, 2021).

In creating economies, there observed colossal advances in money-related administrations. There has been a marvelous increment within the share of grown-ups utilizing monetary accounts, which rose by 30 rate focuses between 2011 and 2021 to 71 percent, is somewhat inferable to FinTech improvements such as versatile cash. The share of grown-ups making or accepting computerized installments developed to 57 percent in 2021 from 35 percent in 2014 concurring to the most recent circular of World Bank Findex information studies. Usually extraordinary news for financial development and diminishing imbalance, destitution, and familiarity. For destitute individuals and little businesses without get to monetary administrations as fundamental as a bank account, FinTech is opening an unused world of opportunity. Fintech offers the capacity to send and receive installments safely and pick up get to reserve funds, credit, and protections items that can offer assistance grow businesses, relieve dangers, and arrange their prospects (Nuguer, 2022).

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This transformation has particularly benefitted ladies. Owning advanced accounts boosts women independence and standing inside the family, as they can straightforwardly get to government installments and compensation, instead of depend on male relatives for control of family funds. Computerized accounts have too given ladies more noteworthy get to credit, which has been appeared to assist destitute individual's smooth vacillations in salary. Take the illustration of ladies who once had to depend on day advances from advance sharks when they needed credit. These advances had intrigued rates of between 10 and 20 percent per day at some point indeed more. Women can presently advantage from FinTech administrations which give microloans at more competitive rates made conceivable by utilizing elective information and information analytics to survey her credit as long as appropriate shields are input. The FinTech transformation is additionally lessening the costs of settlement administrations, a life saver for families in creating nations who are subordinate on budgetary offer assistance from relatives working overseas. The World Bank Settlements Cost Around the world information appears that the normal cost for sending \$200 is around 6 percent over all sorts of suppliers, while the cost to send settlements through versatile cash administrations is beneath 4 percent. This implies more cash for families to spend on fundamental needs, such as nourishment, or wellbeing care and instruction (Tyson, 2021).

#### LITERATURE REVIEW

For Rwanda's digital evolution to become transformational, the private sector needs to play a far greater role in spearheading digitization, through both increased technology adoption and support for innovation. So far digital adoption has been slow to permeate key sectors, and uptake among Micro, Small and Medium Scale Enterprises (MSME's) has been modest. For example, greater merchant acceptance of DFS could help unlock further growth of FinTech, and much more can be done to extend the benefits of Digital Financial Services (DFS) to MSMEs more generally by incentivizing uptake. Where MSMEs typically find access to credit to be a significant challenge, DFS can also offer a potential solution. Bringing more MSMEs online can also increase opportunities for startups to offer digitally enabled business applications, as well as gradually increase local e-commerce (World Bank Group, 2020).

As in numerous creating nations, versatile cash was advocated as a critical device of money related incorporation in Sub-Saharan Africa. This consider endeavors to distinguish the components persuading Rwandans to utilize the portable cash utilizing the FinScope 2016 study information collected from an arbitrary test of 12,480 people. Considering that receiving and utilizing portable cash is discretionary, the greatest probability strategy was utilized to assess an endogenous exchanging relapse show to account for test choice and indigency. The comes about put forward the part of

financial components, riches and profitable resources on sparing advancement. Versatile cash contributes essentially on sparing advancement; it is in this way a figure to boost the money related incorporation and a use point of financial advancement through the upgrade of comprehensive development. Based on the investigate discoveries, it is suggested that investigating the components and techniques to put in put a cashless financial framework would make strides the financial change in Rwanda (Maniriho, 2021).

Song, N. (2022) has assessed the impact of Fintech on Economic Growth: Evidence from China. Budgetary innovation (FinTech) has seen quick advancement as of late in China; be that as it may, ponders investigating the commitments of FinTech to China financial development stay constrained. In this way, this think about propelled by the information crevices and quick development of FinTech inspected (i) the effect of FinTech and the sub-measures of third-party installment, credit, and protections on China's financial development; (ii) the territorial and common effect of FinTech on China financial development; (iii) the causality connections between FinTech and financial development. By using a sample of 31 provinces in China and the instrumental variable generalized method of moments (IV-GMM) technique, the study established the following: (i) FinTech and the sub-measures of third-party payment, credit, and insurance have a statistically significant positive effect on China's economic growth. Specifically, a 10% rise in FinTech, third-party payment, credit, and insurance raises China's economic growth by 8%, 4%, 5%, and 16%, respectively; (ii) the eastern region has the highest growth effect of FinTech. Moreover, Zhejiang province has the highest growth effect of FinTech at the provincial level; (iii) a unidirectional causality exists from third-party payment and credit to economic growth and economic growth to insurance; a bidirectional causality exists between FinTech and economic growth. Song, N. (2022) study explicitly suggests substantial institutional reforms to promote the healthy development of FinTech in China (Song, 2022).

Hashem, *et al.* (2023) reveal the effect of FinTech through money related advancement, budgetary consideration, and regulation quality on the comprehensive development of 25 creating nations in Asia. To serve this reason, the Human Improvement List (HDI), the subordinate variable, has been taken as the intermediary for comprehensive development together with a set of autonomous factors in a well-balanced board information set, which is at that point analyzed to see the effect of changing levels of autonomous factors on human advancement for the period 2014-2021. The results about appear that expanding the level of FinTech beside the Findex, monetary incorporation, and regulation quality may increment human improvement (Hashem, 2023).

Fintech (financial technology) plays a critical role in driving economic growth and development through its various contributions to the economy. Here are some key ways in which FinTech makes a significant impact:

### **Increased Financial Inclusion**

Fintech has been instrumental in expanding access to financial services, particularly in underserved and unbanked populations. By leveraging digital and mobile technologies, FinTech firms have been able to reach individuals and businesses that were previously excluded from the formal financial system. This increased financial inclusion helps stimulate economic activity by providing more people with access to banking, lending, insurance, and investment opportunities, thereby enabling them to participate more fully in the economy (Mashamba, 2023).

### **Enhanced Efficiency and Cost Savings**

Fintech innovations, such as digital payments, automated processes, and AI-driven analytics, have led to significant improvements in the efficiency of financial transactions and services. This, in turn, reduces costs for businesses and consumers, freeing up capital that can be deployed elsewhere in the economy. For businesses, streamlined and automated financial processes result in operational cost savings, while consumers benefit from lower fees, faster transactions, and improved access to affordable financial products and services (Tyson, 2021).

### **Support for Small and Medium-Sized Enterprises (SMEs)**

Fintech solutions have proven to be particularly beneficial for SMEs, providing them with access to financing, payment processing, accounting tools, and other essential financial services. By facilitating easier and more affordable access to capital and financial management tools, FinTech contributes to the growth and sustainability of SMEs, which are vital drivers of economic activity and job creation in many economies.

### **Innovation and Competition in Financial Services**

Fintech has spurred greater competition and innovation within the financial services sector, challenging traditional institutions to improve their offerings and deliver more value to customers. This competition leads to better products, lower costs, and increased accessibility, ultimately benefiting consumers and businesses. The rise of FinTech has also encouraged traditional financial institutions to innovate and modernize their operations, thus fostering a more dynamic and customer-oriented financial landscape (Sheng, 2021).

### **Economic Resilience and Risk Management**

Fintech solutions contribute to enhanced economic resilience by enabling better risk assessment, management, and mitigation. Through the use of advanced data analytics, AI-driven algorithms, and other technologies, FinTech firms help identify and address financial risks more effectively. This, in turn, contributes to a more stable and resilient financial system, ultimately supporting broader economic stability (Nuguer, 2022).

### **Facilitation of Cross-Border Transactions and Trade**

Fintech has streamlined cross-border payments and trade finance, reducing barriers and costs associated with international transactions. By simplifying and accelerating cross-border payments and easing trade finance processes, FinTech contributes to the expansion of global trade and commerce, fostering economic growth and international cooperation (Mugabe, 2021).

### **Job Creation and Economic Growth**

The growth of the FinTech sector itself contributes to job creation and economic growth, providing employment opportunities for a wide range of professionals, including software developers, data scientists, financial analysts, compliance specialists, and customer support professionals. Furthermore, as FinTech firms serve as enablers of economic activity, their contributions to financial inclusion, innovation, and efficiency can have broader positive impacts on overall economic growth, productivity, and prosperity (Nicole, 2021). Overall, FinTech's impact on the economy is substantial and multifaceted, encompassing improved financial inclusion, increased efficiency and cost savings, support for SMEs, innovation and competition in financial services, economic resilience, facilitation of cross-border transactions, and job creation. These contributions collectively help drive economic development, enhance financial stability, and empower individuals and businesses to participate more fully and effectively in the modern economy (Kireyeva, 2021).

## **MATERIALS & METHODS**

This section is limited to the materials used for data collection and methods used for data processing and analysis. The study was limited to a few indicators (see the conceptual framework) and specific methods of data analysis, mainly a linear regression model.

### **Research Design**

This study is a census design and uses data representing the whole country (Rwanda); it is a descriptive design as presenting data using descriptive statistics parameters, and the study is correlative as using a linear regression model; the study gives a correlation between Fintech and economic growth and development of Rwanda. Research design of investigate plan alludes to the generally procedure that you select to coordinated the distinctive components to consider in a coherent and coherent way, subsequently, guaranteeing you may viably address the investigate issue; it constitutes the outline for the collection, estimation, and investigation of information.

### **Population and Sampling**

The population of the study is not limited as this study covers whole FinTech services contributing in Gross Domestic Product (GDP) of the country. And all

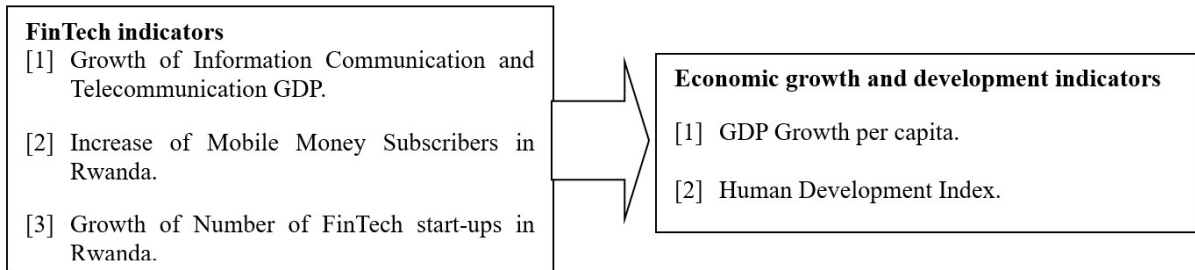
economic activities under financial sector contributing in Rwanda GDP. In other case for economic development, the human development index was considered to

represent this indicator and was taken to all Rwandans.

**Conceptual Framework of the Study**

**Independent Variable**

**Dependent variable**



**Figure 1:** Conceptual framework

**Data Collection Tools and Treatment**

The current study relay only on secondary data collection and analysis. The secondary data used are both quantitative and qualitative. Qualitative secondary data was collected as literature of this study and quantitative data were collected as values obtained while measuring the indicators in the conceptual framework of the study. The main report visited to obtain quantitative secondary data is the Rwanda National Account Reports of National Institute of Statistics (NISR), the global economy portal and world bank statistics portal. All information used are for the year 2018 to 2023 and for some indicators where 2023 was not reported, the change between 2021 to 2022 was assumed to be the same change for the year 2022 to 2023.

**Data Analysis**

Data analysis was performed using both descriptive and inferential statistics. Descriptive statistics were made by presenting indicators in their actual units from the original reports and modifications to the growth rates to ensure that, data are in the same format for easy analysis. Meaning that, the information presented use descriptive statistical parameters like numbers and growth rates.

For inferential statistics, the multilinear regression Equation [2] assumed the following form:

$$\hat{Y}_{1\&2} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Where:  $\hat{Y}_{1\&2}$  = Economic growth and development indicators by 2 indicators such as; GDP Growth per capita rate and Human Development Index.

$\beta_0$  = constant,

$X_1$  = Growth of Information Communication and Telecommunication ,

$X_2$  = Increase of Mobile Money Subscribers in Rwanda,  $X_3$  = Growth of Number of FinTech start-ups in Rwanda,

and  $\beta_{1, 2, \&3}$  = Slopes associated with  $X_1$ ,  $X_2$ , and  $X_3$ , respectively.

While  $\epsilon$  = Error term or the random disturbance term.

**Study Null Hypothesis**

There is no significant role of FinTech in the economic growth and development in Rwanda.

**RESULTS & DISCUSSION**

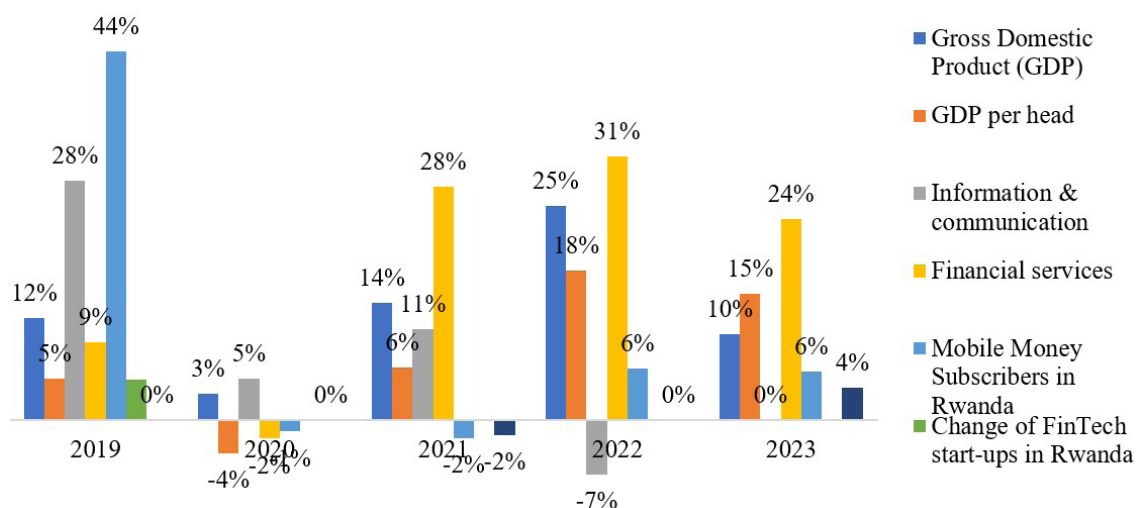
Results were made in form of descriptive and inferential statistics per each indicator as defined in the conceptual framework.

Table 1 and figure 2 show that GDP per head or per capita was increased from 2017 to 2018 at 5% and reduced to 2020 by 4% due to the high increase in value of dollar because in local currency it was increased, and increased 6% by 2021, 18% by 2022 and 15% from 2022 to 2023. All these indicators are not static or changing in regular way, in some years reduced and in some other years increases highly or moderately. This where for example from 2017 to 2018 mobile money subscribers in Rwanda increased at 44% while by 2020 reduce 1%. Mobile money accounts which is equivalent to mobile money subscribers is a big number even greater than Rwandan total population

**Table 1:** Mixed FinTech and Economic growth and Development indicators

Indicators (All)	2018	2019	2020	2021	2022	2023
Gross Domestic Product (GDP) (in billion Rwf)	8,298	9,305	9,596	10,930	13,716	15,109
GDP per head (in current US dollars)	797	836	803	853	1,004	1,155
Information & communication (in billion Rwf)	144	185	194	215	201	201
Financial services (in billion Rwf)	206	225	220	281	369	457
Mobile Money Subscribers in Rwanda in millions	11.07	15.92	15.7	15.36	16.29	17.22
Number of FinTech start-ups in Rwanda	42	44	44	44	44	44
Human Development Index (ratio)	0.54	0.54	0.54	0.53	0.53	0.55

Source: NISR, World Bank, Globe economy portals, 2024



**Figure 2:** Change on mixt FinTech and Economic growth and Development indicators from 2018 to 2023

because it counts mobile money accounts from various institutions, individuals, businesses, etc. Here for example, most people in Rwanda are owning 3 to 4 sim cards and each is registered in the mobile money system (Nicole, 2021).

Considering null hypothesis one stating that, there is no significant role of FinTech on economic growth of Rwanda, the findings prevail the following results:

From Table 2, an ( $R^2$ ) of 1 indicates that the regression predictions perfectly fit the data. This shows that, the analyzed model feet at 82% as ( $R^2$ ) is equal to 0.820. R is also equal to 0.906 meaning that, Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda each contribute 82% to the economic growth in Rwanda as represented by GDP per capita.

**Table 2:** Model summary H01

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.906 <sup>a</sup>	.820	.280	.07340

a. Predictors: (Constant), Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda

**Table 3:** ANOVA Table for the tested variables H01

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.025	3	.008	1.518	.024 <sup>b</sup>
	Residual	.005	1	.005		
	Total	.030	4			

a. Dependent Variable: GDP per head

b. Predictors: (Constant), Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda

Table 3, the results show that the model had an F ratio of 1.518 and the P value was  $0.024 < 0.05$ , signifying that the F ratio was statistically significant, therefore the overall regression model for all the variables tested were statistically significant and can be used for prediction at 5% significant level. This further indicate that the predictors variables Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda used in this study as indicators of FinTech are statistically significant to the economic growth of Rwanda. Therefore, the formulated null

hypothesis starting that there is no significant role of FinTech on economic growth of Rwanda was failed to be accepted in favor of alternative hypothesis or its opposite. Table 4 gives the following linear equation:

$$Y1 = 0.008 + 0.750X1 + 3.042X2 - 31.604X3$$

This means that, there is a positive correlation between Information & communication, Mobile Money Subscribers in Rwanda and negative correlation with Change of FinTech start-ups in Rwanda toward the economic growth (GDP per capita). In other words, one unit change from the one above indicators (3 listed above) lead to change

of 0.750; 3.042 and -31.604 change times additional value to the current units of the GDP per capita of economic growth. In other words, once indicators of independent variable are absolute, the economic growth represented by GDP per capita is equal to 0.008 units. As conclusion the null hypothesis one: there is no significant role of

FinTech on economic growth of Rwanda” is rejected in favor of alternative hypothesis “there is a significant role of FinTech on economic growth of Rwanda”.

Considering null hypothesis two stating that, there is no significant role of FinTech on economic development of Rwanda, the findings prevail the following results:

**Table 4:** Coefficients table for linear regression analysis H01

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.008	.084		.094	.940
	Information & communication	.750	1.350	1.155	.555	.677
	Mobile Money Subscribers in Rwanda	3.042	2.239	6.705	1.358	.404
	Change of FinTech start-ups in Rwanda	-31.604	26.593	-7.782	-1.188	.445

a. *Dependent Variable: GDP per head*

**Table 5:** Model summary H02

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.778 <sup>a</sup>	.605	-.581	.02587

a. *Predictors: (Constant), Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda*

From Table 5, an (R<sup>2</sup>) of 1 indicates that the regression predictions perfectly fit the data. This shows that, the analyzed model feet at 60.5% as (R<sup>2</sup>) is equal to 0.605. R is also equal to 0.778 meaning that, Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda each contribute 60.5% to the economic development in Rwanda as represented by the human development index.

Table 6, the results show that the model had an F ratio of 0.510 and the P value was 0.044<0.05, signifying that the F ratio was statistically significant, therefore the overall regression model for all the variables tested were statistically significant and can be used for prediction at 5% significant level. This further indicate that the predictors variables Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda used in this study as

indicators of FinTech are statistically significant to the economic development of Rwanda represented by Human Development Index. Therefore, the formulated null hypothesis starting that there is no significant role of FinTech on economic development of Rwanda was failed to be accepted in favor of alternative hypothesis or its opposite.

Table 7 gives the following linear equation:  
 $Y_2 = -0.017 + 0.269X_1 + 0.770X_2 - 8.329X_3$

This means that, there is a positive correlation between Information & communication, Mobile Money Subscribers in Rwanda and negative correlation with Change of FinTech start-ups in Rwanda toward the economic development (Human Development Index). In other words, one unit change from the one above indicators (3 listed above) lead to change of 0.269; 0.770 and -8.329 change times additional value to the current units of the

**Table 6:** ANOVA Table for the tested variables H02

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	3	.000	.510	.044 <sup>b</sup>
	Residual	.001	1	.001		
	Total	.002	4			

a. *Dependent Variable: Human Development Index*

b. *Predictors: (Constant), Change of FinTech start-ups in Rwanda, Information & communication, Mobile Money Subscribers in Rwanda*

**Table 7:** Coefficients table for linear regression analysis H02

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.017	.029		-.582	.664
	Information & communication	.269	.476	1.742	.565	.673
	Mobile Money Subscribers in Rwanda	.770	.789	7.133	.975	.508
	Change of FinTech start-ups in Rwanda	-8.329	9.373	-8.621	-.889	.538

a. *Dependent Variable: GDP per head*

Human Development Index or Economic Development. In other words, once indicators of independent variable are absolute, the economic development represented by Human Development Index is equal to -0.17 units. As conclusion the null hypothesis one: there is no significant role of FinTech on economic development of Rwanda” is rejected in favor of alternative hypothesis “there is a significant role of FinTech on economic development of Rwanda”.

The study results give confidence to the study to confirm that there is a significant role of FinTech in the economic growth and development in Rwanda, however based on the indicators selected, it was not for all indicators where growth of Number of FinTech start-ups in Rwanda present negative correlation with economic growth and development of Rwanda. In other case for all tested indicators, the role or correlation is not statistical significant as all p-values for specific indicators (3 from independent variable) present value greater than 0.5%. As explained by (Hashem, 2023) economic growth and development are large components which cannot be explained by a single and small indicators as three above selected indicators. Meaning that, considering a FinTech as main engine for economic growth and economic development can mislead policy makers.

**CONCLUSION**

The conclusion of the study relies on the acceptance or fail to accept study hypothesizes. The main study hypothesis was divided into hypothesis for easy analysis of data, and this has simplified and lead to provision of two hypotheses one for the role of FinTech on the economic growth of Rwanda and the second on the role of FinTech on the economic development of Rwanda. Data analysis generally has concluded by rejecting both null hypothesis and the results made the study to conclude that, there is significant role of FinTech on economic growth and development of Rwanda, but going on indicator to indicator there is an insufficiency evidence to confirm the correlation between growth of number of FinTech start-ups in Rwanda on economic growth and development of Rwanda as the correlation between these variables remain negative. In other case for all three variables, the coefficient table has provided none statistically significance relationship as all p-values are less

than 5% level of significance. This means that, to assess the determinants of economic growth and economic development, there is a need to select more indicators or variables rather than choosing only three indicators, as is the case in this study.

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