Digitalization And Global Value Chain Participation. Evidence From A Small Island Economy.

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Abstract

The present study investigates the impact of digitalization on global value chain participation in Mauritius. The study is done over the period 1990 to 2019. While most of the literature has focused on developed and industrialized economies, less is known on the relationship between digitalization and global value chain for a small island economy like Mauritius. This paper made use of the principal component analysis to construct the digitalization index. Using the dynamic econometric technique, namely the VECM, we show that indeed developing the digitalization base of an economy, even as small as Mauritius, can upgrade GVC participation. We also show that apart from digitalization, FDI inflow and skill intensity is as well key element in upgrading GVC participation. Moreover, manufacturing sector development is seen to have more influence on backward GVC in the long run. The granger causality test shows the existence of a unidirectional causality between GVCP and digitalization, digitalization and FDI as well as human capital and digitalization.

Keywords: GVCP, Digitalisation, VECM, Granger Causality Test, Mauritius

1.0 Introduction

Value chains englobe all the activities that a firm must carry out, starting from the creation to the final use of the product. Brennan and Rakhmatullin (2017) explain that these do not only involve designing, producing, marketing and distributing the product, but also include supporting the final customer. Global value chain (GVC) builds up on the value chains by fragmenting these tasks among multiple firms that are geographically dispersed. Having gained an unequivocal importance in the global economic framework since the 1990s, the GVCs now make up approximately two third of the international trading of goods and services (UNCTAD, 2023). This importance stems primarily from the numerous advantages that the use of GVCs entail. Indeed, participation in GVCs can boost job creation, enhance productivity, stimulate skills and technology acquisition, and increase the standard of living. According to Gereffi and Luo (2015), participation in GVC is believed to "highlight the ways in which new patterns of international trade, production, and employment shape prospects for development and competitiveness, creates opportunities and risks to the enterprises". In the global value chain development report 2021, Xing et al., (2021) depicted how global trade-based GVC participation rates, along with production-based GVC participation rates have shot upwards by 10.9% and 4.6% respectively during the period 1995 to 2008. Unfortunately, this upward surge has been crippled by two shocks, namely the global financial crisis and the COVID-19 pandemic. In 2021, the rates have been stagnating around 44.4% for the trade based participation and 12.1% for the production based participation (Xing et al., 2021).

With the recent exponential development of digital technologies worldwide, conventional trade of goods and services has been reshaped and upgraded. Undeniably, the landscape of GVCs will also be impacted in multiple ways by the technological disruptions (Niehoff, 2022). Indeed, Banga (2019) argues that these new digital technologies will promote efficiency in several tasks (production, planning, product development and logistics), thereby contributing to the development of GVCs. For instance, digital technologies can enable the selection of the most optimal and sustainable route for worldwide shipping (Surimanne, 2023), lead firms can effortlessly monitor and track the production process despite the complexity of some GVCs, and smaller firms can benefit from more easy access to the GVCs (Banga, 2019). Similarly, Loonam and O'Regan (2022), argue that digital technologies like big data, internet of things and artificial intelligence, enhance the degree of connectivity, the innovative power, and development opportunities for GVCs. Additionally, the World Investment Report 2020, maintains that each of these different and new digital technologies will have a distinct impact on "the length, geographical distribution and governance of GVCs" (UNCTAD, 2020). Additionally, the report states that the actual impact on the "smile curve" of international production will be contingent on the specific actions taken by the various industries with respect to technological adoption. As such, the "smile curve" can "flatten, stretch, or bend" (UNCTAD, 2020). Consequently, digitalisation is also expected to influence the GVC participation. However, it is still hard to pin down the actual consequences of digitalization on GVC participation. Indeed, Zhang et al., (2023) state that the relationship is still unclear.

This chapter therefore aims to investigate the nature and the magnitude of the relationship between digitalization on GVC participation, if any, in Mauritius. This chapter is expected to contribute and add on to the literature in several respects. Firstly, the chapter will contribute to the budding body of empirical evidence examining the link between the GVC participation and the recent industrial revolution. Indeed, while digitalization has been spreading its tentacles for ages now, the fourth industrial revolution has relatively only started recently, and the relationship between digitalization and GVC participation is still at its infancy stage. Secondly, the chapter will focus its empirical analysis on a small island developing state, namely Mauritius. Most of the few and existing studies have investigated the link in developing and developed countries, which do not necessarily factor in the unique and distinct characteristics of a small island developing state (SIDS). Terauds and Zhuawu (2021) argue that the SIDS have several characteristics that act as hindrances to their participation in GVCs. These include their small sizes, remoteness, small trade volumes, heavy reliance on imports, high transaction costs and low quality goods and services (Terauds and Zhuawu, 2021). As pointed out by Kowalski et al., (2015), participation in GVCs are contingent on several country specific factors. Indeed, a larger domestic market size decreases backward engagement and increases forward engagement. Similarly, a longer distance from the manufacturing centre also decreases backward engagement. On the other hand, a higher level of economic development is usually tantamount to a higher level of forward and backward engagement. Conversely, higher backward engagement and lower forward engagement is favoured when the manufacturing sector contributes a lot to economic growth. Therefore, generalizing the impact of digitalization on GVC participation in Mauritius from a developing country perspective might lead to erroneous conclusions. To the best of our knowledge, no other studies have assessed the empirical impact of digitalization on GVC participation in a small island developing state, let alone in Mauritius. Indeed, barring a study conducted by Nasser and Ouerghi (2023), who investigate the relationship in a panel of African countries, including Mauritius, this is the only study delving into a quantitative analysis of the impact of digitalization on GVC participation in Mauritius. Thirdly, the chapter will innovatively build a digitalization index to measure the level of digitalization in the country. The index will consider two different aspects of digitalization, namely the penetration level of the technology, and the use of the technology. Englobing these two features of digitalization, as opposed to a single proxy of digitalization, ensures that a fuller and more realistic impact of digitalization will be captured (Morganti et al, 2014).

Therefore, this chapter investigates the impact of digitalization on GVC participation in Mauritius, a SIDS, over the time span 1990-2019. To do so, a Vector Error Correction Model (VECM) is employed. An improved understanding of the qualitative relationship between these variables will provide valuable insights about whether policy recommendations should be restructured to capitalise on the technological revolution in order to optimize GVC participation, and eventually boost economic growth.

Nevertheless, this chapter has a few limitations. First, the digitalization index which constructed with the principal analysis method, while helpful, may not encompass all aspects of digitalization as it considers only two dimensions of digitalization. Moreover, the study also primarily examines the manufacturing sector, possibly overlooking other key sectors of the

island that could also affect GVC participation. Lastly, factors like infrastructure and policy changes, which could influence GVC participation, were not included in the analysis. Such factors could have provided additional insights on the dynamics between GVCP and digitalization.

The rest of the chapter is organized as follows: Section 2 provides a brief overview of the existing literature; Section 3 provides a brief overview of GVC participation in Mauritius; Section 4 discusses the methodology that will be used; Section 5 provides a discussion of the findings and Section 6 summarizes the research and provides a few policy recommendations.

2.0 Literature Review

Kowalski et al., (2015) argue that the main benefits of higher participation in GVCs is linked to both economic and social upgrading. They elaborate that while economic upgrading encompasses four channels (process, product, functional and chain upgrading) through which efficiency is increased, social upgrading considers the an increase in employment, better standards of living, and a healthier environment. Nevertheless, they aregue that the degree of participation is heavily dependent on certain key policy and non policy factors. The non policy factors include the domestic market size, the economic growth of the country, the size of the manufacturing sector, and the location of the country. As for the policy factors, they are related to the existing trade policies and inward FDI openness. Given the benefits of GVC participation, it becomes interesting to assess its interaction with the ongoing radical digital revolution.

Indeed, the number of articles assessing the link between digitalization and GVC participation has been burgeoning over the recent past few years. Most of the studies have analysed the link in a sample of firms from a group of countries. For instance, Lanz (2018) et al., investigate whether digitalization, as measured by the availability of a website for the firm or not, promotes participation in GVcs among manufacturing SMEs from a group of developing countries. The results of their Generalized linear models framework indicate that the relationship is a positive one, from the perspective of both the backward and forward linkages. Indeed, they show that SMEs that possess a website import a bigger portion of their inputs and export a bigger portion of their sales. Interestingly, this positive impact of digitalization on GVC participation is more pronounced in SMEs as opposed to bigger companies. Additionally, the authors also demonstrate that SMEs have a higher GVC participation rate in countries where individuals have a internet connectivity. Similarly, Gopalan et al., (2022) focus on 24839 firms from 52 countries for the period 2006-2017. They make use of a different model, a recursive bivariate probit model coupled with an instrumental variable approach. The results of the model indicates that the digitalization of the firms, as captured by two proxies (possession of a website and internet connectivity speed) positively triggers GVC participation. Interestingly, unlike Lanz (2018), this study makes use of two measure of GVC participation: the first considers firms that import and export simultaneously, while the second one considers firms that not only

simultaneously import and export, but also possess an international quality certification. Their results reveal that the use of digitalization actually pushes participation in GVCs by about 6-10%. Additionally, the results of the paper also confirm that digitalization is an essential driver of participation in GVC for financially constrained firms, firms from small agglomerates and SMEs. Along the same vein, Gniniguè et al., (2023) also analyse the impact of information and digital technologies on GVC participation in a sample of 44 developing countries during the period 1990-2019. They resort to yet another type of approach-a Bayesian model averaging approach. They demonstrate that the link is a positive and significant one, arguing that the cause might revolve around the fact that digitalization enhances the competitiveness of the countries by altering the product, service, and prices. On the other hand, only a scant number of articles focus their analysis on firms from a single country. For instance, Sasidharan and Reddy (2021) assess the same nexus between GVC participation and digitalization in a sample of Indian manufacturing firms using data spanning over the period 2001-2020. The authors resort to a logit model, which confirms the presence of a positive impact. Additionally, the study reveals that digitalization encourages firms that are small and belong to a low technology industry to participate in GVCs more.

Conversely, there are a few studies that do not believe that the link between digitalization and GVC participation is not a linear one. Indeed, Ha (2022) departs from previous studies by looking at the non linear relationship between digital business and GVC. The study focuses on 25 European countries during the period 2012-2019, and considers four different proxies of digital business (value of online selling, sales through e-commerce, e-commerce web sales and customer relationship management usage). The presence of a U-shaped relationship is confirmed, thereby implying that initially risks and uncertainties hinder any benefits from the GVCs. However, once digitalisation reaches a certain threshold level, it is seen to unlock numerous opportunities for the GVC activities. Interestingly, the results also indicate that not only do digital businesses minimize the uncertainties of GVC participation, but also that the impact of digital business is higher in countries that have a more developed institutional structure. Comparably, Nasser and Ouerghi (2023) also investigate how digitalization could potentially influence the participation of African countries in GVCs non-linearly. They collect data spanning over 2005-2018 across 27 African countries and make use of the Hassen Threshold model. The model demonstrates that when digital skills are below the threshold, the impact on both forward and backward linkages to GVCs are negative. However, the opposite is not entirely true, that is, when digital skills exceed the threshold, the study only finds evidence of a positive impact on backward linkages. Nevertheless, digitalization is always seen to have a positive impact on participation in GVCs, whether the level of digital infrastructure is low or high.

On the other hand, there are other studies that have also tried to investigate as to whether digitalization within firms participation in GVCs could enhance the performance of the firms. For instance, Banga (2019) investigates whether digitalization leads to product upgrading in Indian manufacturing firms that participate in GVCs. The analysis employs a systems generalized methods of moments over the period 2001-2015. Interestingly, the author constructs a digital capability index by combining both hard and soft digital assets of the firms,

through a principal component analysis method. The results indicate that the firms with a higher level of digital capacity on top of skilled labour force, are able to generate up to 5% higher product sophistication as compared to firms with a lower level of digital capacity. In a similar fashion, Battiati et al., also (2020) assess the relationship between productivity growth and GVC participation in the digital age, in 12 European countries, the U.S. and 30 industries. The study is carried out over the period 2000-2014, and employs a generalized least squares and instrumental variables approach. The results indicate that both forward and backward participation have a positive and significant impact on productivity growth. Interestingly, they detect a more powerful impact on productivity growth from digital sectors of forward as opposed to backward participation. Furthermore, they also notice that there is a higher productivity return from forward participation when involved in a moderately intensive digital sector.

Overall, despite the various methodologies used in the literature, there seems to be a general consensus that digitalization promotes participation in GVCs in most countries investigated. Nevertheless, there are scarcely any studies done in small island developing states like Mauritius, whose distinct features might affect the relationship under consideration. As such, this chapter endeavours to assess whether the relationship is similar in Mauritius.

3.0 BRIEF OVERVIEW

In general, GVC participation has followed an upward move in Mauritius over the years. In fact, data extracted from UNCTAD-Eora Global Value Chain Database reveal that all the indicators of GVC follow a relatively similar trend over the years, as depicted in the Figure 2.1 below.

Figure 2.1: A breakdown of the main GVC indicators for the case of Mauritius, 1990-2018

Indeed, from 1990 to 2004, the indirect value added (which is the forward GVC participation component of the GVC participation index), the foreign value added (which corresponds to the backward GVC participation component of the GVC participation index), as well as the domestic value added embodied in the exports of Mauritius, all record a gradual increase. Similarly, the total value added, being the sum of foreign value added and domestic value added, also follows the same growth pattern. However, some fluctuations from 2005-2010 is detected in all the indicators, despite the growth rate being much higher than in the previous years. Indeed, in 2005, the indirect value added, foreign value added, domestic value added, and total value added grew by 42%, 67%, 34%, and 44% respectively. Unfortunately, the high growth in these indicators was followed by a rocky ride of ups and downs, before again recording high growth rates revolving around 33% in 2010. In 2014, the GVC indicators recorded a record high value of 726, 432, 1, 233, 299, 2, 389, 506, and 1, 969, 731 in the

indirect value added, foreign value added, domestic value added, and total value added respectively. Indeed, the 2013 budget saw the emergence of several governmental strategies to boost the Mauritian export system. For instance, the government of Mauritius abolished the AGOA levy, as well as the bank guarantee for export oriented enterprises. This released Rs 15 million to the industry. Additionally, to increase the security of exporters, an export credit insurance from foreign insurance companies were permitted and a freeport status was also granted to manufacturing companies planning to export in Africa. Furthermore, an existing freight rebate scheme was maintained for planters and fruit exporters.

In line with the above, the GVC participation index (based on UNCTAD-Eora Global Value Chain Database) reaches its maximum values in 2005 and 2014 (see figure 2.2). The GVC index is computed by combining the foreign value added (which is embodied in the exports of Mauritius) and indirect value added (which is the domestic value added of Mauritius, which is embodied in the exports of other countries).

Figure 2.2: GVC participation Index, Mauritius

On the other hand, digitalization has also witnessed an exponential growth in the island. Figures 2.3 and 2.4 clearly illustrate the rapid increase in the level of adoption of basic digital technologies, such as the internet usage and mobile cellular subscriptions in the island. Indeed, Figure 3 shows that the percentage of the population that use internet has been slowly increasing since 1997, with the growth rate picking up speed in 2007, to reach a whooping 70% in 2023. The rise in the number of mobile cellular subscriptions was also spectacular, rising from 20, 843 in 1997 to 2, 096, 800 in 2023. In fact, according to the latest figures of ICT Development Index (2016), Mauritius ranks first among African countries, and 72nd among 176 countries, with an index value of 5.88.

Figure 2.3: Number of individuals using internet (% of the population) in Mauritius

Figure 2.4: Number of mobile cellular subscriptions in Mauritius

The ascension in both global value chain participation and digitalization in Mauritius beckons the question of whether digitalization might possibly have any impact on GVC participation in the island. If this impact turns out to be significant, it might entail substantial policy implication for the SIDS.

4.0METHODOLOGY

4.1MODEL SPECIFICATIONS

The main objective of the present study is to investigate the impact of digitalization on global value chain participation in Mauritius over the period 1990 to 2019. Moreover, the study also investigates the impact of digitalisation on backward GVC participation of the country. This section describes the models adopted and the explanatory and control variables used in the model. The basic specification of the model is based on earlier studies led by Slany (2020) and Obajasu et al (2021). In this regard, the econometric model takes the following form:

GVCP=f (DIGIT, GDPM, FDI, HC)----------Equation 1

FVA = f (DIGIT, GDPM, FDI, HC)----------Equation 2

Variables Definition

Dependent Variable

The GVC participation index for Mauritius is calculated from the foreign value added and domestic value-added components of the country. GVC = FVA + DVX FVA represent the Foreign Value Added which is embodied in this country's exports. This corresponds to the Backward GVC participation component of the GVC participation index. While *DVX* represents the Domestic Value Added of the country which is embodied in the exports of other countries. This corresponds to the Forward GVC participation component of the participation index (Slany (2019), Ignatenko et al, 2018, obeng et al, 2022, Gopalan et al, 2022).

Independent Variables

The main variables of interest is the digitalization index. A digitalisation index (DIGI) is being used to measure the extent to which a country has digital technologies. To effectively measure digitalisation, the digitalisation index should cover the transition to digitally intensive societies across multiple sets of metrics. The index should not only capture technology penetration, but also its use in order to understand the full impact of digitalisation (Morganti et al, 2014). For this purpose, internet penetration and mobile cellular subscription was used, whereby internet penetration indicates the percentage of internet users in the country and mobile cellular subscription refers to the number of the subscription to a public mobile cellular service which provides access to the Public Switched Telephone Network using cellular technology. The index was constructed by using the Principal Component Analysis (PCA). It is a multivariate statistical technique used to reduce the number of variables in a data set into a smaller number of dimensions. In mathematical terms, from an initial set of n correlated variables, PCA creates

uncorrelated indices or components, where each component is a linear weighted combination of the initial variables (Vyas, 2006).

Vutha et al, (2020), argued that skill intensity defining the share of workers with higher education in the total number of workers have a impact on GVC participation. The authors discussed found in their study that skill has a positive and and significant association with the propensity to join production networks. Hence to capture skill intensity in the present study, the proxy human capital (HC) has been used. HC is measured by the secondary enrolment rate (Cheng et al. (2015)).

Moreover, FDI represent an important internationalization pathway to global value chain participation. It is identified as the primary driver of global value chain (GVC) expansion in the past several decades. The GVC comprises of different stages which involves the production of goods and services whereby each stage adds value to the production and with at least two stages where production is done in different countries thus reinforcing the dynamics between FDI and GVC participation (Qiang et al, 2021). Hence, net FDI inflow as a percentage GDP is added in the regression to capture the link between FDI and GVC participation.

As identified by Lanz et al, (2018), manufacturing enterprises participation in GVC is enhanced by increased digitalization. Moreso, enhanced production in the manufacturing sector may lead to an increase in GVC participation. Hence, GDP in the manufacturing sector (GDPM) is another proxy used in the present study.

The econometric specification can be written as follows:

$$ln\ ln\ GVCP_{t=} \alpha_t + \beta_1 lnDIGIT_t + \beta_2 lnGDPM_t + \beta_3 lnFDI_t + \beta_4 lnHC_t + \mu_t \quad \text{----------} \quad (3)$$

$$ln\ ln\ FVA_{t=} \alpha_t + \beta_1 lnDIGIT_t + \beta_2 lnGDPM_t + \beta_3 lnFDI_t + \beta_4 lnHC_t + \mu_t \quad \text{----------} \quad (4)$$

Where *t* denotes the time dimension and the logarithm is applied to the variables for ease of interpretation (that is in percentage terms).

Unit Root Tests

It is crucial to investigate the time series properties before estimating the model. As identified by Granger and Newbold (1974) and Philips (1986), one may obtain biased results from regressing time series data mainly because of the likelihood that the data might be nonstationary. Hence, because of this situation, panel unit root tests are performed to analyze the order of integration of the different variables used in the study. ADF unit root tests were utilized in the present study. The findings show that stationarity is achieved after differencing each variable once. This implies that the variables are integrated of order one.

Cointegration Test

After checking for stationarity of the variables, we proceeded to investigate whether cointegration exists between the variables or whether there is a long-run link between the variables. The Johansen cointegration test has been used, and the result shows the existence of a cointegrating association amid the variables. Hence, the study proceeded with the use of a vector error correction model.

6.0 FINDINGS AND DISCUSSION

In the presence of cointegration, we used a VECM model, which also caters to dynamism in model. Moreover, by adopting a VECM, we can not only appropriately analyze the effect of climate change on socioeconomic development in Mauritius but also any reverse causality that might exist between the variables. An investigation of other feedback and indirect effects in the hypothesized link also becomes possible. In fact, this framework resembles a series of equations where each determinant comes as the explained variable in a system, which is then solved simultaneously. We estimated a VAR in an error correction model (VECM) for the purpose of our analysis.

$$\Delta lnGVCP_t = \alpha_0 + \sum_{j=1}^{n} \alpha_1 \Delta\, lnDIGIT_{t-j} + \sum_{j=1}^{n} \alpha_2 \Delta\, lnGDPM_{t-j} + \sum_{j=1}^{n} \alpha_3 \Delta\, lnFDI_{t-j} + \sum_{j=1}^{n} \alpha_4 \Delta\, lnHC_{t-j} + \eta ECT_{t-1} + \varepsilon_t \text{----------(5)}$$

$$\Delta lnFVA_t = \alpha_0 + \sum_{j=1}^{n} \alpha_1 \Delta\, lnDIGIT_{t-j} + \sum_{j=1}^{n} \alpha_2 \Delta\, lnGDPM_{t-j} + \sum_{j=1}^{n} \alpha_3 \Delta\, lnFDI_{t-j} + \sum_{j=1}^{n} \alpha_4 \Delta\, lnHC_{t-j} + \eta ECT_{t-1} + \varepsilon_t \text{----------(6)}$$

t denotes the time dimension. μ is a standard white noise process. An optimal lag length of 1 is chosen. Then, VECM is estimated, and the long-run results of the model are reported in

Table 1: Long-run Results

Dependent Variable: LGVCP	**Coefficient** Model 1	**T stats**	**Coefficient** Model 2	**T stats**
LGVCP	1.000000		N/A	N/A
LFVA [backward GVC]	N/A	N/A	1.000000	
LDIGIT	0.887605	1.76612	0.665236	1.72626
LGDPM	2.298895	1.32482	2.628242	2.01168
LFDI	0.494844	4.11284	0.333106	3.60467
LHC	3.862220	4.27555	2.015489	2.90815
Constant	2.081457		3.279566	

Analysing the results from table 1, we observed that digitalization has a positive impact on global value chain participation (GVCP) and backward GVC as well for Mauritius. More precisely, a 1% increase in digitalization has led to a 0.89% increase in GVCP and an increase in backward GVC. This result is in line with Ketan et al, 2023, Gopalan et al. (2022) …….. Digitalisation proves to be cost-effective and reliable telecommunications have allowed multinational firms to outsource complex production activities across borders (World Bank, 2020). Digitalisation allows firms to communicate with its customers, suppliers, distributors and workers regardless of their geographic position (Clarke, 2008; Hagsten and Kotnik 2017). Moreover, it allows firms to internationalise as these firms acquire faster and

better information about various economic agents and market conditions, (Mostafa et al., 2005) and also allows firms to reduce the dependence on costly middlemen, which are essential in establishing trade relations (Fernandes et al., 2019). As rightly pointed by Kim, 2020, digitalisation permits swift cross-border interactions among firms and provides a low-cost medium for participating in global markets (Kim, 2020).

Relating the results to the case of Mauritius, we observed that the island has recorded massive development in the information and communication technology (ICT). The island is the leader in Africa in the ICT sector. In the era of Industrial Revolution 4.0, Mauritius ranked first in Africa in the United Nations e-Government Index 2018. Mauritius has been actively paving its way in developing its digital base along with the rest of the world pioneering towards Internet of Things, blockchain, cloud computing, data analytics and artificial intelligence, Mauritius has been active in setting the pace in the African region. There is more and more digitalization in the both the public and private sector thereby enhancing operational effectiveness and efficiency and provide better service to government institutions, citizens and businesses and also aims towards facilitating business within and across the Mauritian borders[1]. Hence digitalization among various benefits, contribute towards enhancing ease of doing business and promote business continuity.

Zooming on the results further, we note that manufacturing sector growth mainly promoted backward GVC. A 1% increase in GDP of the manufacturing sector has contributed to 2.63% increase in backward GVC. Infact, Mauritius has been performing extremely well over the last few decades mainly because of trade agreements (PTAs), and the ease of doing business. The island has embraced participation in Global value Chains. However, more advanced technological improvement from competitors, greening, and servicification of manufacturing, represents a major challenge to Mauritian operations that are often geographically dislocated from their major markets. Consequently, the export-oriented manufacturers in Mauritius faces the danger of being trapped in low value-added segments of GVCs.

Furthermore, the results shows that foreign direct investment tis another important variable positively impacting on both backward GVC and total GVC participation. FDI is indeed acknowledged as the key driver of global value chain. The literature has identified FDI as the most common way to link developing countries to GVCs (Taglioni and Winkler, 2016), and

[1] https://www.undp.org/mauritius-seychelles/projects/support-resilience-through-digital-transformation-and-capacity-development

this is explained by the fact that multinational corporations are responsible directly (i.e. intra-firm) or indirectly (through contracts), for a large share of trade in value added (UNCTAD, 2013). Finally, investigating the impact of human capital on GVC, we observed from the results that a 1% increase in human capital has led to 3.86% increase in GVC participation and 2.01% increase in backward GVC. Human capital development or skill intensity of a country is a factor contributing to location advantage. Cattaneo et al., 2013; R. W. Jones & Kierzkowski, 1990; UNCTAD, 2013 highlighted in their studies that skill intensity or the availability of skill workforce apart from regulatory and policy frameworks and business facilitation policies are key to value chains activities.

Additionally, the VECM is transformed into an Error Correction Model (ECM) to measure the short run dynamics. The only significant result for the short-run is related to FDI and digitalization. In the short run, digitalization has led to an increase in FDI flow. The results of the short-run dynamics for the other variables are statistically insignificant. It can be concluded that these variables have an impact on global value chain participation mostly in the long run.

Pairwise Granger Causality Test

Having ascertained that a co-integrating relationship exists among the variables, the final step in this study is to verify if there is a uni directional or bi directional causality between the variables. In order to do so, we made use of the pairwise Granger causality test. The Granger-Causality allows for the test of the null hypothesis: variable X does not Granger-Cause variable Y, against the alternative that variable X does Granger-Cause variable Y. The results are presented in the table below:

Table 2: Pairwise Granger Causality Test

Null Hypothesis	***F-Stat***	***Prob.***	***Granger Causality***
LDIGIT does not granger cause LGVCP	4.47501	0.0445	Uniidirectional Causality LDIGIT ↔ LGVCP
LGVCP does not granger cause LDIGIT	0.85099	0.3651	
LDIGIT does not granger cause LFDI	4.95606	0.0361	Unidirectional Causality LDIGIT → LFDI
LFDI does not granger cause LDIGIT	0.32680	0.5731	
LDIGIT does not granger cause LHC	0.08599	0.7718	Unidirectional Causality

LHC does not granger cause LDIGIT	27.3004	0.0000	LHC → LDIGIT
LFDI does not granger cause LHC	0.93675	0.3432	Unidirectional Causality LHC ↔ LFDI
LHC does not granger cause LFDI	6.09642	0.0214	

(X → Y implies X Granger-Causes Y, X ↔ Y implies X Granger causes Y and vice versa)
Source: Authors' computation

The results show that there is a unidirectional causality between digitalization to FDI. While digitalization positively impacts on FDI the reverse does not hold as per the present study. Furthermore, the granger causality test shows the importance of human capital development as a determinant of digitalization. Various scholars have argued that skill intensity mainly in ICT allows an intensification of digitalization and its use in an economy (Black et al, 2021, Berson et al, 2004 among others). Moreover, we can also observe a uni directional causality between HC and FDI whereby human capital development encourages the flow of FDI in the country. This result is in line with Fauzel et al, (2017) arguing that MNCs require more professional, technical and managerial skills and thus human capital development will encourage the flow of MNCs in these countries.

5.0 Conclusion

The aim of the study was to assess the impact of digitalization on global value chain participation in the island economy of Mauritius over the period 1980 to 2019. We used a digitalization index constructed through the use of the principal component analysis framework and investigate its impact on global value chain participation in Mauritius. To study this relationship, the present paper employs the VECM method. The results show that indeed digitalization has positively impacted on global value chain participation. Moreover, the results support the importance of human capital as well foreign direct investment boosting GVC participation. Moreso, we observed that the manufacturing sector development has a more significant impact on backward GVC instead on the total GVC participation. Finally, the granger causality test is further adopted to assess any causal relationship between the variables. A unidirectional causality was observed between GVC participation and digitalistion, human capital development and digitalization as well as FDI and digitalization.

Policy wise, the government of Mauritius will have to continue to work towards more legislation to upgrade GVC in the island and benefit from it. For instance, building an investment confidence in the country is imperative and incentives need to be given to

established firms to allow them to upgrade their process, product, and functional capabilities, and moreover encouraging the shift into new and more demanding value chains. To improve GVC participation, policies in terms of further developing the digital base of the country and the development of technical and management skills to elevate productivity is crucial. Moreover, there is also a need to upgrade the product and policy makers can subsidies firms to allow them to make improvement in the quality, aesthetics, functionality, and other characteristics of products being manufactured thereby improving competitiveness. Upgrading the Mauritian manufacturing sector is therefore critical to redesign its foundations, and increasing its capabilities in terms of production complexity- product and process upgrading. Such development will contribute towards better local market opportunities, boosting regional and global exports, and enhance firms to adopt emerging green and Industry 4.0 technologies.

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