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Integration into Global Value Chains and Economic Performance of SMEs in the Beekeeping Sector

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ABSTRACT: The objective of increasing productivity and therefore the wealth created by beekeeping SMEs remains at the heart of the debates. The aim of this paper is to analyze integration into global value chains on the economic performance of beekeeping SMEs, used data collected on a snowball and matched sample of 105 integrated beekeeping SMEs. At the end of the analyses, the student's t test, generally significant at the 1% threshold, shows that a beekeeping SME would gain an average Net Income of (1199155.43 ± 369430.96 FCFA/ha) when it integrates in the international market. Thus, an active beekeeping man-day would earn remuneration of (8327.46825 ± 2565.49278 FCFA/Man-Day) when the beekeeping SME participates in the international market, much higher than what a man-day would earn when the SME participates in the market regional (5248.50503 ± 821.143995 FCFA/Man-Day) and the national market (4399.41 ± 1003.58 FCFA/Man-Day). Finally, from the apparently independent regression (SURE), it appears that the variables, use of a digital IEC platform; the certification of the cash crop, the cooperative organization and the level of education have a positive and significant influence on the economic performance of beekeeping SMEs.

KEYWORDS: Economic performance, global value chains, beekeeping SMEs

1US$ equivalent to 600 FCFA

1. INTRODUCTION

Global beekeeping production has continued to grow to meet ever-increasing food needs (Blanc *et al.*, 2019). According to estimates by the Organisation for Economic Co-operation and Development and the Food and Agriculture Organization of the United Nations (2019), global beekeeping trade has more than tripled in value. According to the same source and over the same period of time (2000-2019), on average, trade in beekeeping products has posted an annual growth rate of over 6%, rising from US$570 billion in 2000 to over US$1,600 billion in 2019 (OECD and FAO, 2019). Changes and modifications in trade patterns clearly highlight the growing importance of emerging economies on global markets (Casadella, 2018). In sub-Saharan Africa, beekeeping and world trade are the backbone of the economy, with a contribution to Gross Domestic Product (GDP) of almost 30% in West African countries and the mobilization of over 50% of the region's working population (IFAD, 2001; Renard *et al.*, 2004; World Bank, 2016). Indeed, based on OECD and FAO beekeeping outlook projections (2019-2028), on the demand for beekeeping products, which will grow by 15% over the next ten years, and taking into account the importance of the continent's population and the availability of arable land; West African countries have embarked on a vast policy to increase beekeeping production and at the same time stimulate trade in the global value chains of beekeeping Small and Medium Enterprises (SMEs) (Annan *et al.,* 2015). In Benin, it has been noted that the inability of beekeeping SMEs in the country's regions, particularly those in the northwest, to add value to their beekeeping wealth and actively participate in global value chains makes this country one whose post-sale value added remains relatively low compared with other northern countries (Dinham, 2003; Lowder *et al*., 2019). Moreover, for Karsenty (2008); Lee *et al.* (2012); Devaux *et al.* (2020), several difficulties are encountered by beekeeping SMEs in Benin to actively integrate global value chains and improve their economic performance (Lutz and Tadesse, 2017). These include: lack of mechanization, poor access to quality inputs, lack of information on modern techniques and the problem of supervision (Lutz and Tadesse, 2017). Despite these problems, some scholars argued that better integration of beekeeping SMEs into global value chains would promote growth in their output and wealth creation (Hind and Bouchra, 2018). Indeed, according to several

scholars, better integration into value chains enable industrialized countries to catch up more quickly and facilitate the achievement of Sustainable Development Goal 2 on eliminating hunger, achieving food security, improving nutrition and promoting sustainable agriculture (Swinnen *et al.*, 2013; Devaux *et al.*, 2020). This unavoidable transition towards global value chains by Beninese beekeeping SMEs deserves consideration of the influence of beekeeping SMEs' integration into global value chains on economic performance. The aim of this article is to analyze the influence of integration factors in global value chains on the economic performance of beekeeping SMEs.

2. THEORETICAL FOUNDATIONS OF THE RESEARCH

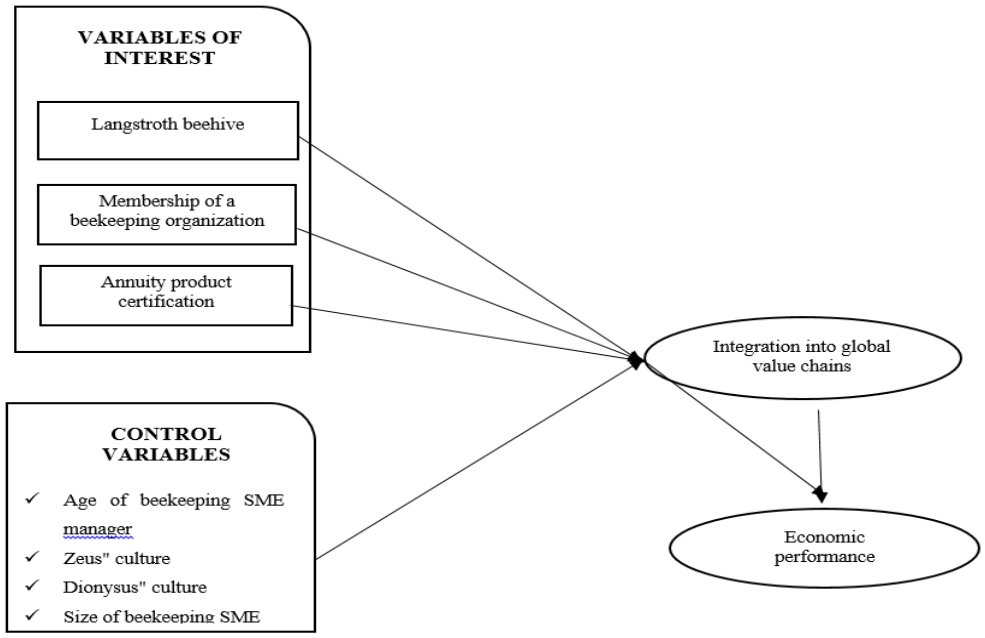
2.1. Internationalization theory

In the literature, internalization theory is fundamentally based on the notion of efficiency (Benito *et al.*, 2019). This theory applied in the context of the integration of beekeeping SMEs into global value chains, assumes that actors involved in these value chains deliberately select efficient modes of governance. Hence, they conduct their business activities in such a way as to minimize production costs (where this is done, with what technology and on what scale) and by governing them (how they are organized, who is involved and how the actors involved are remunerated). What's more, even if in the context of global value chains the actors themselves were disinterested or uninformed about efficiency, competitive forces would tend over time to drive inefficient forms and modes of operation out of the chain. Consequently, efficiency is an axiom of internationalization theory (Benito *et al.,* 2019) and therefore of improved economic performance.

2.2. Synthesis of previous work on the relationship between integration factors and economic performance of beekeeping SMEs

In the literature on inclusive agricultural development, the participation of beekeeping SMEs in global value chains (GVCs) is seen as a promising instrument for realizing income-enhancing opportunities for beekeeping SMEs (Donovan and Poole, 2014; Francesconi and Heerink, 2010; Fischer and Qaim, 2011 ; Markelova *et al.*, 2009; World Bank, 2007; Benito *et al*., 2019; das Nai and Landani, 2020). It is in the same vein that (Barney, 1991; Teece *et al*., 1997; Bonakele, 2020) have shown that economic performance and post-sale wealth creation along the value chain are directed towards the beekeeping SMEs best protected from destructive competitive market forces. Beekeeping SMEs are therefore required to have strategic resources to be able to appropriate a fair share of the added value created (Maertens *et al*., 2012 ; Blare and Donovan, 2018). In addition, some studies recognized that trade in global value chains offers many substantial potentialities to increase the income that derives from its trade and a high labor intensity that could result from increased production (Aksoy and Beghin, 2005; Anderson and Martin, 2005; World Bank, 2008 ; Benito *et al*., 2019). It is for this reason that, in order to achieve a growth in income or net margin that can benefit SME beekeepers, some scholars proposed means and strategies (adoption of technology, development of beekeeping infrastructures, certification of beekeepers' cash products, reorganization of beekeepers into cooperative units) aimed at ensuring better integration of SME beekeepers into global value chains, a guarantee of improved economic performance (Minten *et al*., 2009). For other scholars (Reardon et *al.*, 2003), beekeeping SMEs will benefit more from a skilled workforce and confirmed experts in their respective sectors, which will enable them to produce efficiently and effectively as a result of their integration into global value chains (Pingali *et al*., 2007). In addition, their chances of increasing their economic performance could be multiplied if these beekeepers grouped together in cooperatives, while investing in technological innovations, especially with regard to the acquisition of new methods of integration into global value chains (Reardon *et al.*, 2003).

From all these theoretical conclusions, we present below the conceptual model



3. METHODOLOGY

3.1. Study areas and sampling

Data were collected from the managers of Benin's SME beekeeping companies. The study area covers the Natitingou city (10° 18' 46'' North, 1° 23' 19'' East) and Tanguiéta city (10° 37' 0'' North, 1° 16' 0'' East).

The interest in conducting investigations in this part of the country is explained by its high level of diversified agricultural production. The main activity in the study area is agriculture, in which honey production and marketing is one of the many dominant products (Ahouandjinou *et al*., 2010). For this reason, the sample considered takes into account 105 beekeeping SMEs that are integrated into global value chains in the two communes under consideration.

3.2. Methods for analyzing the economic performance of beekeeping SMEs

In the literature, several methods are used to assess economic performance in beekeeping SMEs (Yabi *et al*., 2012). The most commonly used indicators are Net Margin or Net Income (NI), Average Family Labor Productivity (AFLP) or gross margin and Internal Rate of Return (IRR) (Yegbemey *et al*., 2023). For value chains, performance indicators enable us to compare the economic performance of the different types of market to which beekeeping SMEs have access. Based on the work of Kindemin *et al*. (2019), Sigue *et al*. (2019), the following indicators were determined to assess the economic performance of honey production by SME beekeepers in their access to remunerative markets. Net income or margin was determined according to the following formula :

✓ $MN = PBV - CT$ (1)

With :

MN: Net margin in FCFA/ ha

GVA : Gross Value Product (FCFA/ha)

CT : Total cost in FCFA/ha.

✓ $PML = MN/MOF$ (2)

MN : net income in FCFA/ ha

MOF : family manpower in man-days/ha, defined as the daily remuneration for the work of an adult worker on the beekeeping SME. To quantify family labor, the time spent on each activity was estimated in man-days per hectare, using man-equivalents for women's work (1 Woman-Day = 0.75 Man-Day) and children's work (1 Child-Day = 0.5 Man-Day) (Diagne, 2003; Sigue *et al.*, 2019).

3.3. Specification of a model of the determinants of the economic performance of beekeeping SMEs in their integration into global value chains

To assess the economic performance of beekeeping SMEs integrated into global value chains, considering the simple difference in average results between beekeepers who integrate and those who don't turns out to be an approach posing the so-called selectivity bias problem (Diagne, 2003; Sigue *et al.*, 2019) as at least part of this difference may exist even before integration. Indeed, theoretically, the models that express the relationship between economic performance (P) and the factors (X) that determine it can be in the form :

$$\boldsymbol{P_{ij} = f\left(X_{ij}\right)} \quad (4)$$

With :

- The j index represents the type of performance. In this system, "*j*" can take the values 1, 2 and 3 for three performance indicators: net margin (NM), average family labor productivity (AFLP) and internal rate of return (IRR);
- Index i the producer or beekeeper

Thus, the factors affecting performance indicator j are deduced from the coefficients of $\mathbf{X_{ij.}}$: Then, under the assumption that the nature of the inputs used and the type of labor used are the factors influencing the economic performance of honey production and also taking into account the specification, equation (4) becomes :

$$\begin{cases} P_{1i} = \alpha_{10} + \sum_j \beta_{1j} Z_{ij} + \sum_j \delta_{1j'} A_{ij'} + \sum_{j'} \varphi_{1j''} Q_{ij''} + u_{1i} \\ P_{2i} = \alpha_{20} + \sum_j \beta_{2j} Z_{ij} + \sum_j \delta_{2j'} A_{ij'} + \sum_{j'} \varphi_{2j''} Q_{ij''} + u_{2i} \\ P_{3i} = \alpha_{30} + \sum_j \beta_{3j} Z_{ij} + \sum_j \delta_{3j'} A_{ij'} + \sum_{j'} \varphi_{3j''} Q_{ij''} + u_{3i} \end{cases} \quad (5)$$

With :

- P_1, P_2 and P_3 are the various profitability indicators (NM, AFLP and IRR respectively);
- Z_i variables relating to integration into global value chains;
- A_i search areas
- Q_i socio-economic and demographic characteristics of respondents;

- α_i constant limits; β_j; δ_j, and $\varphi_{j,,}$ the respective regression coefficients of Z_{ij} ; $A_{ij'}$ and $Q_{ij''}$; μ_1, μ_2 and μ_3 the error limits.

Factors affecting economic performance (Net margin, Average family labor productivity, Internal rate of return) in relation to participation in global value chains were therefore deduced from the coefficients and their levels of importance. Furthermore, based on the theoretical framework and the work of Gbaguidi (2015); De Santis (2020); Issor (2017); Ouattara (2007); Goumaz (2019), the exogenous variables of economic performance A_i^* can be modeled as follows:

$$Log(NM) = \alpha_0 + \beta_1 \text{RLANGST}_i + \beta_2 \text{PIEC}_i + \beta_3 \text{OP}_i + \beta_4 \text{UTIFAOC}_i + \beta_5 \text{UTIOCU}_i + \beta_6 \text{UTIFA}_i + \beta_7 \text{ZEUS}_i + \beta_8 \text{DIONYSOS}_i + \beta_9 \text{GSF}_i + \beta_{10} \text{SC}_i + \beta_{11} \text{NR}_i + \beta_{12} \text{RC}_i + \beta_{13} \text{CPR}_i + \delta_1 \text{NATI}_i + \delta_2 \text{TANG}_{i+} + \varphi_1 \text{AGE}_i + \varphi_2 \text{NINSTRU}_{i+} \varphi_3 \text{DRMA}_i + \varphi_4 \text{TAILLE}_t + \varphi_5 \text{NAE} + \mu_i$$

$$Log(AFLP) = \alpha_0 + \beta_1 \text{RLANGST}_i + \beta_2 \text{PIEC}_i + \beta_3 \text{OP}_i + \beta_4 \text{UTIFAOC}_i + \beta_5 \text{UTIOCU}_i + \beta_6 \text{UTIFA}_i + \beta_7 \text{ZEUS}_i + \beta_8 \text{DIONYSOS}_i + \beta_9 \text{GSF}_i + \beta_{10} \text{SC}_i + \beta_{11} \text{NR}_i + \beta_{12} \text{RC}_i + \beta_{13} \text{CPR}_i + \delta_1 \text{NATI}_i + \delta_2 \text{TANG}_{i+} + \varphi_1 \text{AGE}_i + \varphi_2 \text{NINSTRU}_{i+} \varphi_3 \text{DRMA}_i + \varphi_4 \text{TAILLE}_t + \varphi_5 \text{NAE} + \mu_i$$

$$Log(IRR) = \alpha_0 + \beta_1 \text{RLANGST}_i + \beta_2 \text{PIEC}_i + \beta_3 \text{OP}_i + \beta_4 \text{UTIFAOC}_i + \beta_5 \text{UTIOCU}_i + \beta_6 \text{UTIFA}_i + \beta_7 \text{ZEUS}_i + \beta_8 \text{DIONYSOS}_i + \beta_9 \text{GSF}_i + \beta_{10} \text{SC}_i + \beta_{11} \text{NR}_i + \beta_{12} \text{RC}_i + \beta_{13} \text{CPR}_i + \delta_1 \text{NATI}_i + \delta_2 \text{TANG}_{i+} + \varphi_1 \text{AGE}_i + \varphi_2 \text{NINSTRU}_{i+} \varphi_3 \text{DRMA}_i + \varphi_4 \text{TAILLE}_t + \varphi_5 \text{NAE} + \mu_i$$

The coefficients of the variables are to be estimated to obtain directly the elasticity of the factors of integration in global value chains on the economic performance of beekeeping SMEs in the communes considered. The model variables are described in Table 3 below.

Table 3. Description of research variables

Labels	Variables	Nature	Terms and conditions	Expected signs
Variables related to organizational norms				
Langstroth beehive	RLANGST	Discontinued	If Yes = 1; If No = 0	+
IEC digital platform	PIEC	Discontinued	If Yes = 1; If No = 0	+/-
Annuity product certification	CPR	Discontinued	If Yes = 1; If No = 0	+/-
Simultaneous use of family and casual labour	UTIFAOC	Discontinued	If Yes = 1; If No = 0	+
Use of casual labor only	UTIOCU	Discontinued	If Yes = 1; If No = 0	+
Use of family labour only	UTIFA	Discontinued	If Yes = 1; If No = 0	+
Variables linked to operating managers				
Age of SME manager	AGE	Continue	-	+/-
Membership of an SME beekeeping organization	OP	Discontinued	If Yes = 1; If No = 0	+/-
Size of beekeeping SME	SIZE	Continue	-	+
Membership of a financial solidarity group	GSF	Discontinued	If Yes = 1; If No = 0	+/-
Years of experience	NAE	Continue	Quantitative	+
Gender	SEX	Discontinued	Female = 1 Male = 0	+
			0 = None ; 1 = Primary ;	

Education level	NINSTRU	Discontinued	2 = Secondary 1 ; 3 = Secondary 2 ; 4 = Superior ;	+
Variables linked to the farm's cultural norms				
Zeus" culture	ZEUS	Discontinued	If Yes = 1; If No = 0	+
Dionysus" culture	DIONYSOS	Discontinued	If Yes = 1; If No = 0	+

4. RESULTS

4.1. Economic performance indicators for beekeeping SMEs

Table 4 shows comparisons between the various economic performance indicators for national, regional and international markets. Analysis of this table reveals a statistical difference between the different markets considered in terms of gross product by value (t = 134.10; ddl = 209; p = 0.0001); net income or margin (t = 47.04; ddl = 209; p = 0.0001); average net labor productivity (t = 49.24; ddl = 209; p = 0.0001) and internal rate of return (t = 5.99; ddl = 209; p = 0.0001).

Indeed, the gross product in value calculated for all SME beekeepers amounts to (1286190.5 ± 154284.2 FCFA/ha) for the national market; (2917656.4 ± 84716.8 FCFA/ha) for the regional market and (3419060.4 ± 369575.7 FCFA/ha) for the international market. The total cost borne by SME beekeepers in their integration into national, regional and international value chains is respectively (652675.7 ± 47712.5 FCFA/ha); (2161871.7 ± 82058.4 FCFA/ha) and (2219905 ± 1169.9 FCFA/ha). In terms of producer profit, the net margin of SME beekeepers is positive, with an average of (633514.8 ± 144515.9) FCFA/ha) for the national level; (755784.7 ± 118244.7 FCFA/ha) for the regional level and (1199155.4 ± 369430.9 FCFA/ha) for the international level.

Average labor productivity represents the daily wage of an active beekeeper. A beekeeping worker who produces honey earns an average of (4399.41 ± 1003.58) FCFA/HJ for the national level; (5248.50503 ± 821.143995 FCFA/HJ) for the regional level and (8327.46825 ± 2565.49278 FCFA/HJ) for the international level. Honey production is an economically profitable activity from the point of view of producers' daily wages, especially as the average wage of a man-day is equal to 2000 FCFA/HJ, lower than the daily earnings of an active honey producer in a beekeeping SME in the research zone. Turning to the internal rate of return, analysis of Table 4 shows that for all beekeeping SME managers surveyed, the internal rate of return is higher than zero, with an average of (26.90% ± 11.52%). The interest rate charged by the Decentralized Financial Structures (SFD) is 20% in the research area, which is lower than the average IRR obtained (IRR = 26.90%). This implies that honey production is economically profitable in terms of capital investment.

Table 4. Economic indicators of SME beekeeping market integration

Calculated indicators	Marché National	Regional Market	International market	Total	Student's t-test
Gross Product Value (GPV)	1286190.48 ± 154284.15	2917656.38 ± 84716.76	3419060.43 ± 369575.668	2540969.1 ± 202858.859	t = 134.064 ddl = 209 p = 0.000
Fixed cost	411937.62 ± 29156.72	1785158.14 ± 52396.84	1844010 ± 1169.94886	1347035.25 ± 27574.503	t = 22840.523 ddl = 209 p = 0.000
Variable cost	240738.09 ± 45147.85	376713.514 ± 64083.1288	375895 ± 0.0002142	331115.535 ± 36410.3263	t = 22840.523 ddl = 209 p = 0.000
Total cost	652675.71 ± 47712.45	2161871.66 ± 82058.4074	2219905 ± 1169.94886	1678150.79 ± 43646.9354	t = 27496.484 ddl = 209 p = 0,000
Net margin or net income	633514.76 ± 144515.97	755784.724 ± 118244.735	1199155.43 ± 369430.96	862818.303 ± 210730.555	t = 47.038 ddl = 209 p = 0.000
Average net labor productivity	4399.41 ± 1003.58	5248.50503 ± 821.143995	8327.46825 ± 2565.49278	5991.79443 ± 1463.40559	t = 49.236 ddl = 209 p = 0.000
Internal rate of return	30.11% ± 15.11%	16.93% ± 5.11%	33.77% ± 14.45%	26.90 ± 11.52%	t = 5.981 ddl = 209

					p = 0.000

4.2. Determinants of integration into global value chains and the economic performance of beekeeping SMEs

The apparently independent regression results in Table 5 show specifically that variations in the exogenous research variables explain 70.64%, 50.17% and 26.68% respectively of the observed variations in economic performance (for net margin, average labor productivity and internal rate of return respectively). Overall, the three (03) models were significant at the 1% level (Table 5). The Breusch-Pagan test of independence is significant, indicating that the correlation matrix is significant (P = 0.0001). The null hypothesis cannot be rejected, as the models are interrelated. The simultaneous modeling used in this study is therefore well justified.

The economic performance of integration into global value chains is determined mainly by variables linked to organizational norms, the socio-economic and demographic characteristics of the beekeeping SME's manager, the agroecological conditions of the research area and the organization's cultural norms. Thus, several factors influence the integration of beekeeping SMEs into global value chains. These include: information, exchange and communication platform (PIEC); cash product certification (CPR); simultaneous use of family and casual labor (UTIFAOC); use of family labor (UTIFA); colony renewal (CR); age; farmer organization; number of years' experience; gender and level of education. These factors are significant and significantly influence the economic performance of beekeeping SMEs. In addition, local agro-ecological conditions have an influence on beekeeping SME productivity. In fact, the variables IEC digital platform, cash crop certification, use of family labor, age, organization of beekeepers, number of years' experience in beekeeping, gender and level of education positively influence economic performance in terms of net honey production margin (Table 5). With regard to the internal rate of return, the variables certification of the cash product; use of family labor; signing of contracts with particular clients; renewal of colonies; peasant organization and number of years of experience had a significant influence on the internal rate of return of SME beekeepers (Table 5).

Table 5 : Estimation results for the apparently independent regression model

Variables	Net margin		Average family labor productivity		Internal rate of return	
Model summary	Probability (F) = 0.0000 R^2= 0.7064 Comments: 105		Probability (F) = 0.0000 R^2= 0.5017 Comments: 105		Probability (F) = 0.0000 R^2= 0.2668 Comments: 105	
	Coef (t-student)	p	Coef (t-student)	p	Coef (t-student)	p
Constant	110704.4(10.58)	0.000	2518.24(0.40)	0.686	28103.13(3.65)	0.000
Variables related to organizational norms						
RLANGST	846.95(0.52)	0.602	2181.18(2.26)**	0.024	1642.09(1.37)	0.169
PIEC	6642.94(3.69)***	0.000	3908.36(3.65)***	0.000	1340.09(1.01)	0.311
CPR	2961.318(2.22)**	0.026	7444.71(9.38)***	0.000	2014.95(2.05)**	0.040
UTIFAOC	230.0622(0.15)	0.883	2196.77(2.36)**	0.018	1123.38(0.98)	0.328
UTIOCU	162.4921(0.08)	0.937	2966.57(2.42)**	0.015	440.08(0.29)	0.771
UTIFA	4575.582(2.76)***	0.006	1068.79(1.08)	0.280	2334.2(1.91)**	0.056
SC	1738.95(1.05)	0.296	530.63(0.54)	0.592	2230.60(1.82)**	0.068
NR	616.97(0.37)	0.712	778.26(0.78)	0.434	41.115(0.03)	0.973
RC	551.181(0.31)	0.758	619.68(0.58)	0.561	-2909.133(-2.21)**	0.027
Socio-economic and demographic characteristics of beekeeping SME managers						
AGE	3723.51(2.22)**	0.026	248.45(0.25)	0.803	1167.01(0.95)	0.343
OP	13485.13(8.07)***	0.000	1192.31(1.20)	0.231	2964.82(2.41)**	0.016
SIZE	438.14(0.23)	0.817	860.78(0.76)	0.446	1182.13(0.85)	0.397
GSF	567.69(0.37)	0.713	806.50(0.88)	0.380	-1440.54(-1.27)	0.204

NAE	7622.18(4.77)***	0.000	3116.09(3.28)***	0.001	-3201.9(-2.73)***	0.006
GENRE	6268.52(3.66)***	0.000	1119.93(1.10)	0.272	428.87(0.34)	0.734
NINSTRU	3846.46(2.41)**	0.016	1295.94(1.36)	0.173	222.8017(0.19)	0.850
Search area						
Natitingou	8928.705(6.80)***	0.000	544.60(0.70)	0.486	-2382.17(-2.47)**	0.014
Tanguiéta	5722.547(4.01)***	0.000	478.20(0.56)	0.574	-718.38(-0.68)	0.494
Variables related to the cultural norms of the beekeeping SME						
ZEUS	962.7813(0.55)	0.582	73.360(0.07)	0.944	-582.51(-0.45)	0.651
DIONYSOS	2183.471(4.25)***	0.002	678.22(4.65)***	0.005	-744.09(-0.58)	0.563

***: value significant at 1% (P≤0.01); **: value significant at 5% (0.01< P≤0.05); *: value significant at 10% (0.05< P≤0.10).

5. DISCUSSION

To stay in the market, family farmers need to develop products that have a demand, or seek demand for the products they already produce. In the case of honey, the solution is the global value chain market (Da Silva, 2018). Moreover, in order to enter the international market, it is necessary to comply with all the rules established by this trade. In such a context, the implementation of a digital platform remains necessary and fundamental. Indeed, according to (Loebbecke and Picot, 2015; Schmidtv *et al*., 2017), a number of skills are required for beekeepers to be sustainably integrated into the global market, and more specifically into a *global value chain* (GVC) to improve their economic performance. From the results obtained, it emerges that the use of an information, exchange and communication platform could have an influence on integration into global value chains, but would also positively influence net margin and average net labor productivity.

For Case (2016) and Florence (2016), the use of platforms by beekeeping SMEs is part of the logic of digital revolution where all beekeeping SMEs should use it to improve business operations, invent new (digital) business models, refine business intelligence and dialogue with customers and stakeholders through new (digital) channels. This assertion echoes that of (Loebbecke and Picot, 2015; Schmidtv *et al*., 2017) who indicate in their study that, product information is not always the main requirement of customers when they visit SME digital platforms, but access to the beekeeping product to buy it is. This corroborates the research of (Brad *et al*., 2002) who, based on a sample of 1,607 SME promoters, analyzed the market share of SME promoters who switched from telephone to online trading during the 1990s. They concluded that SMEs that switched from telephone trading to the use of digital online platforms performed well, and saw their market share increase by more than 2% per year.

Seemingly independent regression analyses (SURE) also show that cash product certification has a positive and significant influence on net margin and net labor productivity. Indeed, with the emergence of beekeeping SMEs, managers are witnessing new opportunities that can potentially improve their economic performance and lift them out of poverty (Babah Daouda *et al*., 2016; Babah Daouda *et al*., 2019). To achieve this, cash crop certification becomes a necessity. Based on a sample of 36 people within the AMADIR company; the work of (El Kahri *et al*., 2014) using univariate analysis showed that 57% of respondents consider product certification to be very important for the competitiveness of beekeeping SMEs, against 29% who do not find its impandortance. Similarly, 68% of those interviewed reported a high level of sales after implementation of the certification system (Rolland, 2009).

These results contradict those of (Abouzaid *et al*., 2022), who noted the negative effects of cash crop certification. Indeed, for its scholars, the cash product certification process can increase the workload for staff, to the detriment of their main tasks necessary for the smooth running of the beekeeping SME, and without monetary compensation (Gonzales and Nair, 2004; Rosly *et al*., 2007; Abouzaid *et al*., 2022). Other scholars (Moreland and Clark, 1998; Berghe 1998; Moreland and Clark 1998; Chiarini, 2015) find that the cash product certification process could create the phenomenon of bureaucracy. Thus, to certify the product, the beekeeping SME is obliged to comply with the various procedures and registrations built into the system, sometimes to the detriment of the efficiency of market processes (Bevans-Gonzales and Nair, 2004; Moreland and Clark, 1998).

6. CONCLUSION

The aim of this study was to analyze the influence of integration factors in global value chains on the economic performance of SMEs in the beekeeping sector. Indicators such as information, exchange and communication platforms; cash product certification; cooperative organization of beekeeping SMEs; age, level of education, number of years of experience, agroecological conditions of selected localities and Dionysos business culture showed positive results on the economic performance of beekeeping SMEs.

In other words, they are profitable. Innovative practices for integration into global value chains further confirm these links. From these results, we can see that family beekeepers are playing an increasing role in the enhancement and protection of natural resources through integration into global value chains, and in turn in improving economic performance. When properly accompanied, they can contribute to preserving biodiversity through farming practices that increase soil organic matter levels, reduce erosion or help protect endangered species.

Moreover, SME beekeepers also need to develop their skills through practices such as ongoing training, application of their learning, information sharing, certification of the product obtained and communication between farmers, enabling the development of bonds of trust. Skills development is also crucial if farmers are to learn to innovate and integrate new production and management techniques. None of this will be possible unless small and medium-sized beekeepers are integrated into a cooperative, so that the latter can enter the global market and create value for its members. Similarly, it's important for beekeeping SME managers to be aware of the activities to be carried out, and to develop a "process" vision. A "process" vision means that they understand that individual action interferes with the overall result, positively or negatively. It is important to emphasize the role of the leader and his or her level of corporate culture in this process. From a theoretical point of view, this research based on a conceptual framework makes important contributions, including improving the framework for the evolution of beekeeping SMEs, based on a more accurate definition and characterization; understanding the organizational norms and socio-economic and demographic characteristics that will be available to the beekeeping SME as it integrates into global value chains; and gaining a better understanding of the skills needed for a beekeeping SME to succeed in global value chains, based on the development of competencies and know-how.

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