

# **The determining factors of productivity and competitiveness from the perspective of territorial and sustainable development**

## **Factores determinantes de la productividad y competitividad desde la perspectiva del desarrollo territorial y sostenible**

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### Abstract

In the present research work, it is identified the determining factors of productivity and the competitiveness in the province of Tungurahua (Ecuador) from the territorial and sustainable development perspective, through the use of three techniques: the individualized interview, the focus group and the survey of the different representative territorial actors, coming to the conclusion, in this case, that the driving factors are: the human capacities, the politic and economic environment, the financial capital, the business capital, the natural capital, the technology capital, the institutional capital, the social capital, and the infrastructure capital. This study contributes with information and results that can be used as input in the elaboration of public policies, aimed to promote the provincial productivity and competitiveness.

**Palabras clave:** development, economics, productivity, competitiveness, qualitative methods, Ecuador.

JEL: O12, O18, E23, B41, Q01, R11.

### Resumen

En el presente trabajo de investigación, se identifican los factores determinantes de la productividad y competitividad en la provincia de Tungurahua (Ecuador), desde la perspectiva territorial y del desarrollo sostenible, mediante el uso de tres técnicas: la entrevista individualizada, el grupo focal y la encuesta a los diferentes actores territoriales representativos; se concluye, en este caso, que los factores impulsores son: las capacidades humanas, el entorno político y económico, el capital financiero, el capital empresarial, el capital tecnológico, el capital institucional, el capital social y el capital de infraestructura. Este estudio contribuye con información y resultados que pueden ser utilizados como insumo en la elaboración de políticas públicas, encaminadas a promover la productividad y competitividad provincial.

**Keywords:** desarrollo, economía, productividad, competitividad, métodos cualitativos, Ecuador.

JEL: O12, O18, E23, B41, Q01, R11.

# 1 Introduction

The development is seen as a process and a way of personal and collective life in permanent construction, and characterized by the deployment and synergistic interaction of the capacities and potentialities of a given territory and oriented towards a quality of life freely chosen by the actors of the territory —which include the economic, social, territorial, endogenous and environmental areas—, and that allow and promote the personal well-being in society, the equality, the equal opportunities, the cultural diversity and a harmonious relationship with nature (Flores-Tapia 2019, Vázquez-Barquero & Rodríguez-Cohard 2018). From this perspective, in the present investigation, it is analysed productivity and competitiveness as determining factors of a comprehensive, territorial and sustainable development and beginning with the conceptualization of productivity and competitiveness that also have the characteristic of being comprehensive, territorial and sustainable and through the application of three techniques —individualized interview, focus group, and survey of the different representative territorial actors— to identify the determinant factors of productivity and competitiveness in the province of Tungurahua (Ecuador, Latin America).

However, the province under study occupies an intermediate position in terms of the levels of productivity and competitiveness with respect to the other provinces of Ecuador (BCE 2020), thus, wasting the endogenous potentialities and the construction of territorial capacities that would allow it to have a better performance at the national economy level and with better results for the quality of life of its population. This situation is due, in part, to endogenous and exogenous factors that affect the low productivity and competitiveness of the Tungurahua province. The former may be related to natural resources, human resources, existing technology in the territory, its historical-social trajectory, the management model, and the business structure, among others (Tomás Carpi 2008); the second, exogenous factors, may refer to the national macroeconomic context and the situation of external markets in the globalized world of the 21<sup>st</sup> century (Flores-Cevallos & Flores-Tapia 2020, Porter 1990).

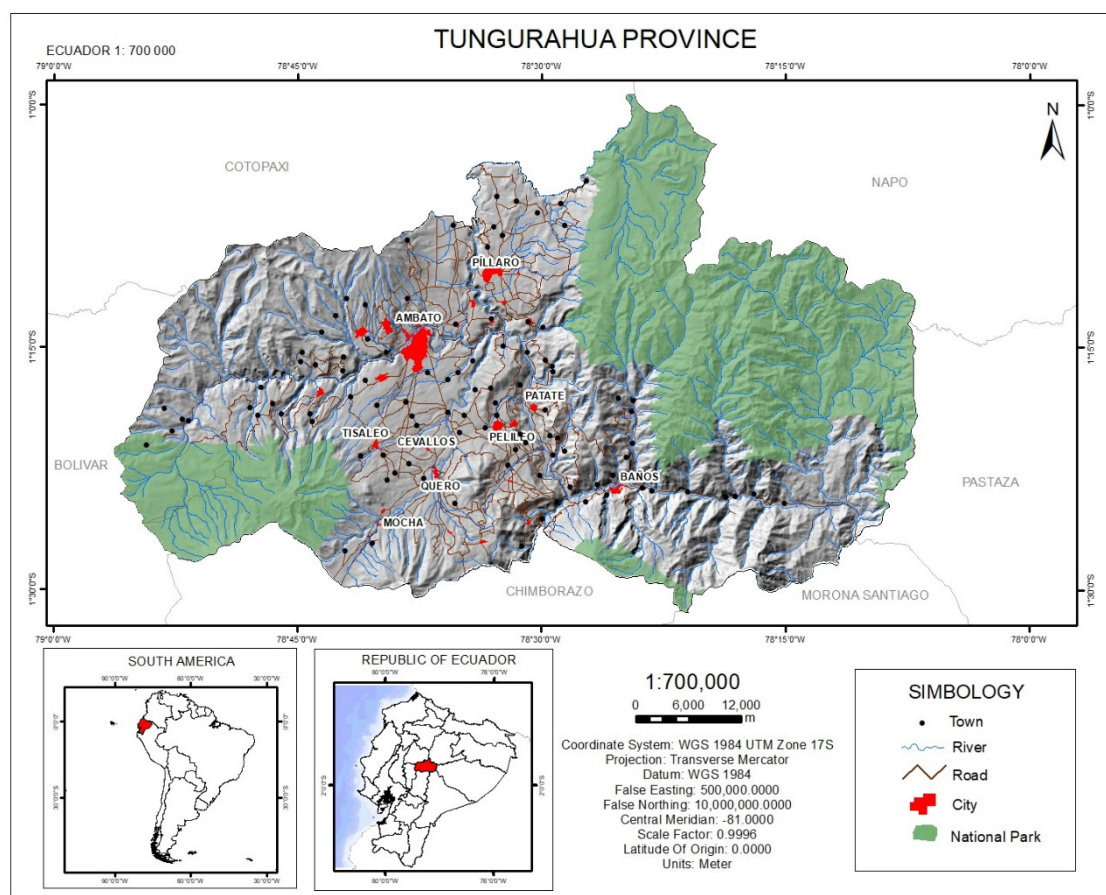
Having said that, the objective of this research work is to identify the endogenous determining factors of productivity and competitiveness that are closely linked to the comprehensive, territorial, and sustainable development process in the province of Tungurahua.

In this context, the study contributes with information and results that can be used as input in the elaboration of public policies aimed to promote the productivity and competitiveness of Tungu-

rahua, closely linked to the National Development Plan of Ecuador (Secretaría Nacional de Planificación y Desarrollo 2017b), to the Sustainable Development Goals (United Nations 2020) and to the territorial potentialities of the other provinces of the country, that can be specified in clusters, networks and productive chains.

## 2 Territorial characterization of the province of Tungurahua

This work is focused on the province of Tungurahua, which it is located in the central highlands of the Ecuador (Map 1), with a projected population of 590,600 habitants for the year 2020 (INEC 2021). It consists of 9 counties and 44 rural parishes. It is the second smallest province of Ecuador by area, with 3,369.40 square kilometres, which represents the 1.24% of the national territory (Gobierno Provincial de Tungurahua 2015a).



**Map 1**

Province of Tungurahua, geographical location

Source: self-prepared, from the map of the GAD Provincial Tungurahua (2020).

The natural areas correspond to the 49.2% of the total provincial territory, which makes it the holder of a significant natural

capital for the promotion of ecological tourism, applied research and environmental conservation services, among other activities. Hence, the integrating element of the territory of the province of Tungurahua in productive aspects and human settlements is the territorial system of the upper basin of the Pastaza River, with an approximate extension of 8,257 square kilometres, which corresponds to 3% of the total area national. Additionally, the potential of this water resource has allowed the development of hydroelectric production; thus, the province has three hydroelectric power generation plants, with an average annual production capacity of 229 megawatts, contributing to the 5.7% of the national installed capacity (Corporación Eléctrica del Ecuador 2020) (Map 1).

Some basic figures about the province under study are: the population of the province of Tungurahua represents the 3.5% of the national population, which is 15,012,228 habitants; the illiteracy rate is 7.47%, which is above the national average of 6.75%; the economically active population represents the 4.2% of the total national active population, which is 8,054,595 habitants; the unemployment rate is 3%, and the underemployment is 16%, which is less than the national average of 5 and 20%, respectively (INEC 2021).

Among the productive activities in the province, the following are the most important: agriculture (26.94% of the EAP), manufacturing (18%), and commerce (16%). It is significant to note that 39.46% of the population in Tungurahua do not work under dependency; therefore, we identify the self-management of employment capacity in the province as one of its strengths. As per the social indicators, the urban poverty reaches to a 55.56% and rural poverty at 44.44% (GAD of Tungurahua 2015, GAD Provincial Tungurahua 2020).

The province of Tungurahua reported in 2016 a gross production of \$4,7 billion US dollars, and a gross value added reached \$2,6 billion US dollars. In 2016, it contributed with a 2.8% to the national GDP or \$2,8 billion US dollars, ranking 9<sup>th</sup> among the 24 provinces of Ecuador and a *per capita* GDP of \$5,002.94 US dollars, which is a slightly lower value than the national average (BCE 2020a) (Table 1).

Provinces	GDP provinces (thousands USD)	GDP percentage of total (%)	GDP per capita (USD)	Gross value added total (thousands USD)	GDP other elements (thousands USD)	Population (2016)
Pichincha	27,123,656	27.50	9,029.78	25,270,011	1,853,644	3,003,799
Guayas	26,801,873	27.18	6,462.96	24,970,220	1,831,654	4,146,996
Manabí	6,400,634	6.49	4,237.78	5,963,212	437,423	1,510,375
Azuay	5,084,420	5.16	6,165.58	4,736,948	347,472	824,646

Provinces	GDP provinces (thousands USD)	GDP percentage of total (%)	GDP per capita (USD)	Gross value added total (thousands USD)	GDP other elements (thousands USD)	Population (2016)
Los Ríos	3,765,182	3.82	4,293.68	3,507,868	257,314	876,912
El Oro	3,433,568	3.48	5,043.10	3,198,916	234,652	680,845
Esmeraldas	3,144,676	3.19	5,164.47	2,929,768	214,909	608,906
Orellana	2,920,432	2.96	19,054.2	2,720,849	199,584	153,269
Tungurahua	2,822,957	2.86	5,002.94	2,630,034	192,922	564,260
Chimborazo	2,093,459	2.12	4,134.62	1,950,391	143,068	506,325
Santo Domingo	1,958,000	1.99	4,586.45	1,824,190	133,811	426,910
Imbabura	1,918,346	1.95	4,249.05	1,787,245	131,101	451,476
Loja	1,903,310	1.93	3,800.58	1,773,237	130,073	500,794
Promedio	4,108,915.5	4.17	5,443.71	3,828,110.1	280,805.37	687,088.45
Total	98,613,972	100	5,980.18	91,874,643	6,739,329	16,490,123

**Table 1**

GDP and GDP *per capita* – selected provinces (2016)

Source: self-prepared, from Cuentas Nacionales del Banco Central del Ecuador.

Additionally, the analysis of the main hydrographic and orographic conditions of the province of Tungurahua partially corroborates what Moncayo (2016b) has said, in that the presence of geophysical factors have prevented an adequate expansion in the domain of space and that the geographical gaps have influenced the dispersed settlement of the population, generating isolated nuclei of power and delaying communications, making isolation the predominant characteristic of Ecuadorian development. However, the inhabitants of the province of Tungurahua have managed to reverse this situation through the improvement of entrepreneurial skills applied to trade, agriculture, construction, and the implementation of manufacturing industries, mainly (Martínez & Clark 2013).

It is important to note that, as the province of Tungurahua is strategically located in the centre of Ecuador, at the same distance from the two main economic poles of the country, Quito and Guayaquil, the road network implies advantages for the structuring with other national territories and greater ease of access to ports and airports for the exportable offer of Tungurahua. If we add to this the network of fairs and markets and the transport and storage

capacity it has, it can become, in a medium term, an attractive province for the implementation of new industries, due to lower transport costs and the reduction in the travel times, of raw material, intermediate products and final goods (Gobierno Provincial de Tungurahua 2015b).

Once the physical aspects of the province of Tungurahua have been reviewed, the hydrographic and orographic wealth stands out, as well as the diversity of climates, flora, and fauna, being these important comparative advantages that can become competitive advantages if they are appropriately promoted by a successful improvement policy of productivity and territorial competitiveness. Likewise, the road network that the province has becomes a key resource for the internal mobility and trade of products, as well as towards the other provinces and regions of Ecuador.

In that context, this province has been selected because it has an average level of impact to the national economy, which will allow us to use it as a pilot study experience, to compare it with the more productive areas and to contrast it with the less productive areas likewise, economically speaking. In addition, the province of Tungurahua is characterized for having a favourable territorial diversification of economic activities in the agricultural, manufacturing, industrial, and services sectors. The comparative advantages tied to the human capital and the joint effort among the private sector, the public institutions and the Academia can provide scenarios and mechanisms of endogenous sustainable development, which are linked to the national development plan and the redirecting of the productive matrix, which has been established in the national policy guidelines for productive development (Ministerio de Coordinación de la Producción, Empleo y Competitividad 2010, Secretaría Nacional de Planificación y Desarrollo 2017a).

### 3 Theoretical framework

From the economic point of view, some productivity definitions are considered, among which the following can be highlighted: Samuelson and Nordhaus (2010, p. 116) note: «Productivity, a term denoting the ratio of output to inputs. Economists typically look at two measures of productivity. Total factor productivity is output divided by an index of all inputs (labour, capital, materials...), while labour productivity measures output per unit of labour (such as hours worked). When output is growing faster than inputs, this represents productivity growth». Mankiw (2012, p. 536) defines it as «quantity of goods and services produced for each unit of labour». Krugman and Wells (2015, p. 688) establish that «long-run economic growth depends almost entirely on one ingredient: rising productivity [...]». The term labour productivity, or productivity for

short, is used to refer either to output per worker or, in some cases, to output per hour [...]. For the economy as a whole, productivity—output per worker—is simply real GDP divided by the number of people working». The common ground of these concepts is the search for efficiency in the production of goods and services and they involve the productivity of the factors and resources used in the possibilities of economic growth.

Now, from the perspective of the concept of comprehensive, territorial and sustainable development, productivity is defined as «[...] the relationship between the production of goods and services that are obtained out of a particular production system and the resources used to obtain it, that is, work, capital, energy, materials, land, information and time» (Alburquerque *et al.* 2008, p. 31). Therefore, productivity goes beyond the technical and managerial aspect; are the attitudes towards work, the participation of the workers in the planning of the company, in the implementation of the processes and, above all, in the distribution of the profitability obtained from the productive, business, and social framework in the territory, which is what makes the difference with the traditional concept of productivity. And, in this regard, the territorial-historical, social, cultural, labour, business, institutional, and geopolitical specificities, among others, play a key role.

The territory is conceived as an agent that fosters the articulated interconnections between companies, organizations, and economic and social actors. The territorial development cannot be posed as a functional issue, nor as a summation of various individual components, but rather as an integrated system, where the different forces of development—institutional change and adaptation, flexible organization of production, urban development of the territory, diffusion of innovations and knowledge, institutional change and adaptation—, they interact with each other, developing synergies between them and favouring economic and social growth, by promoting, among other aspects, the productivity and competitiveness of the production systems (Vázquez-Barquero & Rodríguez-Cohard 2015).

On that sense, «there is general agreement that increasing productivity and competitiveness are objectives that should guide the process of structural change in local economies» (Vázquez-Barquero 2005, p. 12).

It is important to note that this comprehensive, territorial and sustainable perspective in the economic, social, endogenous territorial, and environmental areas of productivity aims to reduce poverty and inequality (Piketty 2014; Sen 2009, 2012), to the extent that the territory advances towards a productive matrix that endogenously generates jobs, favours access to technology, the appropriation of the knowledge and the sharing of the results among the various actors of the territory.



Another matter to which the thinkers of comprehensive, territorial, and sustainable development pay special attention refers to the drivers of productivity. They say that the driving factors of productivity have to do with reducing costs but also with the quality, the capacities to appropriately satisfy the demand, and the commitment of workers to the production, the higher qualification of human resources, the forms of production and sustainable innovation, the productive differentiation, the eco-efficient technologies and, mainly, the improvement of the work environment (Crespi *et al.* 2014).

From the previous, we can conclude that productivity and competitiveness are inseparable concepts in the context of a comprehensive, territorial and sustainable development vision, being the concept of productivity inherent to that of the concept of competitiveness, since both are based on a series of endogenous capacities of their shared territory, highlighting among others the human capital, natural resources, labour market, social capital, business capital, technology and innovation, among others (Flores-Tapia 2019, Vázquez-Barquero 2007).

From the endogenous territorial approach, Alburquerque *et al.* (2008b, p. 15) define the competitiveness of a company or group of companies as:

[...] its ability to maintain or increase its presence in the markets, or to open new markets. It is a term that has a comparative and contextual meaning, that is, it refers both to the competitiveness of a company in relation to competing companies in the markets, and to the socio-institutional and territorial context from which the company or group of companies deploy their competitive activity.

Along those lines, the competitiveness is a determining element in a comprehensive, territorial and sustainable development, which isn't based on low prices or low costs, nor on the availability of natural resources, let alone on exchange rate depreciations and low rates, but instead in the technology adaptation, quality, human talent, knowledge, management, design, information, systems, marketing and other tools that generate territorial competitive advantages (Deming 1986, Porter 2015, Vázquez-Barquero & Rodríguez-Cohard 2018). The territory appears as the main source of specific resources for the technological advancement itself and the generation of synergies and collaborative institutional networks. The territory in the context of globalization requires strategic approaches to redirect productivity and competitiveness (Beugelsdijk *et al.* 2018, Cuervo 2006).

Attention should also be drawn to the fact that the driving factors of productivity, which in turn support competitiveness (Alburquerque & Pérez 2013, Fernández-Arias & Rodríguez-Apolinar 2016), may have a territorial impact at the microlevel through the improvements induced in the company or in the production

chain; at the mesolevel, through conditions of territorial competitiveness, social capital built by the actors, institutionalism, public-private alliances, and efficiency of the public administration; at the macrolevel, we have the public policies, regulations, business cycles and international competition that play a powerful driving role; and, at the metalevel, it is related to business values and organizational culture, socially responsible entrepreneurship and social cohesion (Prokopenko 1989), showing that the development of capacities and potentialities of the territory creates a favourable environment to productivity and competitiveness and that, when significant differences are established and promoted in terms of productivity and competitiveness factors, competitive advantages are accomplished, thus contributing to the sustainability of the endogenous development.

However, to fully understand the dynamics of competitiveness, this study appeals to the diamond model of Porter (1990). The interactive aspects in this dynamic are the conditions of the production factors, the demand, the organization of the productive system, and the institutional and regulatory environments. The territory must be also incorporated into this proposal as a decisive actor in the competitive advantage from a comprehensive, territorial and sustainable approach (Pérez-González & Jiménez-García 2012, Max-Neef 1991). As a consequence of this interaction, arises the concept of competitive advantages resulting from the deliberate effort of companies and countries to innovate, differentiating itself from the so-called «classical comparative advantages» of the Heckscher-Ohlin model (Ketels & Keller 2015, Krugman *et al.* 2015).

Additionally, the construction of business competitive advantages is done based on internal and external factors. It is important to distinguish that business external factors are such with respect to the companies themselves, but that they are internal to the territory. Otherwise, the endogenous nature of the process is lost (Cardona *et al.* 2013, Álvarez & Rendón 2010, Canzanelli 2004).

Likewise, Albuquerque *et al.* (2008, p. 28), in addition to the concept of *competitive advantages*, also link the concept of *acquisition of competencies* to the territorial competitiveness:

Competitive advantages refer to those elements that allow companies and the territory where they are located to positively differentiate their offer with respect to that of their competitors, while competencies are the skill set, experiences and knowledge that allow the companies and the territory to develop and consolidate their offer.

On the other hand, there are several ways to promote associative territorial strategies aimed to obtain the competitive advantages, highlighting among them the productive integration projects, which can be classified according to the levels of appropriation ben-

efits resulting from the collective actions and the type of business relationship among them, thus creating the so-called «local production systems» —low appropriation and horizontal relationship—, clusters —low appropriation and vertical relationship—, horizontal networks —high appropriation and horizontal relationship—, and vertical networks —high appropriation and vertical relationship— (Dini *et al.* 2005).

## 4 Materials and methods

The involvement of the different territorial actors is necessary to identify the territorial capacities and, with it, the forces that can drive the development of the province. Therefore, in the process of gathering information from the primary sources to identify the determining factors of productivity and competitiveness in the province of Tungurahua, three techniques are used in this work: the semi-structured interview, the focus group, and the survey. The individualized interview and the focus group are applied to a sample of actors representing the public sector, the private sector, and the Academia of the province of Tungurahua, which are predisposed to collaborate with the research, while the survey is applied to a sample of actors representing the business sector, as well as to a sample of the citizens of the province.

The qualitative techniques used in this study are utilized to obtain and show results in terms of subjective assessments; thus, from the perspective of the actors involved in the productivity and competitiveness of the territory, in such a way that we can reach the objective of the present research: identify the endogenous determinants of productivity and competitiveness articulated to the process of integral, territorial, and sustainable development of the province of Tungurahua.

The individualized interview is developed through a conversation with a particular purpose or intention that is set based on research objectives (García *et al.* 1986, Rubio & Varas 2004, Yin 2014), while the focus group intends to gather points of view, attitudes, feelings and emotions that occur during the interaction between the participants on a topic proposed by the researcher, in order to obtain a multiplicity of perspectives in the group (Escobar & Bonilla-Jiménez 2009, Mella 2000, Besser & Hanson 2004, Yin 2014). The opinion poll technique is defined by Hernández Sampieri *et al.* (2014, p. 165) as «non-experimental cross-sectional or transactional descriptive or correlational-causal research».

The focus group technique is applied to two different groups of people representing the public, private and academic sectors. Then, to cover all the analysis categories, an individualized inter-

view is designed and applied, which consists of a questionnaire that covers deeper each of the selected variables or factors related to territorial productivity and competitiveness.

The variables or specific factors considered in the design of the semi-structured questionnaire for the interview and the focus group are based on Tomás Carpi's model of territorial capacities, namely: infrastructure and logistics capital, human capital, natural capital, technological capital, urban capital, institutional capital, financial environment, political and economic environment, and business capital (Tomás Carpi 2008).

The sample data selection criteria for the individualized interview are as follow: people eighteen years old of age or older, actors with a proven track record of public, private, or academic representation in the province of Tungurahua and their availability to participate in the research. The number of interviews applied are taken in function of the coverage reached or saturation of the analysis categories (Table 2).

Technique	Primary source of information	Number of interviews/surveys
Semi-structured interview	Public sector	
	Private sector	58 interviews
	Academia	
Focal group	Local public service workers or deconcentrated entities workers, private sector representatives and Academia personalities	2 focal groups (6 and 7 participants, respectively)
Survey	Citizens	384 surveys
	Productive sectors	381 surveys

**Table 2**

Techniques and primary sources of information for the identification of the determining factors of productivity and competitiveness –Tungurahua (2019)

Source: prepared by author.

The participants in the first focus group come from the Academia and the public sector, all with a master's degree, five of them being of the male gender and one of the female gender. The participants of the second focus group come from the private sector, the public sector, and the Academia, all with a master's degree, four of them being of the male gender and three of the female gender.

The number of people interviewed is 58 —42 belong to the male gender and 16 belong to the female gender—, working at management positions with high responsibility, of which 37 belong to the private sector, 12 to the public sector and 9 to the Academia.

We applied 384 surveys to citizens, with a structured questionnaire, that consists of questions organized into the following categories: infrastructure, human talent, natural resources, technology, institutions, management, financial environment, political and economic environment, and business capital. We proceed to use a stratified random sampling with proportional allocation by cantons. Similarly, 381 surveys are applied to representatives of the productive sector of the province of Tungurahua, taking into account a simple random sampling. In both cases, the population used for the calculation of the sample is finite and a margin error of 5% is considered, with a confidence level of 95%, in addition to double tailed. The data are tabulated and analysed by descriptive and inferential statistical techniques, using the Excel statistical package.

## 5 Results and discussion

The representative actors participating in the focus group, as well as the people interviewed, which are associated to business activities in the province of Tungurahua, identify the infrastructure, the human talent, the natural resources, the technology, the institutionality, the management capacity, the financial environment, the political and economic environment, and the business capital as the determining factors of productivity and competitiveness.

Next, we proceed with the characterization of each of the productivity and competitiveness variables obtained because of applying the individualized interviews and the focus group technique to the different territorial actors.

The *infrastructure* variable in the province of Tungurahua, according to the criteria of the interviewees and the participants of the focus group, is characterized by an excellent roadway network, a very good electrical energy system, drinking water, sanitation, fuel supply and good operation of the telecommunications, that favour the productive and commercial processes of the businesses. If we compare it with other provinces, the current state of the infrastructure and the resources of productive assets is one of the best in the country, surpassed only by Pichincha, Guayas and Azuay, in which the Central Government has made historically greater investments (SENPLADES 2020):

It is a very important variable within the productivity issue, since having good roads, good access, having telecommunications, having assets that

are really productive is very important [...]. Above all, in rural sectors we have roads that are fully paved, easily accessible, allowing fluidity, not only in transport, but also in products and raw materials (Interviewee 2.21).

With respect to the *human talent* factor, the participants in the focus group and the interviewees highlight the existence in Tungurahua of a labour market with qualified personnel and with a mindset and favourable attitudes to work —mainly in the leather and footwear, textiles, agriculture, retail commerce, metalworking, and auto bodywork sectors—. Nevertheless, they consider necessary the implementation of continuous training processes —with greater coordination between the Academia and the productive sectors—, working towards a greater specialization to make the local productive system a sustainable one, provided mainly by the permanent advances in technology, materials, and production processes.

In addition, the investments made by the Central Government and the efforts of the local autonomous governments have favoured better health conditions, nutrition, and access to education at all levels, which are key aspects to achieve higher levels of productivity in the province. The interviewees acknowledge that the training programs offered by the universities and by the public and private companies have contributed to acquiring and improving the managerial, productive, and commercial skills set of the labour force.

The former implies that the human capital of the province of Tungurahua is an endogenous variable that contributes to the improvement of productivity and territorial competitiveness, although its current situation is simply not optimal enough to generate sustainable competitive advantages in the provincial productive sector, as stated by one of the interviewees below:

I consider that the people of Tungurahua have very good attitudes regarding labour; there are people who have initiative and thus that has helped a lot to the development [...]. The province has the largest production in the auto bodybuilding sector and in the footwear sector. This has made that many people have decided to specialize in these areas. But I consider that much is lacking in the other sectors; the selection of a specific productive specialization area must be a synergy effort between the university's academic offering and what is needed by the productive system (Interviewee 1.3).

The participants of the focus groups and the interviewees perceive that the *natural resources* (Gobierno Provincial de Tungurahua 2015b) that the province has are an endogenous resource that has allowed the development of a series of economic activities such as agriculture, livestock, hydroelectric power generation and tourism, among others. They stand out as natural strengths of the territory the quality of its soil for agricultural purposes and livestock needs, the water resource both for irrigation and for hydroelectric power generation and its use for industrial processes, raw material for the construction industry, the wood for the construc-

tion work and furniture design industry, the landscape and natural tourist attractions —volcanoes, rivers, lakes, highlands...—, which have favoured the local, and international tourism and the geopolitical location has been strategic for the domestic trade.

It has also been pointed out that the lacking of a greater use of natural resources is largely due to the fact that the people of Tungurahua have focused their economic activity primarily on domestic trade, but also to other causes, such as the lack of effective incorporation of leading edge techniques and qualified knowledge in the agroindustrial processes and in the lack of introduction of eco-efficient technologies, as well as the high vulnerability of the province to natural risks, such as volcanic eruptions and earthquakes, and to climate changes effects such as landslides, recurring floods and droughts. The following intervention by a territorial agent on the perception of the *natural capital* variable and its impact on territorial productivity and competitiveness serves as an example:

We can mention as an advantage for the province of Tungurahua its climate that favours its horticultural production all year round and its strategic geographical location in the centre of the country, for the supply chain and the distribution of the same [...]. Its topography allows the cultivation of its entire territorial extension [...]. In the disadvantages, it can be pointed out that at certain seasons of the year the presence of frosts and hailstorms may damage the production [...]. The river flows can cause flooding (Interviewee 1.16).

The *technology* is perceived by the participants in the focus group and the interviewees also as a key factor in the productivity and competitiveness of the province of Tungurahua. In this regard, they consider that, although a significant number of large companies in the sectors of vehicle assembly, auto bodywork, leather and footwear, textiles, glass production, and agroindustries, among others, strive to incorporate technology into their production processes and seek to become certified under existing quality norms, this is not an easy task, nor an economical one because, since its internal technological capacity is very scarce, and it must be acquired outside the province, creating a dependence on the territory towards its external environment. The interviewees and participants of the focus group also state that the research and development, and the technology appropriation, as well as the innovation in equipment, materials, products, and processes in the productive sector need to be strengthened.

Additionally, the interviewees and participants of the focus group highlight that the disadvantage with respect to other better positioned national territories such as Quito, Guayaquil and Cuenca is particularly marked by the technological capacity and accessibility that these territories take on their favour —they have technological distribution networks and a much more specialized human talent—, and because the businessmen of the aforementioned cities

own a greater vision of the impact of technological investment on production than the businessman from Tungurahua, thus showing the territorial inequalities in this regard. They exhort for a greater involvement of the local Academia with the productive sectors and vice versa, to address the specific requirements of the territory in innovation and the most suitable academic offer of specialized technological training for the entrepreneurial business talent in Tungurahua:

The productivity levels would increase with the adaptation of technologies within the companies, but unfortunately here in the province very few companies have that vision of investing [...]. In fact, here there are companies that are over fifty years old and continue to maintain the same processes that they had when they started and did not improve their productivity levels (Interviewee 2.21).

At the *institutional* level, according to the focus group participants and interviewees, is characterized by the presence of local and decentralized entities, that have better conditions in systems, infrastructure, and human talent, among others, in comparison to previous decades. However, the process of building the institutional framework related to the capacity for coordination, social animation and strategic coordination of local actors must be improved. The institutional framework must focus its efforts on strengthening the guarantee of rights, the sectoral integration in the territory and reducing social gaps —particularly in the rural sector.

It is highlighted the productive-commercial skeleton, which is characterized by the development, and presence of family businesses and enterprises constitutes an asset (INEC 2021); however, it is not able to create a collaborative and inclusive business network. It is recognized that the public and private institutionality in Tungurahua has promoted and facilitated the deployment of the productive and commercial entrepreneurial talent of its population, a criterion that does not extend to the institutionality of the Central Government, because the actors of the territory perceive macro policies —particularly tax related— and corruption acts that discourage the local businessman:

During the last years, we have seen a great performance and a great development of the institutions responding to the needs [...]. But we have also seen in recent months a somewhat sad situation, the networks of national corruption that are emerging [...], which tells us that the institutions are not fully developed (Interviewee 1.9).

In general, the perception of the interviewees and the participants of the focus group is that the province of Tungurahua shows improvements in the capacity *management* by its local actors; this is due particularly by the lessening of the bureaucratic procedures. They point out that productive chain networks, clusters, and organizational development programs have been promoted by the local public administration and other actors in the territory (CorpoAmbato 2020).



On the other hand, for the interviewees and participants of the focus group, the participatory management model led by the Provincial Decentralized Autonomous Government of Tungurahua constitutes an asset to the territory. However, they point out that the local public administration needs higher levels of modernization to give timely and effective responses to citizen and business requirements, thus improving the provision of public services, incorporating dynamic management tools and territorial and statistical information systems, exercising a greater control for the adherence to the territorial norms, disseminating the environmental regulatory framework and monitoring its compliance and, also, incorporating strategies oriented to the internationalization of the territory:

In the productive aspect, for example, the provincial productive strategies concept has been instituted. One strategy is of tourism, another one is of agricultural, and the other is the «strategy of competitiveness». Each strategy groups the producers of each of those sectors. Likewise, what you do is work based on those specific needs, prioritize what they require and then put it into practice. It is supported with activities that can solve their needs (Interviewee 2.10).

The *financial environment* in the province of Tungurahua is recognized by the interviewees and participants of the focus group as favourable for productivity and territorial competitiveness. They point out that public, private and credit union entities provide a suitable and accessible credit offer; thereby, sustaining the entrepreneurial capacity in the production and trade. The comments are positive about the role of this sector in the economic dynamics of the province, despite the remembrance of the national shock related to the bank's collapse of the year 2000. Of course, the interviewees expect lower interest rates and longer loan periods:

The people from Tungurahua are good paying their debts, and that is because we are good producers. Thus, this means that all financial institutions have a good amount of their economic resources invested in the market [...]. The financial sector invigorates the economy [...]. The positive side of this is that we have a fairly high potential to grow as entrepreneurs and as a province (Interviewee 2.9).

The interviewees and the participants of the focus group consider that there is a strong incidence of the *political and economic environment* in the productivity and competitiveness of Tungurahua, due to the political activity and the decisions that regulate the national and local economy. They express that the perception of authoritarianism has decreased with the latest change at the national government, although they point out that the effectiveness of this change in policies related to the productive and commercial sector remains to be seen.

Likewise, the promises made by the Central Government concerning tax reduction, the creation of public-private alliances and companionship of the state to the private sector —small, medium, and large companies— generate expectations that will affect the

entrepreneurial investment decisions and the creation of new business ventures in the territory:

In recent years, taxes have risen sharply, and restrictions have been placed on imports and on exports too, even though the State said that it encourages exports, these exporters needed to import their raw materials and, since they had no raw materials, they also had to stop exporting their goods [...]. Ecuador has a very high-risk rate. Investors prefer to go to less risky countries, such as our neighbouring countries, and that is not good for Ecuador (Interviewee 2.18).

The *business* variable that brings together dimensions such as labour relations that favour the involvement of employees, efficient business organization, development of production systems, improvement of product and service quality, product and process innovation, and organizational development, marketing and sales, social responsibility, as well as environmental sustainability of production, presents different nuances in the interviewees perception as follow.

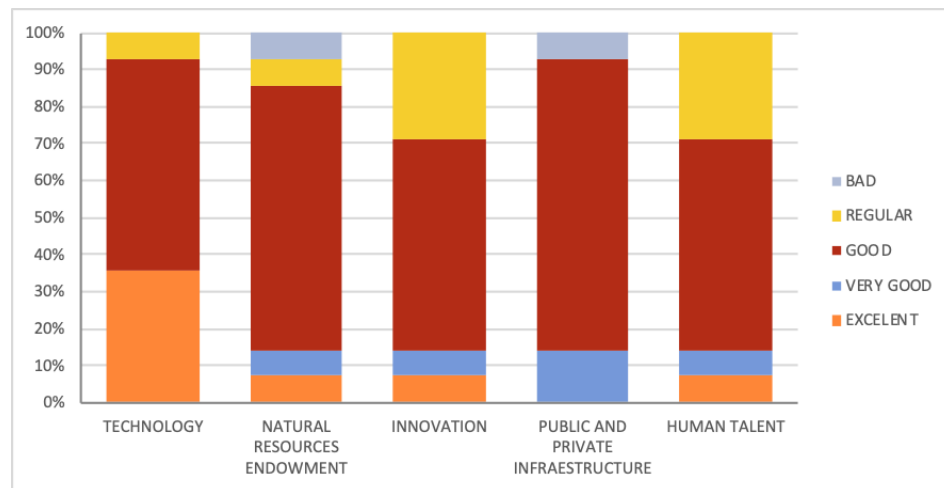
On one hand, they recognize the key role of businesses and business ventures in the development of the territory and the capacity of local entrepreneurs to strengthen and diversify the economy, without having to depend excessively on the Central Government and its institutions. They emphasize the positive future vision of the province and value tremendously their personal and business capacity to progress and overcome adversity. On the other, they are not at all unaware of the problems and challenges related to the need for innovation, the incorporation of knowledge and technology adaptation, the opening of new markets, the improvement of the quality of products and processes:

In our territory, the company's growth and the improvement of production are influenced by the labour relations. There are new sales tools [...]. The company operates according to good manufacturing practices [...]. Thus, the entrepreneur's management is the helm that turns the boat. In the company, there are training programs of all sorts (Interviewee 1.14).

The third technique indicated in the introductory part of this study is the survey. One is applied to the citizens and the other to the productive agents of Tungurahua —year 2019—. The survey's objective is to determine the perception of the current state of productivity and competitiveness by the citizens and by the productive sector of the province of Tungurahua. The survey applied to the citizens includes a sample data of 384 citizens out of a total of 504,583 residents surveyed (INEC 2020b), while the survey of the productive sector is applied to 381 companies out of a total of 41,790 with an address in Tungurahua (INEC 2020a). In both cases, a marginal error of 5% is allowed, with a 95% of confidence interval, and a variance of 0.25 is considered. The sampling data selection process follows what is established by Lind (2012) and Hernández-Sampieri *et al.* (2014). The survey was applied by the

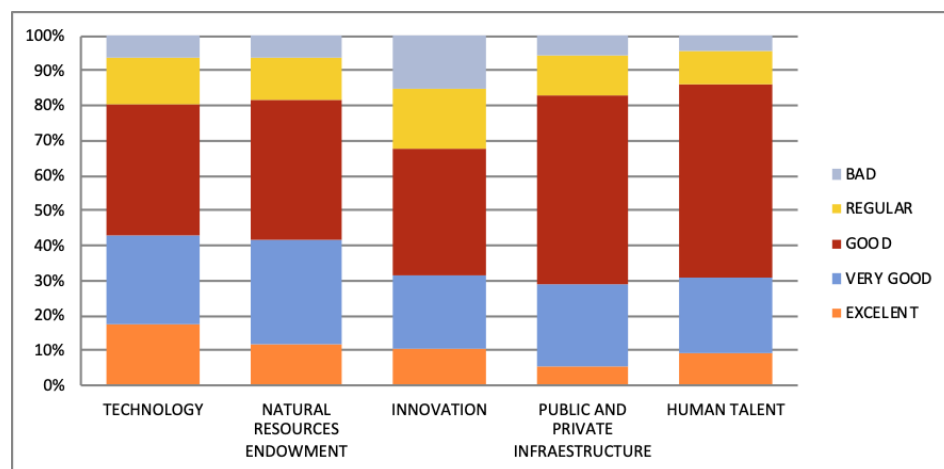
Pontificia Universidad Católica del Ecuador, Sede Ambato (PUCESA 2020), during the year 2019.

The following factors of productivity and competitiveness were considered for the survey: technology, endowment of natural resources, innovation, infrastructure and human talent, institutions, macroeconomic environment, health, higher education and training, labour market, financial system, and entrepreneurial capacity; they were typified accordingly to a scale of «excellent», «very good», «good», «regular», and «bad». Once the data has been computed, the results show that citizens' perception of the current state of the technology and infrastructure factors are much more positive than the innovation and human talent factors (Figure 1).



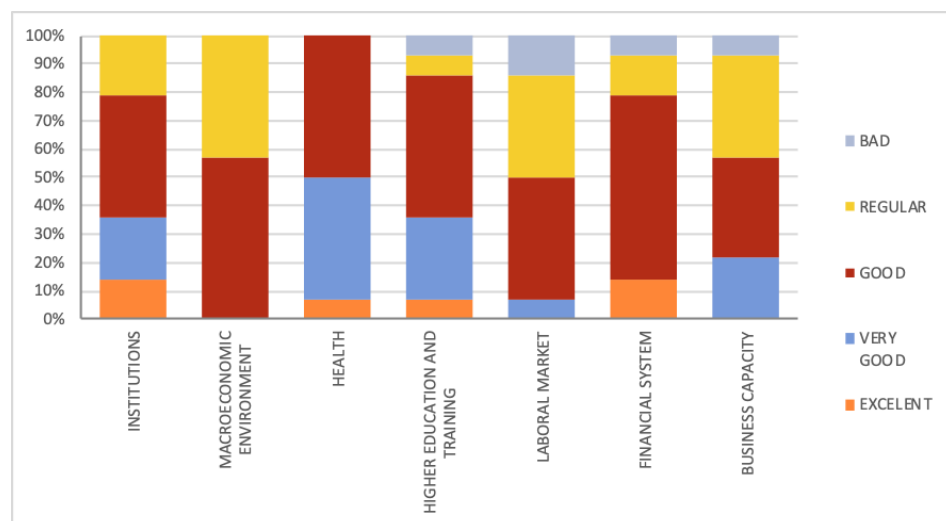
**Figure 1**  
Factors of productivity in Tungurahua current state perception —citizens— (2019)  
Source: prepared by author, taken from the PUCESA survey.

Meanwhile, the productive agents' perception with respect to the factors of technology, infrastructure and the endowment of natural resources is much more positive than the perception of the current state of human talent and innovation factors (Figure 2).



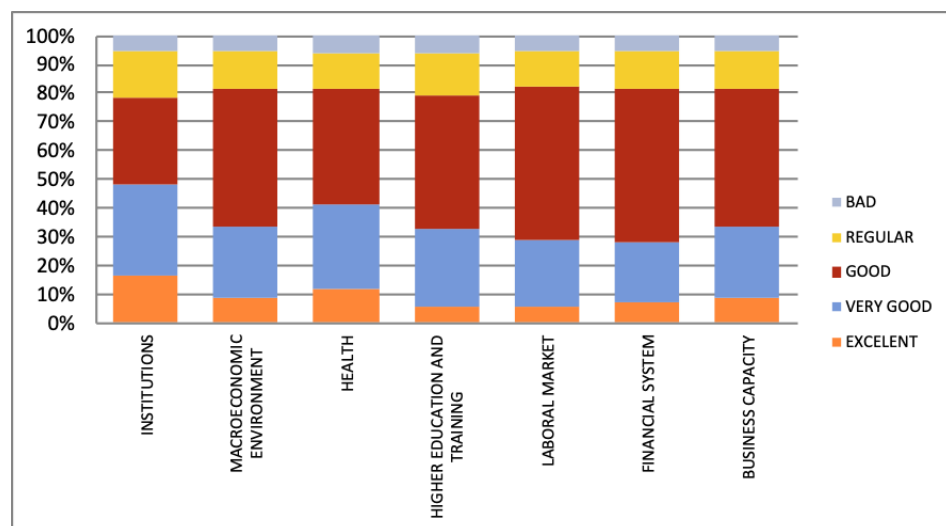
**Figure 2**  
Factors of productivity in Tungurahua current state perception —productive agents— (2019)  
Source: prepared by author, taken from the PUCESA survey.

Likewise, once the data have been computed, the results show a much more positive perception of citizens regarding factors like health, higher education and training, institutions, and the financial system (Figure 3).



**Figure 3**  
Factors of productivity in Tungurahua current state perception —citizens— (2019)  
Source: prepared by author, taken from the PUCESA survey.

Meanwhile, the productive agents' perception on the current state of the following factors: health, business capacity, financial system, macroeconomic environment, and labour market is much more positive with respect to the factors of higher education and training and institutions (Figure 4).



**Figure 4**  
Factors of productivity in Tungurahua current state perception —productive agents— (2019)  
Source: prepared by author, taken from the PUCESA survey.

As a result, if we compare the computational tabulations obtained from the interviews, the focus group and the perception surveys with respect to the factors of productivity and territorial com-

petitiveness, we can evidence a much more positive assessment of the following factors: health, education, financial system, and labour market, coinciding with the perception results obtained through the use of qualitative techniques —focal group, individualized interviews and surveys—, emphasizing that the natural resources factor shows significant endogenous potentialities, thus corroborated with the analysis of perception of citizens and productive agents. Likewise, the factors that show a less positive assessment are institutions, macroeconomic environment, and entrepreneurial capacity, placing them as those in which a further intervention and strengthening is necessary.

Now, the results of the application of the territorial competences model following Tomás Carpi corroborate what was stated mainly by Correa *et al.* (2010), Cuervo (2006), Flores-Tapia *et al.* (2022), and Moncayo (2016), who stress that, from the territorial perspective, for the design of development strategies, the qualification of human capital and productive innovation; the promotion of the business fabric, the valuation of natural capital and environmental sustainability, the formation of social and institutional capital for economic growth is necessary and redesign of promotion policies. Similarly, they point out that an equilibrium technological behaviour improves results: this is the case, for example, of the acquisition of capital goods combined with efforts for organizational change, research, and development (R&D), design and training.

Likewise, the results of this research confirm the conclusions reached in Ecuador, among other authors, Escobar and Bonilla-Jiménez (2015), Espinoza and Guzmán (2011), Salgado (2000), and Valarezo (2013), who point out that, through the history of the country, development models have been implemented that have failed, among other causes, due to the disjointed implementation with the national reality and an unfavourable and restrictive environment caused by factors such as state inefficiency, reduced investment capacity, scarce development of the manufacturing and tertiary sectors, an export economy of eminently primary and poorly diversified products, infrastructure limitations, technological dependence, little development of both public and private institutions, low capacity to accumulate capital and a low level of productivity and competitiveness.

## 6 Conclusions

Based on the concepts of productivity and competitiveness reviewed thus far, this research considers productivity as the capacity of the territory and its business network to optimize the production of goods and services obtained from a strict synergistic combination of factors and endogenous resources such as the

technology and the knowledge incorporated into the production and management processes, to the qualification of human capital, to the political-social and economic conditions, to the provision of infrastructure and specialized information and support systems, to the quality, to the values, and to the entrepreneurial spirit, among others. The results of productivity in this research are valued not only for the levels of efficiency and cost reduction, but primarily for the quality of employment, an adequate redistribution of income to the productive agents and for a notable contribution to the economic, social, endogenous, and environmental territorial sustainability in the context of a comprehensive, territorial, and sustainable development.

In this study, for its part, it is proposed the concept of competitiveness as the capacity of a territory and its businesses to participate and better position themselves in the markets —domestic and international—, and the concept of productivity as being the required condition from which to develop and maintain a driven competitive advantages, from the comparative advantages of their natural resources and/or from endogenous factors maximized by their territorial actors, such as human capital, social capital, entrepreneurship ecosystem, strategic information, research-development and innovation, eco-efficient production systems, quality management and continuous improvement, or political and legal stability, among others. Now herein, the study's proposed concepts of productivity and competitiveness share the same vision of a comprehensive, territorial, and sustainable development.

In considering all the above mentioned analysis, and in the context of the concept of a comprehensive, territorial and sustainable development, the catalysts factors of territorial productivity and competitiveness in the province of Tungurahua, according to Tomás Carpi, are the human capacities, the political and economic environment, the financial capital, the business capital, the natural capital, the technological capital, the institutional capital, the social capital, and the infrastructure capital. This opens the door for future investigations, where a mathematical model can be created by applying quantitative methods that complement and enrich the study reached herein with the qualitative techniques used in this investigation; for example, the well-known data envelopment analysis method —DEA—, which will allow us to calculate the productivity of the province of Tungurahua based on the variables identified here and comparing it with the productivity achieved by other territories and/or between different time periods.

The dynamism of the economic, social, technological, and institutional context has made that the comprehensive, territorial, and sustainable productivity and competitiveness become one of the aspects of special concern to guide territorial and national public policies. Furthermore, the new conditions of productivity and competitiveness linked to innovation, quality, human talent, crea-

tivity, contact networks, systems, design, and differentiation of goods and services, or logistics, among others, fortunately also allow a new protagonist role for the territories and leave open the possibility of promoting a comprehensive, territorial, and sustainable development in the economic, social, endogenous territorial and environmental scopes; hence the need to study, in future research, the link between the public policies and the development with territorial specificities, through a comprehensive, territorial, and sustainable productivity and competitiveness policy. Also, it should be noted that, although the *gender* variable is important, the research prioritizes the proportionality of the sample stratified by cantons, remaining as a future line of research.

With that said, before the application of the proposed methodology, which has yielded the determinants of productivity and competitiveness as results, a possibility of working on a future line of research opens, to replicate this methodology, and validate these results in other territories of Ecuador, even other regions of Latin America.

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