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Scrutinizing individual entrepreneurial orientation: An integrated view of its relationship with entrepreneurial process in the university context

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Abstract

Purpose: To scrutinize the individual entrepreneurial orientation and its effect on the entrepreneurial process in the university context.

Design/Methodology/Approach: This study employs a quantitative approach with an explanatory depth, and a cross-sectional and longitudinal analysis. In this vein, three main databases collected through surveys of university students in regional and global contexts are used, which are analyzed through parametric and non-parametric statistics, as well as functional data.

Originality/Value: This research offers innovations in the study of the entrepreneurship shaping from the individuals' perspective. Thus, the proposed model is original and enables us to determine the institutional and educational factors that influence the individual entrepreneurial orientation, and the effect of this orientation on the entrepreneurial process stages. The results help to position individual entrepreneurial orientation as a relevant construct within entrepreneurial research and contribute to filling the gaps between entrepreneurial cognitions and entrepreneurial behavior.

Contents

1 Problem Statement

Entrepreneurship has been consolidated as a phenomenon of relevant interest for the economic growth promotion, the innovation advancement and competitiveness increase (Acs et al., 2008). For this reason, since the 1980s, entrepreneurial research has developed progressively and consistently, elucidating all the factors that determine entrepreneurial activity (Audretsch, 2012). In the midst of this situation, the role of the individual is increasingly recognized and its recurrence as analysis unit becomes relevant, in view of the rising concern to understand the key elements involved in the entrepreneurial process. Therefore, examining all deep beliefs, attitudes, and personal characteristics behind the cognitive structures provides important elements to understand this process and, consequently, entrepreneurship (Krueger, 2007; Liñán et al., 2011).

In this way, individual entrepreneurial orientation as the set of characteristics and attributes associated with the personality of entrepreneurs provides a conceptual framework for understanding how individuals engage in entrepreneurial activity (Bolton & Lane, 2012; Pidduck et al., 2021). This construct, which combines individuals' perceptions of innovativeness, proactiveness, and risk-taking, turns out to be a determining factor in characterizing the entrepreneurial mindset (Krueger & Sussan, 2017; Pidduck et al., 2021), and encouraging the process around the entrepreneurial career (Anwar et al., 2021; Martins & Perez, 2020).

Entrepreneurial orientation, as a response disposition to different exogenous aspects affecting the individual (Krueger & Sussan, 2017), is determined by several formative factors, among which entrepreneurship education stands out. Precisely, through this education, the dimensions development associated with entrepreneurial orientation is stimulated as a prior step to the entrepreneurial process (Lindberg et al., 2017; Marques et al., 2018). However, the education-orientation relationship has not been addressed in detail and the analyses lack variables that represent deeper aspects of the formation process. In this vein, the causality of the benefits or satisfactions associated with entrepreneurship education programs is not clear, thus requiring new insights into this issue (Nabi et al., 2017).

These new findings highlight the relationship between external and internal individual

factors and place individual entrepreneurial orientation as a link in this relationship. From this formation process perspective, they recognize the entrepreneurial career as a learning process that (in most cases) begins in the higher education institution and its context, and has the capacity to develop skills towards entrepreneurship (Fayolle, 2018; Fayolle et al., 2006b; Leiva et al., 2021; Silva et al., 2021). On this premise, the benefits and satisfactions of formation assume a relevant role in analyzing how the individual valuation of entrepreneurship education is transferred first to the orientation and, as a consequence, to the entrepreneurial process.

Despite recent advances in integrating entrepreneurial orientation and the entrepreneurial process, examining in detail the role and importance of this orientation as a predecessor of intention is a current requirement, since it provides relevant insights into how the decision and conviction to start a new business arises. The fulfillment of such requirement is consistent with the need to understand all those deep assumptions and characteristics that underlie and determine this intention, which enables a significant progress of this construct (Hueso et al., 2021; Liñán & Fayolle, 2015). Furthermore, individual entrepreneurial orientation is an alternative or complement to traditional theories such as the entrepreneurial event model and the theory of planned behavior, which have been widely addressed in the literature and require replacement or the assumption of new approaches and configurations (Donaldson, 2019; Liñán & Fayolle, 2015).

Beyond the development of entrepreneurial intention, there is still no evidence to understand its association with the later stages of the entrepreneurial process. In particular, it is not known to what extent the entrepreneurial behavior carried out by an individual depends on this orientation. Examining this behavior from the internal factors that shape it, implies considering entrepreneurship as a conscious contemplation based on attitudes, values or cognitive structures that are ultimately shown when individuals materialize the knowledge or ability to start a venture (Donaldson, 2019; Gieure et al., 2020). In this sense, it is not enough to identify a simple link between intention and behavior, but it is pertinent to determine the role of attitudes, values or structures that intervene before and after the intention development. This situation is in line with the call of authors such as van Gelderen et al. (2018) and van Gelderen et al. (2019). They demand the study of the entrepreneurial process over intention in order to contribute to closing the gaps between entrepreneurial cognitions and the individual's action.

This entrepreneurial process as an venture career inducer is not seen as an event that occurs separately, but rather as a response to several environmental, economic, political, social, and cultural conditions (Aloulou, 2021; Garcia-Cabrera et al., 2018; Gui et al., 2021). This approach recognizes the institutional context as a critical factor in

explaining differences in entrepreneurial phenomena, and understands that the personal characteristics focused on venture creation depends on institutional dimensions (Duran et al., 2019; Ogunsade et al., 2021). Although some research gaps in the entrepreneurship field have been closed with the institutional economic theory incorporation (Urbano et al., 2019), the multiple ways in which institutions impact entrepreneurial activities and outcomes remain unknown (Bjørnskov & Foss, 2016; Martins et al., 2021; Wales et al., 2021), and the effect of these institutions on the relationship between individual entrepreneurial orientation and the entrepreneurial process has seldom been pinpointed. Hence, examining the effect of strengths or weaknesses of the institutional environment on the entrepreneurial orientation and intention relationship allows us to understand individuals' proclivity for entrepreneurship and its variation across regions.

Concerning these variations, most research has been perform in isolated regional contexts (e.g. Popov et al., 2019; Rajković et al., 2020). Therefore, new studies are needed to validate individual entrepreneurial orientation in global terms and by economic activity levels. This process can lead to analyses that help to understand why entrepreneurship varies across economies, and how individuals shape their cognitive structures to create new ventures in response to the economic conditions in which they are immersed.

Finally, at the methodological level, cross-sectional samples and parametric analyses based on inferential statistics to test causal relationships are the constant in the literature (da Cruz et al., 2021). Consequently, samples individuals with multiple measurements over time are required to allow longitudinal analyses, providing evidence of both the cognitive evolution of the individual and the entrepreneurial process. In addition, sophisticated statistical techniques —such as non-parametric regression and functional data— provide access to new possibilities in terms of results and are beginning to be introduced in entrepreneurship research.

2 Objectives

General Objective

To scrutinize the individual entrepreneurial orientation and its effect on the entrepreneurial process in the university context.

Specifics Objectives

1. To identify the contents and future agenda in the use of the individual entrepreneurial orientation in the entrepreneurship field.
2. To examine the effects of entrepreneurship education, and its methodologies, on individual entrepreneurial orientation development; as well as its relationship with entrepreneurial intention.
3. To compare individual entrepreneurial orientation among university students in factor-, efficiency-, and innovation-driven economies.
4. To determine the incidence of institutional factors on individual entrepreneurial orientation and entrepreneurial intention relationship.
5. To develop a longitudinal analysis of the relationship between individual entrepreneurial orientation and entrepreneurial process.

3 Theoretical Framework

3.1 Individual Entrepreneurial Orientation

As a firm-level construct, entrepreneurial orientation refers to a strategic posture that characterizes the entrepreneurial behaviors whereby the discovery and exploitation of new opportunities is possible (Lumpkin & Dess, 1996). This construct has been approached from two different conceptualizations, which allows the research development in several areas within the entrepreneurship field.

Initially, research on entrepreneurial orientation dates back to Miller (1983) and Miller & Friesen (1982, 1983), who, based on a firm characterization, explored the entrepreneurship determinants. As per the authors, entrepreneurship development is shaped by the environmental stimulus, the structural attributes, and the behavioral repertoire to which the firm is exposed. This last category includes three dimensions, namely innovativeness, proactiveness and risk-taking, which are identified as specific components of entrepreneurial orientation (Basso et al., 2009; Covin & Slevin, 1989). Thus, an entrepreneurial firm is one that "engages in product market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations, beating competitors to the punch" (Miller, 1983, p. 771).

The second approach to conceptualize entrepreneurial orientation research emerges with Lumpkin & Dess (1996). These authors, based on Miller (1983) and Covin & Slevin (1989), define the "entrepreneurial orientation" term, add two dimensions (autonomy and competitive aggressiveness). Thus, they reformulate the phenomenon studied (Basso et al., 2009). Accordingly, the five dimensions of entrepreneurial orientation combine to form unique configurations that vary according to the conditions of the surrounding environment and organizations; understanding such orientation from a multidimensional approach that contrasts with the uni-dimensional view prominent in the literature (Lumpkin & Pidduck, 2021; Pidduck et al., 2021).

Thus, this orientation reflects the entrepreneurial nature by defining the organization's behaviors, which can be seen as the manifestation of the individual action of its members

(Bolton & Lane, 2012; Rauch et al., 2009). Through them and their entrepreneurial posture, the organization develops and achieves higher performance and corporative entrepreneurship (Cardona Montoya et al., 2017; Covin & Slevin, 1991). In this vein, the entrepreneurial orientation can be analyzed from the individual perspective, which allows to further the understanding of the entrepreneurial phenomenon from an attitudinal approach. This stream, therefore, recognizes the importance of the person for the entrepreneurial behavior promulgation and entrepreneurial endeavors, both in organizational and non-organizational contexts (Covin et al., 2020; Krueger & Sussan, 2017).

At individual level, the entrepreneurial orientation dimensions are considered as personality characteristics and attributes that increase the likelihood to engage in and be successful at entrepreneurial activities (Bolton & Lane, 2012; Pidduck et al., 2021). Such dimensions —which coincide with its counterpart at the organizational level— conceive entrepreneurial orientation from a behavioral and dispositional viewpoint. Thus, this set of characteristics can reflect both dispositions and behaviors to enable entrepreneurs to deal with uncertainty (Lumpkin & Pidduck, 2021).

In dis-aggregated terms, innovativeness, proactiveness, and risk-taking are the most representative dimensions of individual entrepreneurial orientation construct (Bolton & Lane, 2012; Covin et al., 2020; Kraus et al., 2019). Innovativeness —which is related to creative processes— reflects the will to update the old ways by generating new ideas and combinations (Kraus et al., 2019; Subramaniam & Youndt, 2005). Proactiveness refers to the manifest ability to take an anticipatory posture and reflects the forward-looking perspective and entrepreneurs' pioneering (Lumpkin & Dess, 2001; Pidduck et al., 2021). While risk-taking considers the individual's willingness to allocate different resources and efforts to projects with uncertain outcomes in order to achieve new opportunities (Bolton & Lane, 2012; Riviezzo, 2014).

The recognition of the role of individuals in the incentive and enactment of entrepreneurial orientation dimensions has opened up new research opportunities (Pidduck et al., 2021), and has positioned this construct as a key factor to understand entrepreneurial dynamics from a cognitive perspective. Through this process, a number of relevant studies have emerged with the aim of developing and consolidating measurement scales for the different dimensions, as shown in Figure 3.1.

In this regard, the research developed by Taatila & Down (2012) and Bolton & Lane (2012) offer two measurement instruments widely accepted and adopted by the academic community. The instrument linked to the first research and adapted from Covin & Slevin (1989) understands the aforementioned orientation as the confluence of innovativeness, proactiveness, risk-taking, and networking. The instrument associated with the second

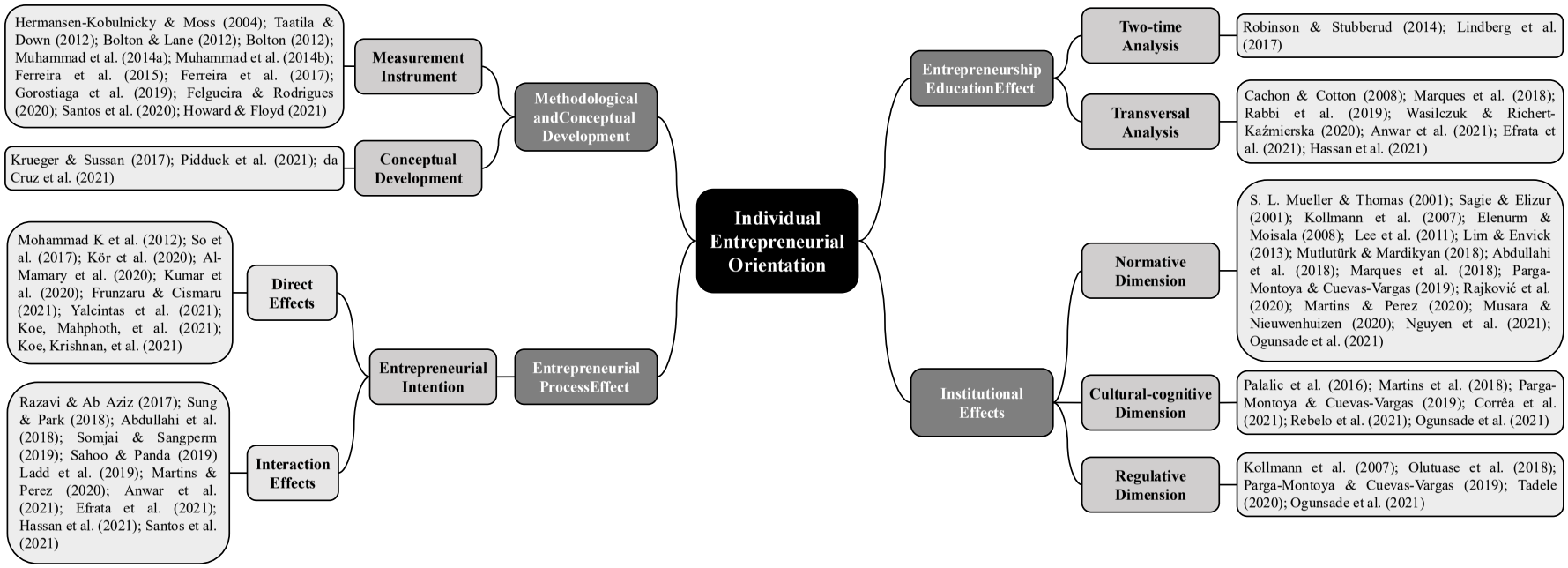


Figure 3.1: Thematic Relationships in Literature

research —which was validated and tested on a sample of 1100 university students— perceives innovativeness, proactiveness, and risk-taking as the most relevant dimensions to characterize individual entrepreneurial orientation. The latter instrument is evaluated in the U.S. business context (Bolton, 2012) and in the Serbian educational context (Popov et al., 2019). It has served as a basis to develop measurement instruments that include passion and perseverance as additional dimensions of entrepreneurial orientation (Santos et al., 2020). Inclusion that is only warranted to perseverance, while passion is seen as a mediator between entrepreneurial orientation and entrepreneurial outcomes (Howard & Floyd, 2021).

Alternatively, and not less relevant, other research has resorted to various methodological techniques to obtain measurement instruments that complement existing ones. These techniques include content analysis, personal interviews, group discussion and Delphi technique (Muhammad et al., 2014a, 2014b), cognitive maps and the measurement of attractiveness by using a category-based evaluation technique (MACBETH) (Ferreira et al., 2015), the Assessment Center (AC) method (DeGennaro et al., 2016), and cognitive maps and the multi-criteria interactive decision-making method (TODIM) (Ferreira et al., 2017). The development of these instruments has also been motivated by considering specific sampling contexts, such as the pharmaceutical context (Hermansen-Kobulnicky & Moss, 2004), the eastern geographical context (Muhammad et al., 2014a), the secondary education context (Kurniawan et al., 2019), the higher education context (Gorostiaga et al., 2019), and the higher education teaching and research context (Felgueira & Rodrigues, 2020), among others.

At the conceptual level, approaches in the literature consider individual entrepreneurial orientation as the best framework for conceptualizing, measuring, and modeling the entrepreneurial mindset. In this regard, Krueger & Sussan (2017) identify several measures of the dimensions related to this orientation and discuss their importance as a mechanism to assess deep changes in entrepreneurial mindset, which are reflected in a tangible behavior. Conversely, Pidduck et al. (2021), use entrepreneurial orientation to model individuals' dispositional beliefs, which give rise to entrepreneurial mindset defined as an orientation towards goals and objectives. Finally, da Cruz et al. (2021) conduct a literature review associated with individual entrepreneurial orientation in the higher education institutions context, highlighting the need for further empirical studies that delve into the relationships of the variables that make up the structure of this orientation.

3.2 Entrepreneurship Education

Entrepreneurship education refers to any pedagogical formation process on entrepreneurial attitudes and skills (Fayolle et al., 2006b), which enables the acquisition of entrepreneurial facets without these necessarily being the individual's own characteristics (Alum & Drucker, 1986). Such education provides the concepts and skills to recognize opportunities that others have overlooked, fostering the vision and tenacity required to push an idea into reality (Kuratko, 2005). Through this formation process, the individual learns an innovative approach to problem solving, improves the capacity for adapting to change, increases the self-sufficiency level, fosters creativity, and favors his career options (Henry et al., 2005; Marques et al., 2018).

The recognition of entrepreneurship education for the development of attitudes to venture creation (Cachon & Cotton, 2008; Hahn et al., 2020; Mitra, 2008), entrepreneurial intention (Hassan et al., 2021; Leiva et al., 2021; Maresch et al., 2016; Silva et al., 2021), and regional economic growth (Galvão et al., 2018) is a widely accepted phenomenon in the literature. For this reason, entrepreneurship education programs have experienced a wide development and diffusion within the different educational levels (Fayolle, 2018; Jones et al., 2014). These programs have been incorporated mainly in higher education context and include processes of awareness raising, informal inspiration and active experimentation, as well as skills training subjects and theoretical courses (Farashah, 2013).

There are two types of teaching methods developed in these education programs: traditional methods, and innovative methods (Mwasalwiba, 2010). In traditional methods students assume a passive role while they receive the knowledge imparted by the teacher, understood as the expert agent responsible for feedback (Samuel & Rahman, 2018). The most commonly used methods are lectures, case studies, and group discussions. They are less effective in influencing entrepreneurial attitudes (Bennett, 2006; Mwasalwiba, 2010). The second category includes action-based methods that emphasize the teacher's role in stimulating learning and encouraging students to rediscover their abilities, knowledge, and attitudes (Bennett, 2006; Samuel & Rahman, 2018). These student-centered methods include computer simulation of business games, role play, business plan development, personal and group projects, visitation to entrepreneurs, new business creation, workshops, among others (Mwasalwiba, 2010; Samuel & Rahman, 2018).

Within these latter methodologies, games based on computer simulations emerge as a valuable method that addresses various learning areas, such as cognitive, affective, and behavioral (Harviainen & Lieberoth, 2012). These games represent pedagogical tools that contribute to experiential learning since they allow students to simulate the reality

of the entrepreneurial process, experiencing its complexity and uncertainty in a less risky way (Newbery et al., 2016). Although the empirical evidence on the effectiveness of the use of serious games in courses related to entrepreneurship is scarce (Calabor et al., 2019), the results denotes its potential to influence attitudes and intentions towards self-employment (Krajger et al., 2020), as well as interactivity and active learning (Ruben, 1999).

Finally, the potential of entrepreneurship education programs is represented in direct benefits that determine students' attitudes and intentions (Souitaris et al., 2007). These can be summarized into three factors, namely learning, incubation resources, and the inspirational part of the program (Ahmed et al., 2020; Souitaris et al., 2007). The first factors refer to the acquisition of knowledge and the access to tangible and intangible resources derived from the training program, while inspiration refers to the entrepreneurial emotions and motivations generated by the program's implementation. Such inspiration, which involves motivating, energizing, and guiding behavior towards the desired goal (Nabi et al., 2018), requires a stimulus represented in a person or idea, i.e., a trigger (Thrash & Elliot, 2003) and whose understanding and promotion has been little studied and deserves greater research attention (Nabi et al., 2017).

Entrepreneurship Education and Individual Entrepreneurial Orientation

In terms of the general purpose of the research, most of the literature that addresses this relationship examines and tests the potential of pedagogical interventions to encourage entrepreneurial personal characteristics, which are represented in the individual entrepreneurial orientation dimensions. In this sense, findings with related samples between two time points demonstrate the importance of intensive courses to stimulate risk-taking and innovativeness in individuals with a pronounced entrepreneurial intention (Robinson & Stubberud, 2014), while education based on self-directed methodologies (adapted to the learning style of young adults) lead to higher levels of individual entrepreneurial orientation (Lindberg et al., 2017).

From a cross-sectional perspective, the results suggest that entrepreneurship education promotes —by moderating gender and family background— innovativeness and proactiveness of Portuguese university students (Marques et al., 2018). Additionally, the pedagogical processes associated with such education stimulate the personal attitudes that lead to entrepreneurial orientation (understood as another personal attitude) (Cachon & Cotton, 2008). Not only entrepreneurship education has a direct relationship with individual entrepreneurial orientation, in this respect, the findings of Rabbi et al.

(2019) highlight the role of the formative center in determining the relationship between entrepreneurial orientation and new venture creation. Regarding this venture creation process, entrepreneurial orientation acts as a mediator between entrepreneurship education and entrepreneurial intention (Efrata et al., 2021; Hassan et al., 2021), or as an independent variable in the mediation exerted by such formation on intention (Anwar et al., 2021). Finally, based on the identification of the innovativeness, proactiveness, and risk-taking levels, Wasilczuk & Richert-Kaźmierska (2020) discuss and formulate a set of recommendations for entrepreneurship education, which aimed at strengthening the individual entrepreneurial orientation of Y and Z generations.

3.3 Entrepreneurial Process

Venture creation is not an instantaneous result but the consequence of an entrepreneurial process (Reynolds & Miller, 1992). The entrepreneurial process begins when the individual develops a clear intention to carry out the entrepreneurial activity and ends with the materialization of the entrepreneurial behavior through the creation and management of a business (Gieure et al., 2020; Zapkau et al., 2017). This process includes two stages, namely, (1) the stage of entrepreneurial intention development, and (2) the stage of entrepreneurial behavior development (the individual becomes a nascent entrepreneur and then engages in entrepreneurial behavior).

Entrepreneurial Intention Stage

The behavior guided to the business creation can be understood as the culmination of a long and evolutionary process that starts with the entrepreneurial intention (Fayolle et al., 2006a). This intention is considered the best individual predictor of entrepreneurial behavior, and captures all those motivational or attitudinal antecedents that influence such behavior (Fayolle et al., 2014). Accordingly, the presence of a higher entrepreneurial intention increases the probability that the behavior oriented towards business creation will be realized. The understanding of this intention from the cognitive approach has been possible by means of the entrepreneurial event model and the theory of planned behavior.

Proposed by Shapero & Sokol (1982), the entrepreneurial event model considers that perceived feasibility and perceived desirability are the main determinants of intention. Perceived feasibility indicates the degree to which the individual is capable of starting a venture and is directly associated with his expectations (Krueger, 1993). Perceived desirability, on the other hand, refers to the individual's degree of attraction in the

creation of a venture and reflects his affect regarding entrepreneurial activity (Krueger, 1993). Thus, these two attitudes determine the credibility of alternative behaviors in relation to entrepreneurial behavior, and lead to entrepreneurial intention after exposure to entrepreneurial activity (Shapero & Sokol, 1982; Zhang et al., 2014).

As per the theory of planned behavior proposed by Ajzen (1991), this intention is explained by the attitude towards behavior, perceived behavioral control and subjective norms. Attitude towards behavior refers to the degree of personal appreciation for entrepreneurship, and indicates the individual's attraction to entrepreneurial career (Liñán et al., 2011). Perceived behavioral control is defined as the perceived ease or difficulty of becoming an entrepreneur and reflects the individual's ability to manage his behavior (Zhang et al., 2014). Finally, subjective norms measure the perceived social pressure to engage in entrepreneurial behaviors and reflect the perceived approval of reference groups in the decision to become an entrepreneur (Liñán et al., 2011). Thus, these three motivational antecedents are configured in the intention, and capture the individual's disposition and effort towards entrepreneurial behavior (Fayolle et al., 2014).

Entrepreneurial Behavior Stage

In the second phase, intentions are no longer the central issue, at this point the initiation and achievement of actions in order to reach the entrepreneurial goal emerge as the main focus (Gollwitzer, 2012). In this sense, individuals proceed to action planning, whereby they reflect and decide when, where, how and how long to act, resulting in implementation intentions (van Gelderen et al., 2018). Once the action plan is formulated, the individual enters the action phase where he ensures that the actions undertaken to achieve the defined objective are successful. There, such actions are defined as intentional behavior. Thus, the theory of the action phase proposed by Gollwitzer (2012) constitutes a conceptual support to understand action from the configuration, establishment and fulfillment of objectives in a self-regulated framework, whose use begins to acquire dynamism in the entrepreneurial field (e.g. van Gelderen et al., 2018, 2019).

Individual Entrepreneurial Orientation and Entrepreneurial Process

The entrepreneurial process has received special attention in the literature, where the first stage is the most addressed. Research on individual entrepreneurial orientation is no stranger to this dynamic, since most of the results find a relationship —either direct or indirect— between this variable and the intention models, while the literature that

discusses the link between individual entrepreneurial orientation and the second stage of the entrepreneurial process is limited.

In direct terms, the impact of individual entrepreneurial orientation on entrepreneurial intention is verified for agriculture students in Iran (Mohammad K et al., 2012), business students in Indonesia (So et al., 2017), for relational and structural support context in Turkey (Kör et al., 2020), for university students in Saudi Arabia (Al-Mamary et al., 2020), across different regions and gender in India (Kumar et al., 2021), for Generation Z students in Romania (Frunzaru & Cismaru, 2021), and university students in Turkey (Yalcintas et al., 2021). In the framework of technology-based entrepreneurship findings in the literature suggest a positive effect of individual entrepreneurial orientation on Malaysian university students' intention towards techno-entrepreneurship (Koe, Krishnan, & Alias, 2021; Koe, Mahphoth, et al., 2021).

From interaction models, the determination of individual entrepreneurial orientation on entrepreneurial intention has been examined in light of the moderating effect of (1) transformational leadership (Razavi & Ab Aziz, 2017), (2) entrepreneurial self-efficacy (Somjai & Sangperm, 2019), (3) access to finance Abdullahi et al. (2018), and (4) culture (Chienwattanasook et al., 2019), while from an indirect perspective it has been mediated by (1) entrepreneurial self-efficacy searching and entrepreneurial self-efficacy marshaling (Ladd et al., 2019) and (2) entrepreneurship education (Anwar et al., 2021). This mediating role has also been assumed by entrepreneurial orientation to intervene in the effect that (1) the closer valuation of entrepreneurship and the closer stigma of entrepreneurial failure (Martins & Perez, 2020), (2) the entrepreneurship education (Efrata et al., 2021; Hassan et al., 2021) and (3) the family, structural and cultural environment (Santos et al., 2021) has on intention. From a moderating role entrepreneurial orientation influences the impact of sustainability orientation on sustainable entrepreneurial intention (Sung & Park, 2018), and access to financing, access to business information, social networks and university support on entrepreneurial intention (Sahoo & Panda, 2019).

3.4 Institutional Factors

Institutions —which are created by society as constraints and impositions to limit and oversee human behavior— define, and limit the choices of individuals (North, 1990). These institutions delimit what is appropriate in an objective sense and create expectations that determine the actions of individuals or organizations (Bruton et al., 2010). In turn, the jurisdiction level of institutions operates at multiple levels starting from localized interpersonal relationships to the world system (Scott, 2014; Urbano &

Alvarez, 2014).

From the institutional economic theory approach proposed by North (1990), there are two types of institutions, which can be formal and informal. Formal institutions are regulations, contracts, and political rules (legal and economic) that limit the individual's interaction, while informal institutions such as traditions, values, beliefs, social norms, and practices, come from socially transmitted information and are part of the patrimony named culture. These institutions, from a political viewpoint, are conceived as repositories of authority and resources used to solve recurring problems at the social level and are part of the public and private sphere (Kenneth & Bonchek, 2010). While, from an organizational-theoretical perspective, institutions act as myths incorporated by organizations to gain legitimacy, resources, stability and better survival prospects (Meyer & Rowan, 1977).

These institutions analyzed from different approaches are compiled and summarized by Scott (2014) in an integrated model focused on organizations. According to the author "institutions comprise regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life" (Scott, 2014, p. 56). The regulatory dimension corresponds to the capacity to set laws and rules, which provide guidelines for future behavior and may operate through informal mechanisms (shaming activities) or may be highly formalized and assigned by specialized actors. The normative dimension, which represents behavioral patterns based on social, professional, and organizational interaction constraints, operates through values (what is preferred or desirable) and social norms (how things should be done), and are difficult to change in the long term. Finally, the cultural-cognitive dimension refers to the shared conceptions configured in a conceptual framework that allow the individual to encode and interpret information, and therefore mediates between the external world's stimuli and the response of the individual entity.

Translated to entrepreneurship, the institutional dimensions embody the set of rules and norms that articulate and organize the different interactions that take place between individuals and social groups, which an impact on entrepreneurial activity and economic development (Urbano & Alvarez, 2014). In this sense, the regulatory dimension encompasses all those government policies that support ventures and minimize the risks associated with the development of new entrepreneurial projects (Bruton et al., 2010). The normative dimension, in the field of entrepreneurship, represents the degree of admiration and social legitimacy of the entrepreneurial activity, as well as the social acceptance of the forms used by the members of a community to create new ventures (Busenitz et al., 2000). While the cultural-cognitive dimension addresses all those knowledge and skills that the individual possesses to create and operate a new venture

(Bruton et al., 2010).

Empirical evidence in the literature confirms the influence of institutions in promoting entrepreneurial activity (Aparicio et al., 2016; Martins et al., 2021; Urbano et al., 2019), and emphasizes the differential role of regulative, normative, and cultural-cognitive dimensions in the development of such activity (de Mello et al., 2022; Urbano & Alvarez, 2014). In terms of the individual, the findings are in line with this evidence and demonstrate the potential of the three institutional dimensions to determine entrepreneurial intention and motivations (Aloulou, 2021; Garcia-Cabrera et al., 2018; Gui et al., 2021).

In this vein, entrepreneurship is understood as a systemic phenomenon supported by both individual processes and the institutional environment in which it emerges (Ács et al., 2014). Therefore the relationship between institutional dimensions and entrepreneurial activity varies (Chowdhury et al., 2019). This variation can be explained by the development status of the economies (Chowdhury et al., 2019; de Mello et al., 2022), where motivation and alternative costs —in conjunction with the degree of uncertainty, ambiguity, and turbulence of institutional frameworks— determine necessity or opportunity ventures (Amorós et al., 2019). Such economic development status based on the categorization of factor-, efficiency- or innovation-driven economies turns out to be a boundary condition for understanding how institutions indirectly shape entrepreneurial activity and, specifically, the entrepreneurs' potential to profit from more entrepreneurially oriented ventures (Wales et al., 2021).

Factor-driven economies are characterized by dependence on unskilled labor and null innovative knowledge generation, and focus their competitiveness on low-cost factors and the natural resources available (Acs et al., 2008). Efficiency-driven economies are dominated by the use of technologies that increase their productive efficiency and must work harder to create value and foster their economic prosperity (Acs et al., 2008). Meanwhile, innovation-driven economies are characterized by high levels of research and development, as well as by the knowledge intensity and promotion of the institutions that generate it (Abdesselam et al., 2018).

Institutional Factors, Individual Entrepreneurial Orientation and Entrepreneurial Process

Empirical evidence has demonstrated how individuals prone to innovativeness, proactiveness and risk-taking manifest higher entrepreneurial intentions (e.g. Martins & Perez, 2020; Yalcintas et al., 2021). This proclivity is not immune to the conditions in which the individual unfolds; on the contrary, it can be strengthened or weakened according to the development level of the institutions in his context. Within the framework of the

collective sense represented in the normative dimension, the literature findings reveal how common beliefs, values, and assumptions about entrepreneurship may vary across cultures, causing individual entrepreneurial orientation to exhibit higher or lower levels depending on the region (Elenurm & Moisala, 2008; Lee et al., 2011; Lim & Envick, 2013; S. L. Mueller & Thomas, 2001; Sagie & Elizur, 2001).

Within the framework of research focused on normative dimension that is not explicitly culture-based, the literature remarks the importance of business environment guided to the informal entrepreneurial sector (Musara & Nieuwenhuizen, 2020), the educational support and the structural support (Mutlutürk & Mardikyan, 2018), and the role models (Marques et al., 2018) in stimulating individual entrepreneurial orientation. This construct determines the impacts of social entrepreneurship (efficiency and generosity) through the ecosystem associations' effect (quality and efficiency of support) (Nguyen et al., 2021).

Concerning the cultural-cognitive dimension, the proclivity for innovativeness, proactiveness and risk-taking increases when the individual's institutional context is endowed with adequate entrepreneurial social capital (Corrêa et al., 2021), increased self-confidence (Martins et al., 2018) and strengthened networking for future business (Palalic et al., 2016). While, in uni-dimensional terms, the individual entrepreneurial orientation is enhanced by the cognitive styles (rational, intuitive) of nurses in the Portuguese health services (Rebelo et al., 2021).

In turn, the findings associated with the regulatory dimension stressed the role of structural and economic-financial factors in encouraging individual entrepreneurial orientation. In this regard, Olutuase et al. (2018) recognize the importance of the state of the infrastructures that support entrepreneurial intention, the ease of access to financial services, and business protection. While Tadele (2020) and Abdullahi et al. (2018) recognize how innovativeness, proactiveness, and risk-taking can be strengthened through easy access to financial resources (access to credit and microfinance).

From a conceptual approach Kollmann et al. (2007) illustrate how regulative and normative dimensions (cultural layer, political/legal layer, macroeconomic layer, and microeconomic layer) are configured to encourage the orientation of the pre-nascent entrepreneur. In this regard, the authors stress the importance of the subjective perceptions that potential entrepreneurs have of these factors. Perceptions that are above and beyond the objective conditions of the environment and are aligned with the cultural-cognitive dimension.

In explicit terms the relationship between individual entrepreneurial orientation and institutional dimensions has been addressed by the research of Parga-Montoya & Cuevas-Vargas (2019) and Ogunsade et al. (2021). The first authors' findings demonstrate the

potential of the regulative, normative, and cultural-cognitive dimensions to promote individual entrepreneurial orientation from a gender perspective and under a quantitative methodological design. While Ogunsade et al. (2021), based on an exploratory qualitative approach, examine the role of institutional dimensions in fostering the entrepreneurial mindset, which comprises the three dimensions of individual entrepreneurial orientation.

With the recognition of the institutional context's role in strengthening individual entrepreneurial orientation, some studies highlight this role in the entrepreneurial process understanding. Thus, from the mediation perspective, the findings reveal how the individual entrepreneurial orientation transfers to the intention the effect of (1) access to financing, access to business information, social network and and university support (Sahoo & Panda, 2019), (2) approval of reference people and business protection (Olutuase et al., 2018), and (2) the stigma of failure and the close valuation of entrepreneurship (Martins & Perez, 2020). Within the normative dimension framework, the orientation - intention relationship is studied through the cultural lens, demonstrating through cross-cultural (Kumar et al., 2021), inferential (Rajković et al., 2020), and moderating analyses (Chienwattanasook et al., 2019), the national culture's potential to encourage entrepreneurial career choice. Likewise, according to a study by Gimenez-Jimenez et al. (2022) social support cultures decrease the negative relationship between risk-taking behavior and progress in the entrepreneurial process for female entrepreneurs illustrating the role of social support cultures as a buffer against possible losses. Finally, from the regulatory dimension and considering a moderation interaction, Abdullahi et al. (2018) emphasize the importance of access to finance in increasing the entrepreneurial intention of entrepreneurially oriented individuals.

3.5 Main Hypotheses Supported by the Literature

After the presented background, the main relationships that will be tested as hypotheses in the different articles that arise from the thesis are shown below.

Table 3.1: Proposed Hypotheses

- Entrepreneurship education program increases students' individual entrepreneurial orientation.
- Program inspiration is significantly associated with individual entrepreneurial orientation.
- Serious games usage is significantly associated with students' individual entrepreneurial orientation.
- Individual entrepreneurial orientation is significantly associated with entrepreneurial intention
- Individual entrepreneurial orientation dimensions differ significantly between factor-, efficiency-, and innovation-driven economies.
- Regulative, normative and cultural-cognitive institutions strengthens the relationship between individual entrepreneurial orientation and entrepreneurial intention.
- The economic development status (factor-, efficiency-, or innovation-driven economies) strengthens the effect of regulative, normative and cultural-cognitive institutions on the individual entrepreneurial orientation and entrepreneurial intention relationship.
- Individual entrepreneurial orientation is significantly associated with entrepreneurial process over time.

4 Methodology

The methodological approaches for each of the research objectives are described below.

4.1 Objective 1

As the first objective of the research, the systematic literature review aims to contribute to understand conceptual, methodological, and thematic development of individual entrepreneurial orientation. Thus, a review is carried out adopting a domain-based approach (Paul & Criado, 2020) and following the research guidelines proposed by Denyer et al. (2008) and Tranfield et al. (2003). Through this procedure, an effective, efficient, systematic, and transparent synthesis is achieved, with the capacity to be replicable.

- *Database:* SCOPUS and WoS (Web of Science).
- *Analysis period:* Initial deadline: unrestricted. Final deadline: December 31, 2021.
- *Search equation:* The search is conducted using the keywords "individual* entrepreneurial orientation", "entrepreneurial orientation" AND "individual*", "entrepreneurial orientation" AND "nascent* entrepreneur*" and "entrepreneurial orientation" AND "student*" in the titles, keywords, and abstracts of the academic articles.
- *Exclusion criteria:* The search yielded 843 articles. Because the impact factor of journals written in English is higher compared to journals designed in another language (P. S. Mueller et al., 2006), we decided to include articles written in English. After this process and eliminating duplicates, 526 articles were retained in our sample. We subsequently read their abstracts to ensure the treatment of entrepreneurial orientation from an individual-related perspective. In those cases where the treatment of this construct was not evident, we conducted a full article reading to confirm it. During this process, a total of 398 articles were excluded, so that the final sample comprises 128 articles for review.

- *Analysis axes:* (1) Thematic analysis, this analysis examines the main categories and subcategories that have grounded the research on individual entrepreneurial orientation. (2) Dimensional analysis, a content analysis is carried out to examine the theoretical and conceptual support for the attitudes that define individual entrepreneurial orientation. (3) Methodological analysis, this identifies the methodological designs, data analysis techniques, samples and other methodological details used in the sample of articles analyzed.

4.2 Objective 2

This objective is achieved through two studies that seek to identify the role of entrepreneurship education on the individual's entrepreneurial orientation and its subsequent effect on the intention to carry out a business. In the first study, the role of entrepreneurial education is represented by a benefit of the formation process, namely, inspiration. While in the second study the role of such entrepreneurship education is distinguished by the learning satisfaction generated by the use of a serious game associated with an active methodology in entrepreneurship education. Both studies are developed following an explanatory depth, a cross-sectional analysis, and an inferential study technique, and for each of them a robust sample composed of university students is used.

Study 1

- *Objective:* To identify the effect of entrepreneurship education program on the development of university students' individual entrepreneurial orientation and the role of such orientation in the relationship between program inspiration and entrepreneurial intention.

- *Variables:* Program inspiration, innovativeness, proactiveness, risk-taking, entrepreneurial intention.

- *Database:* The study was performed in two very long-established Latin American universities located in Medellin, Colombia, and Loja, Ecuador, both universities with excellent reputations and a recognized vocation for entrepreneurial education. Data was collected over three semesters (2018 semester 2 and 2019 semesters 1 and 2) on 1423 students enrolled in a transversal entrepreneurship course. The information is part of a survey conducted at the beginning and end of the formation

program, using a seven-point Likert scale and dichotomous questions. This non-probabilistic or non-random sampling technique is often used in research focused on educational contexts due to accessibility, availability, and geographic proximity (Martins & Perez, 2020).

- *Analysis technique:* The Wilcoxon signed-rank test is employed to identify the changes that may occur on the individual entrepreneurial orientation dimensions due to the entrepreneurship educational process. This test, which is non-parametric, allows comparing two related samples at the median level, defining the order of the observations in the two samples, and considering the magnitude of the observations (Gibbons & Chakraborti, 2011). Structural equation modeling (SEM) is used to test the other hypotheses. As a multivariate statistical technique, SEM is configured as a combination of factor analysis and multiple regression, allowing the establishment of interrelationships between latent constructs, and observed variables (Hair et al., 2010). Model mediation is estimated through the bootstrapping approach (Hayes & Preacher, 2014). Given that the measures used seek verification of a particular theoretical model, a common factor model approach consistent with covariance-based SEM is adopted (Davcik, 2014). The estimation of the model is performed by the maximum likelihood method in AMOS software.

Study 2

- *Objective:* To determine the effect of serious games in entrepreneurship education on individual entrepreneurial orientation and entrepreneurial intention.
- *Variables:* Performance expectancy, effort expectancy, learner satisfaction using serious games, innovativeness, proactiveness, risk-taking, entrepreneurial intention.
- *Database:* The study took place in 2019 with a sample of 963 students from a private university in Medellin, Colombia, which is well-known by their entrepreneurial vocation, and their support for developing entrepreneurial spirit. The study considers treatment and control groups ($N_{\text{Treatment}=462}$, $N_{\text{Contol}=501}$) through pretest posttest quasi-experimental design. All students answered a survey at the beginning and end of a 18 weeks compulsory course, which is transverse to all undergraduate college. Data collection corresponds to a convenience sampling technique, which is part of non-probabilistic sampling techniques (Bryman et al., 2018). The treatment group is composed by students exposed to an active learning methodology in entrepreneurship. This methodology is based on a serious game named *Villa Innovadora*, which is aimed to reinforce students' attitudinal characteristics and

their entrepreneurial capacity through a dynamic role-playing game with hidden identities that represents the entrepreneurial ecosystem.

- *Analysis technique:* Similar to the previous study, to determine the effect of serious games on individual entrepreneurial orientation for the treatment sample, the Wilcoxon signed-rank test is applied. While the remaining hypotheses are contrasted with the SEM covariance-based analysis, where the estimation of the direct relationships is carried out by maximum likelihood, and the indirect hypotheses are estimated under the bootstrapping approach. AMOS software is used.

4.3 Objective 3

To achieve this objective, two phases of analysis are required. In the first phase, the validity and reliability of the individual entrepreneurial orientation construct is tested in global terms and for factor-, efficiency- and innovation-driven economies. This process, which is of exploratory depth and cross-sectional analysis, enables a representative assessment of the measurement instrument developed by Bolton & Lane (2012). In turn, the second phase contrasts the innovativeness, proactiveness and risk-taking levels between factor-, efficiency- and innovation-driven economies. This contrast, which allows understanding the entrepreneurial phenomenon at the economic level from the personal characteristics that shape the entrepreneurial orientation, is of explanatory depth and cross-sectional type.

- *Variables:* Innovativeness, proactiveness, risk-taking.

- *Database:* The sample is obtained from the GUESSS project in its 2021 edition. Since 2003, the GUESSS (Global University Entrepreneurial Spirit Students' Survey) project developed at the University of St. Gallen (Switzerland), has collected, and analyzed information related to the entrepreneurial intentions and activities of undergraduate and graduate students in various fields of study in different countries around the world. In this sense, the information collected by the project, through the electronic survey instrument, comprises for its 9 edition 58 countries and more than 267000 complete responses, enabling the research development in different economic, social, or cultural contexts.

- *Analysis technique:* In the first analysis phase, an exploratory and confirmatory factorial analysis is conducted for the individual entrepreneurial orientation construct in factor-, efficiency- and innovation-driven economies and global terms.

The exploratory factorial analysis model is a statistical method for investigating common but unobserved sources of influence on a variable set, where the empirical basis suggests that variables in a carefully chosen domain are often interrelated (Cudeck, 2000). This analysis is executed in SPSS software and applies inferential statistics. In turn, confirmatory factorial analysis is a statistical model designed to identify and explore unmeasured sources of variability in a score set, whose appeal is its ability to test detailed hypotheses deductively (Hoyle, 2000). Such analysis is carried out by comparing a 1-factor and a 3-factor model for individual entrepreneurial orientation using SEM analysis in AMOS software.

For the second analysis phase (where the proposed hypotheses are tested), the Wilcoxon rank sum test is used. This test, which is usually known as the Mann Whitney U test, is the non-parametric counterpart of the t-test for unrelated samples and compares two independent populations at the median level (McIntosh et al., 2010). In addition, to facilitate the visualization of the results, the boxplot is used, which shows the location, dispersion, skewness, and width of the data tails from the quartile division (Benjamini, 1988).

4.4 Objective 4

This objective carries out a cross-sectional quantitative explanatory analysis. For this purpose, a set of institutional variables is selected, which assume the role of moderating variables in the individual entrepreneurial orientation and entrepreneurial intention relationship. These exogenous variables, obtained for 58 countries around the world and from different databases, are replicated at the individual level for each of the countries, with these individuals as the analysis unit. In addition, the economic development status assumes the role of a second moderator, intervening in the effect of institutional variables on individual entrepreneurial orientation and entrepreneurial intention relationship. Each of the proposed relationships is initially estimated using parametric statistical techniques, and then non-parametric estimation is applied for those that turn out to be significant.

- *Variables:*
  - Moderating institutional variables: Normative dimension: Entrepreneurial culture (GCR), entrepreneurial status (GEM), university support (GUESSS), support from reference groups (GUESSS), equalitarianism (GUESSS). Cultural-cognitive dimension: networking (GUESSS), entrepreneurial values and motivations (GUESSS), opportunities (GEM).

Regulative dimension: Property rights (IEF), fiscal freedom (IEF), business freedom (IEF), investment freedom (IEF), regulatory quality index (WB), political stability index (WB), cost of starting a business (WB).

- Moderating economic development variables: factor-driven, efficiency-driven, and innovation-driven countries (GCR).
- Endogenous variables: Innovativeness (GUESSS), proactiveness (GUESSS), risk-taking (GUESSS), entrepreneurial intention (GUESSS).
- Control variables: Gender (GUESSS), knowledge area (GUESSS), education level (GUESSS), age (GUESSS).

- *Databases:*
  - Global Competitiveness report (GCR): Developed by the World Economic Forum, the Global Competitiveness report is a yearly report published since 1979. The report, which aims to boost long-term growth and prosperity, is based on the Global Competitiveness Index (GCI), which identifies the performance of approximately 140 countries on 12 competitiveness pillars. Data associated with the 2020 report are considered for the analysis.
  - Global Entrepreneurship Monitor (GEM): Such project emerges in 1999 as the joint research between Babson College (USA) and London Business School (UK). This is one of the most important international projects regarding entrepreneurship, which publishes not only the annual Global GEM Report, but also a variety of national and special topic reports each year. The information reported constitutes a relevant input to establish public policies and develop academic research with entrepreneurship as the analysis focus. The project sample includes 115 economies worldwide and 22 years of data. Data associated with the 2021 report are considered for the analysis.
  - Index of economic freedom (IEF): Published by The Heritage Foundation, the Index of economic freedom provides a detailed analysis of progress in economic freedom, prosperity and opportunity covering 12 freedoms, from property rights to financial freedom, in 184 countries. In addition, the index addresses aspects related to country-level interaction, such as an economy's openness to the market and global investment. Data from 2021 are selected for analysis.
  - World Bank (WB): (1) Regulatory quality index, collects perceptions about the government's ability to formulate and implement sound policies and

regulations that permit and promote private-sector development, (2) Political stability index, measures perceptions about the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism, (3) Cost of starting a business, includes all official fees and fees for legal or professional services if such services are required by law. For all indices, data from 2021 are selected for analysis.

  - GUESSS Project: Described in objective 3 methodology. Data from 2021 are selected for analysis.

- *Analysis technique:* To test each of the proposed relationships, both parametric and non-parametric regression are used. For the first version, the regression analysis is performed under a hierarchical linear modeling (HLM) approach. This method of multilevel data analysis allows the identification of different relationships between variables measured at different levels and detects effects that may not be identified through traditional analysis techniques (Todd et al., 2005). The software used are MatLab and R.

  Once the variables with a significant relationship are identified, the second version of the regression is developed. Like parametric regression, its nonparametric counterpart aims to estimate and test the regression function characteristics, without making explicit assumptions regarding the functional form of the probability distribution for the sample observations. In this sense, nonparametric regression is nothing more than a collection of techniques for fitting regression functions when there is little a priori knowledge about their shape (Takezawa, 2005). The regression results represented in smoothed curves show the dynamics of two variables for the entire data domain. For this case kernel estimators are used, namely Priestley-Chao, Nadaraya-Watson, Gasser-Müller and multivariate kernel. The software used are MatLab and Python.

4.5 Objective 5

This objective is possible thanks to the development of a quantitative approach with explanatory depth and longitudinal analysis. In this sense, a sample of individuals is selected and monitored over a medium-term time period, to identify the evolution of their entrepreneurial orientation, intention and behavior. Once the data collection time has elapsed, the causality analysis between the variables involved is carried out using functional statistics. This procedure, that considers the individual as the analysis unit,

also adopts a gender approach. In this objective, entrepreneurial behavior is represented from a volitional-actional viewpoint, through the denominated entrepreneurial action.

- *Variables:* Innovativeness, proactiveness, risk-taking, entrepreneurial intention, entrepreneurial action.

- *Database:* The sample is composed of Colombian university students who received entrepreneurship formation and expressed interest in the entrepreneurial process. Thus, in the first semester of 2021, 185 individuals were selected from different areas of knowledge and academic semesters, which are measured recurrently for approximately three years. Figure 4.1 represents the timeline of the measurement process. The measurement is carried out through an electronic survey that inquires about several aspects related to the entrepreneurial personal characteristics, the entrepreneurial process, and the business operationalization. The survey is interactive and displays a set of options according to the individual's stage in the entrepreneurial process. In turn, to stimulate the respondents' participation, in each measurement, a gift bonus of a commercial establishment is awarded.

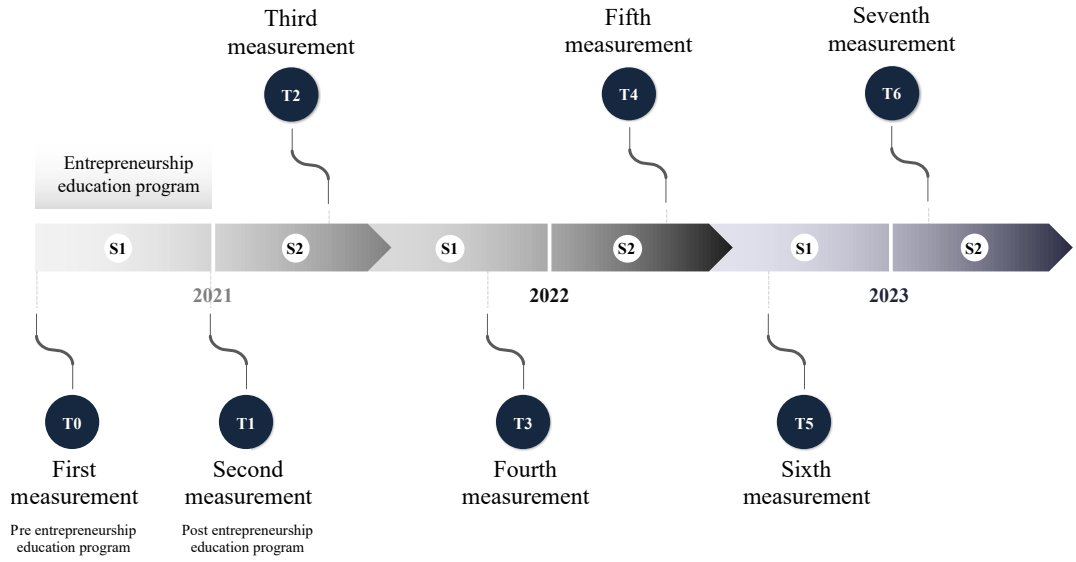


Figure 4.1: Measurement timeline objective 5

- *Analysis technique:* The analysis technique applied corresponds to functional data.The basic idea behind functional data analysis is to express discrete observations arising from time series in the form of a function, which represents the entire measured function as a single observation to subsequently extract modeling information about a data set (Ullah & Finch, 2013). Such analysis models variables that take values in a function space and allows (1) to represent the

data, (2) to display various prominent features in the data, (3) to study the most important sources of patterns and variations among the data, and (4) to explain the variation of an outcome or dependent variable using information from the input or independent variables (Ramsay & Silverman, 2005). In the context of this research, functional principal component analysis and functional regression analysis are used, and its implementation is executed in MatLab and R software.

Table 4.1 summarizes the methodological aspects of the research objectives.

Table 4.1: Methodological summary

Objective	Paper	Main hypotheses	Data	Variables	Analysis technique
Objective 1: To identify the contents and future agenda in the use of the individual entrepreneurial orientation in the entrepreneurship field	Paper 1	-	SCOPUS and WoS (Web of Science)	**Analysis axes:** Thematic analysis, dimensional analysis, methodological analysis	Systematic literature review
Objective 2: To examine the effects of entrepreneurship education, and its methodologies, on individual entrepreneurial orientation development; as well as its relationship with entrepreneurial intention.	**Paper 2:** To identify the effect of entrepreneurship education program on the development of university students' individual entrepreneurial orientation and the role of such orientation in the relationship between program inspiration and entrepreneurial intention	**(1)** Entrepreneurship education program increases students' individual entrepreneurial orientation **(2)** Program inspiration is significantly associated with individual entrepreneurial orientation **(3)** Individual entrepreneurial orientation is significantly associated with entrepreneurial intention	This study uses a pre and post-test analysis with data from 1,423 undergraduate students from Colombia (612) and Ecuador (811)	Program inspiration, innovativeness, proactiveness, risk-taking, entrepreneurial intention	The Wilcoxon signed-rank test is used for the pretest-posttest analysis and the SEM is used for the cross-sectional analysis
	Paper 3: To determine the effect of serious games in entrepreneurship education on individual entrepreneurial orientation and entrepreneurial intention	**(1)** Entrepreneurship education program increases students' individual entrepreneurial orientation **(2)** Serious games usage is significantly associated with students' individual entrepreneurial orientation **(3)** Individual entrepreneurial orientation is significantly associated with entrepreneurial intention	A pretest posttest quasi-experimental design is used by considering 963 undergraduate students (control group=501 and treatment group=462)	Performance expectancy, effort expectancy, learner satisfaction using serious games, innovativeness, proactiveness, risk-taking, entrepreneurial intention	The Wilcoxon signed-rank test is used for the pretest-posttest analysis in the control and treatment groups, and the SEM is used for the cross-sectional analysis in the treatment group
Objective 3: To compare individual entrepreneurial orientation among university students in factor-, efficiency-, and innovation-driven economies	Paper 4	Individual entrepreneurial orientation dimensions differ significantly between factor-, efficiency-, and innovation-driven economies	GUESSS survey (267000 observations across 58 countries)	Innovativeness, proactiveness, risk-taking	Exploratory and confirmatory factor analysis and Wilcoxon rank sum test are used for cross-sectional analysis
Objective 4: To determine the incidence of institutional factors on individual entrepreneurial orientation and entrepreneurial intention relationship	Paper 5	**(1)** Regulative, normative and cultural-cognitive institutions strengthens the relationship between individual entrepreneurial orientation and entrepreneurial intention **(2)** The economic development status (factor-, efficiency-, or innovation-driven economies) strengthens the effect of regulative, normative and cultural-cognitive institutions on the individual entrepreneurial orientation and entrepreneurial intention relationship	Global Competitiveness report, GEM, Index of economic freedom, World Bank, GUESSS survey	**Moderating institutional variables:** Normative dimension: Entrepreneurial culture, entrepreneurial status, university support, support from reference groups, equalitarianism. Cultural-cognitive dimension: networking, entrepreneurial values and motivations, opportunities. Regulative dimension: Property rights, fiscal freedom, business freedom, investment freedom, regulatory quality index, political stability index, cost of starting a business. **Moderating economic development variables:** factor-driven, efficiency-driven, and innovation-driven countries. **Endogenous variables:** Innovativeness, proactiveness, risk-taking, entrepreneurial intention. **Control variables:** Gender, knowledge area, education level, age.	Robust regression, non-parametric regression are used for cross-sectional analysis
Objective 5: To develop a longitudinal analysis of the relationship between individual entrepreneurial orientation and entrepreneurial process	Paper 6	Individual entrepreneurial orientation is significantly associated with entrepreneurial process over time	185 Colombian undergraduate students	Innovativeness, proactiveness, risk-taking, entrepreneurial intention, entrepreneurial action	The sample is measured semi-annually for a period of three years and then a longitudinal analysis is carried out using the functional data technique

5 Main Contributions

This research contributes to fill some gaps in the literature on individual entrepreneurial orientation, entrepreneurship education, entrepreneurial intention and behavior, and institutional factors. First, the objective 1 development allows us to identify the theoretical, dimensional, and methodological characteristics of the research on individual entrepreneurial orientation, from publications in the main academic databases. These findings add relevant information to the debate related to entrepreneurial orientation as a uni-dimensional or multi-dimensional construct that has been adapted at the individual level from the organizational context. In addition, the results feed into the discussion around the dimensions of individual entrepreneurial orientation that remains open, and complement the findings of da Cruz et al. (2021) for multiple contexts of analysis.

Secondly, objective 2 provides further evidence of entrepreneurship education's importance in stimulating entrepreneurial characteristics and attitudes. Thus, the research focuses its attention on an innovative method of entrepreneurial education such as serious games. This method, which is considered to be quite important for the entrepreneurial skills development (Calabor et al., 2019), has not been approached from the perspective of individual entrepreneurial orientation, and certainly not in the context of the entrepreneurial process. Additionally, this objective responds to the call of Nabi et al. (2017) to perform studies that inquire about the benefits of the entrepreneurship education programs and that are represented in the inspiration generated by an idea, a topic, a teacher, or a participant within the formation process. This complements the findings of authors such as Souitaris et al. (2007) or Ahmed et al. (2020) and helps to consolidate the research line on entrepreneurship education in the scientific community.

Thirdly, research objective 3 yields two contributions in light of the literature. Currently, studies are required to ensure the reliability and validity of individual entrepreneurial orientation for robust samples and in different contexts (Bolton & Lane, 2012; Howard & Floyd, 2021; Romaní et al., 2021; Santos et al., 2020). The research results allow us to confirm the appropriate building of this construct based on a sample composed of individuals from different countries around the world. Although comparisons of individual entrepreneurial orientation are frequent at the level of culture

(Elenurm & Moisala, 2008; Lee et al., 2011), individualistic and collectivistic regions (S. L. Mueller & Thomas, 2001; Sagie & Elizur, 2001) or gender (Kumar et al., 2021; Lim & Envick, 2013), no studies have been yet carried out to analyze this construct for factor-, efficiency- and innovation-driven economies. This analysis enables us to understand how entrepreneurial attitudes fluctuate according to the individual's economic conditions and constitutes a contribution to comparative economic studies.

Fourthly, following the causal line of individual entrepreneurial orientation on entrepreneurial intention, this research, through objective 4, unveils the different institutional factors that determine this relationship. Despite the presence of some progress in this regard (e.g. Abdullahi et al., 2018; Chienwattanasook et al., 2019; Kumar et al., 2021), the analyses (1) are limited to a regional sample context, (2) do not consider the different economic development levels of the regions, (3) and do not delve deeply into the different institutional dimensions. In this sense, the institutional theory proposed by Scott (2014) offers this research a solid framework widely used in the field of entrepreneurship (Urbano & Alvarez, 2014; Urbano et al., 2019). This theory in combination with the economic status categorization allows us to understand how institutional dimensions encourage or limit individual entrepreneurial orientation and entrepreneurial intention relationship across factor-driven, efficiency-driven, and innovation-driven countries, contributing to the findings of Wales et al. (2021) and de Mello et al. (2022) from a cognitive perspective. Furthermore, through a methodological exploration with control variables, we add a gender perspective to the growing discourse on the effect of institutional aspects at the country level on the promotion of the entrepreneurial process (Bullough et al., 2022; Gimenez-Jimenez et al., 2022; Yousafzai et al., 2015), which may gain relevance with the thesis development.

Fifthly, objective 5 furthers the understanding of entrepreneurial behavior from the personal characteristics that are part of the individual's cognitive structures. Thus, the research is not only oriented to the first phase of the entrepreneurial process, which is part of objectives 2 and 4, but also identifies the relationship between individual entrepreneurial orientation and entrepreneurial behavior represented in entrepreneurial action. Hence, the possible findings related to this objective are in line with the research carried out by van Gelderen et al. (2018), van Gelderen et al. (2019) and Gieure et al. (2020), but it also offers differentiating results by considering medium-term scenarios for the analysis, which are not frequent in entrepreneurial research at the individual level.

Lastly, at the methodological level, the study uses robust and longitudinal samples, as well as sophisticated statistical techniques, such as non-parametric regression and functional data. These methodological aspects that offer the possibility of new findings are beginning to be introduced in entrepreneurship research, and constitute an advance

over cross-sectional samples and parametric analyses based on inferential statistics, widely addressed in the literature on individual entrepreneurial orientation (da Cruz et al., 2021).

Figure 5.1 presents the theoretical model and proposed relationships.

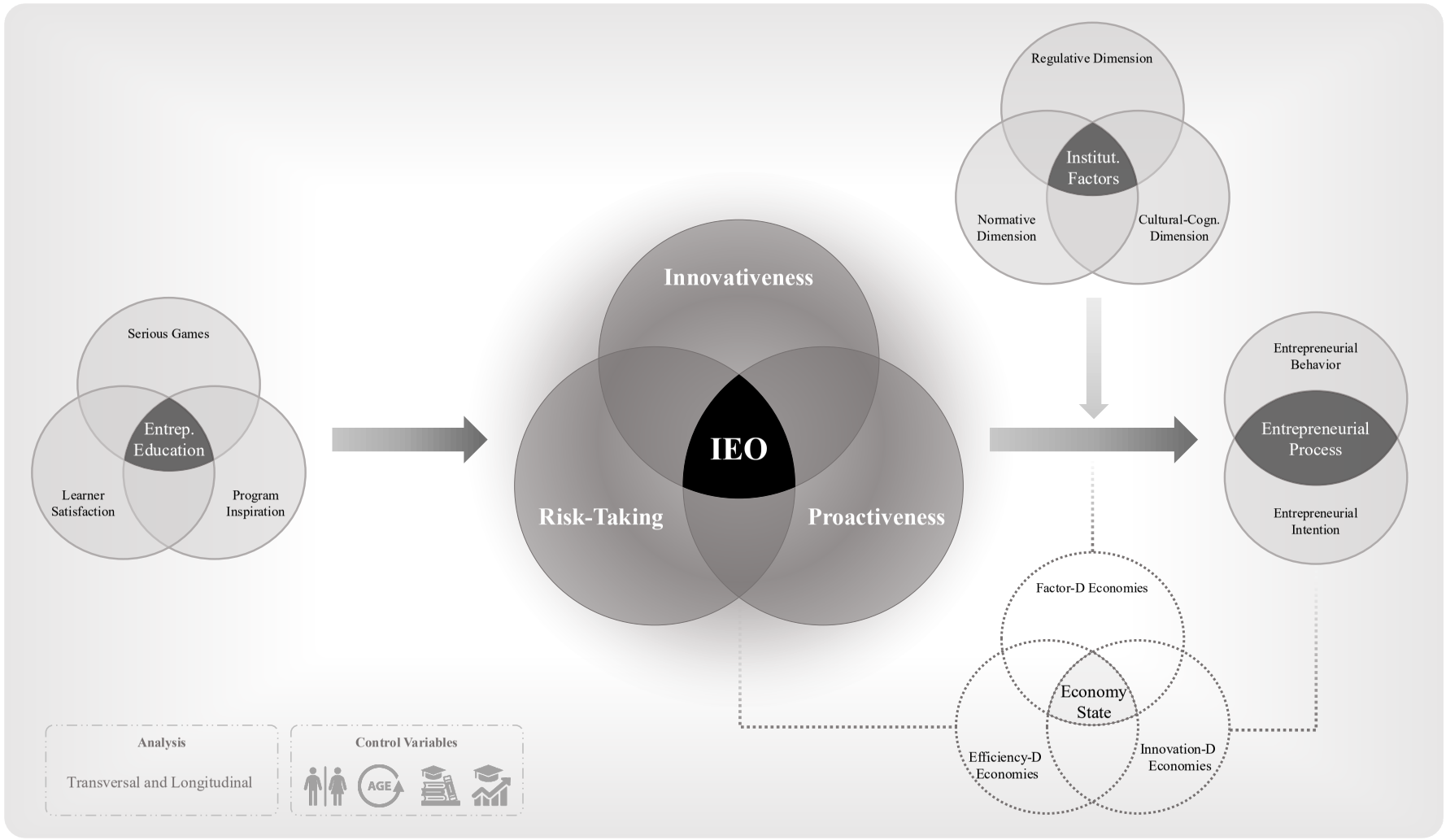


Figure 5.1: Proposed Model

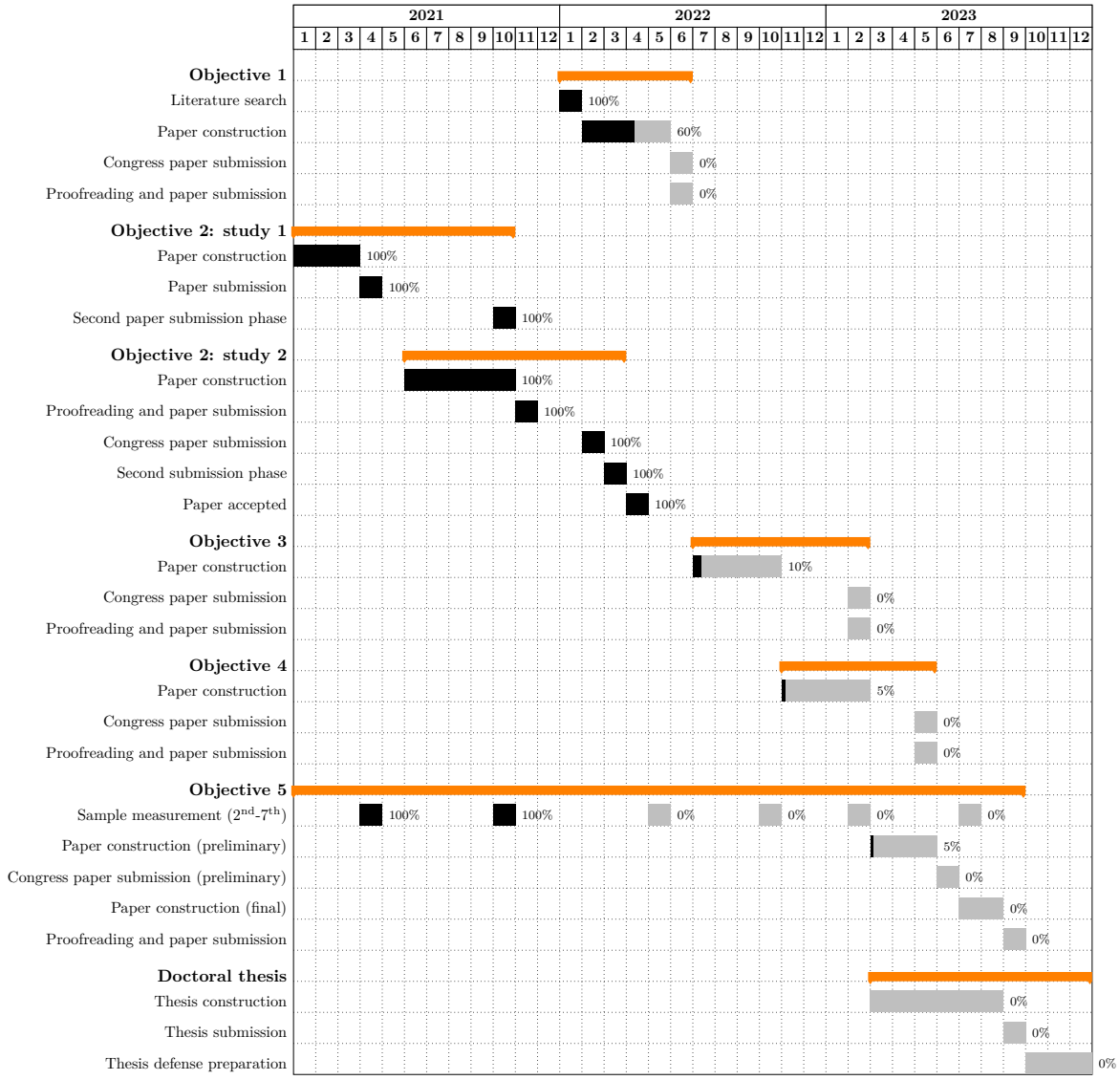
6 Expected Results and Timeline

Table 6.1: Expected and Preliminary Results

Papers	Journals	Conferences	Objectives	Preliminary results
Objective 1: Paper 1	Entrepreneurship Theory and Practice; Journal of Business Research	IECER 2022	To identify the contents and future agenda in the use of the individual entrepreneurial orientation in the entrepreneurship field	In writing phase with 60% progress.
Objective 2: Paper 2	Journal of Entrepreneurship in Emerging Economies	CLADEA 2020[1]	To identify the effect of entrepreneurship education program on the development of university students' individual entrepreneurial orientation and the role of such orientation in the relationship between program inspiration and entrepreneurial intention	Published in the journal.
Objective 2: Paper 3	The Journal of Entrepreneurship	ACEDE 2022[2]	To determine the effect of serious games in entrepreneurship education on individual entrepreneurial orientation and entrepreneurial intention	Accepted for publication in the journal.
Objective 3: Paper 4	International Entrepreneurship and Management Journal	ACEDE 2023	To compare individual entrepreneurial orientation among university students in factor-, efficiency-, and innovation-driven economies	We have the primary database (GUESSS). The paper is about 10% developed.
Objective 4: Paper 5	Small Business Economics	RENT 2023	To determine the incidence of institutional factors on individual entrepreneurial orientation and entrepreneurial intention relationship	We have the primary database (GUESSS). The paper is about 5% developed.
Objective 5: Paper 6	International Journal of Entrepreneurial Behavior & Research	ISBE 2023	To develop a longitudinal analysis of the relationship between individual entrepreneurial orientation and entrepreneurial process	From 7 measurements we have 4 measurements for each of the 185 individuals. The remaining 3 measurements will be conducted during the thesis development. The paper is about 10% developed.

[1]The paper version submitted to the journal corresponds to an updated version of the one presented at the conference.
[2]The paper version submitted for the conference corresponds to a different version than the one accepted for publication in the journal.

Table 6.2: Project Timeline



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