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Directrice du laboratoire Larequoi : Annie BARTOLI
Professeur

Rédactrice en chef : Delphine FRANCOIS PHILIP DE ST JULIEN
Maître de conférences-HDR
delphine.desaintjulien@uvsq.fr

Coordination : Sylvie YUNG
Assistante du LAREQUOI
sylvie.yung@uvsq.fr

Quentin BEDARD
Chargé de communication
quentin.bedard@uvsq.fr

Auteurs des articles

Sonia GEORGIEVA	Membre associé	LAREQUOI
Yacine HANNACHI	Membre associé	LAREQUOI
Philippe HERMEL	Professeur des universités	ISM-IAE/LAREQUOI
Soufiane KHERRAZI	Docteur	LAREQUOI
Tsvetina LUNGAROVA	Ph. D. Candidate	Université Saint-Clément d'Ohrid, Sofia
Justin PAUL	Professor	University of Puerto Rico, San Juan, USA
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Archana SRIVATAVA	Assistant Professor	Shri Ramdeobaba College, India

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ARTICLES

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Effects of corporate social responsibility and traditions in innovation on the activity of an international company- the case of “Schneider Electric”

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Sonia GEORGIEVA & Tsvetina LUNGAROVA
soniageorgieva.bg@gmail.com

Abstract

An important issue for CSR is whether it is instrumental for the legitimacy of organizations or does it mean philosophy and identity validation practices? This study focuses on CSR effects in the culture and practices of Schneider Electric as a direct consequence of its long history, business flair and a strong tradition of innovation. Specific CSR generators are tracked in the culture and way of doing business by the organization in the conditions of market competition. The study shows CSR not as a concrete and autonomous image-assertion strategy, but as a direct function of Schneider Electric 'personality' and 'character', which manifests itself in its day-to-day implementation at market conditions and according to the current economic environment: corporate citizenship.

Key words:

CSR, corporate culture, innovation, lifelong learning, Industrie 4.0

JEL Classification:

M14 Corporate Culture • Diversity • Social Responsibility

Introduction

Corporate Social Responsibility (CSR) is an increasingly popular topic both because of the many attempts to define it and because of the increased impact of corporations on society as a result of globalization. On the one hand, there is a variety of definitions, the differences among which are mainly in the nuances, but they are essentially based on common components (Caroll, A. and Brown, J., 2018). On the other hand, the question is whether CSR at all is a stand-alone category both in science and practice or is an instrument for corporate hypocrisy – simply a technique for building and maintaining a positive corporate image in the course of performing the corporation’s activity, whose sole purpose is profit maximization. Here is also the problem of personification of legal entities in view of the impact they have during their life cycle and in this relation the possible imposition of rights and obligations not only of legal nature, but of moral nature as well or the so-called "corporate citizenship”. The mentioned diversity of aspects of CSR interpretation determines the approach taken by the authors in this study to review the emergence and development of corporate social responsibility in the course of the activity of an international company with more than a hundred years of history and strong traditions of innovation -

"Schneider et Cie", predecessor of the modern-day multinational company "Schneider Electric". The aim is to clarify what is the relationship between the performance of the business activity in view of profits and the impact on society as a result of the company's business. The variety of definitions which should be covered to define CSR as well as the main research assumption that both (CSR and company activity) are mutually generated and linked in a straightforward relationship have led to the decision to view CSR effects without placing restriction in terms of a precisely given definition of CSR. Methodologically, the survey is based on a business-historical approach to the structural and comparative data analysis.

"Schneider et Cie" in a historical perspective

The French company "Schneider et Cie" was founded as far back as 1836 in Bourgogne (Burgundy) by the Schneider[1] brothers. A careful reading of the available archival records and research show that the success of the company is based on the constant pursuit of its founders of technical and at the same time social innovation during the First Industrial Revolution in France. As early as 1838, the Schneiders had attained one of their greatest technical successes, namely the construction of the first French steam locomotive (*la"Gironde"*) in Creusot, which marked the end of the British monopoly in this sector. Another remarkable technical achievement during this period was the invention in 1842 of the large mechanical steam hammer, weighing 3 tons, by the French engineer François Bourdon in Creusot (Beaud, C., 1977). Along with technical and technological innovations, the company's main element in its overall strategy was its social activity. From the very beginning, the Schneiders realized that man is as important as a machine in the production process, and in many cases even more important than the machine. At the time this was indeed a social innovation, the meaning of which was manifested in the more rational and, at the same time, more humane management of people in the process of production, called nowadays "human resources management". "This is not about philanthropy, but more about the so-called paternalism, whose emphasis is on the solidarity of the interests within the enterprise. Ever since the beginning of their activity, the Schneider brothers had taken social measures in the interest of both the workers and the management of the company. This approach of social governance in Creusot filled a gap in society at that time, namely the lack of social policy on the part of the liberal state after the bourgeois revolution of 1789 in France.

A striking example of the conscious social care and responsibility was the creation of the Schneider Schools as early as 1837. The vocation of these schools was in three directions. The first is aimed at providing general and vocational training to the children of the staff in the factories with a view of preparing the skilled workforce needed for the growing high-tech production. It was from Creusot's youth that many accountants, engineers and other specialists emerged later in the new technological processes who worked in the Schneiders' factories and were their highly competitive advantage. The second vocation of the schools was to make a fair selection of the most gifted and deserving students among the workers' and employees' children and to direct them to the new *Arts et Métiers* specialty schools in the big cities. The third direction aimed to create a staff that shared Schneider's values of responsibility to future generations and respect for the founders of the company. The fruits of these schools had their socially useful projection ahead of the time. They were, in fact, an early manifestation of the company's behaviour as a corporate citizen as a result of its sustainable decision to invest in education, work and qualifications. A direct effect of Schneider's social strategy was the sustained number of workers in Creusot even

[1] In 1836, the brothers Eugène and Adolf Schneider bought the former royal military plants in Creusot, Bourgogne, and adapted them for peacetime metallurgical production. Hence the popularity of the Schneider-Creusot in historiography. After the death of Adolf Schneider in 1845, the firm was run by Eugene Schneider until 1875.

during an economic crisis such as that of 1848-1850. In order to overcome it, Schneider temporarily restricted investment in production but did not reduce wages (Beaud, C., 1995). It can therefore be argued that the desire for profit was not at all costs, but that there was a certain balance between financial performance and social responsibility.

Tradition and Innovation during the Second Industrial Revolution

The end of the 19th century marked a new stage in the company's development and orientation to military production. France's defeat in the Franco-Prussian war of 1870 and the related need to increase the military power of the state was largely the reason behind this. Schneider expanded even more the scope of its activity. Based initially in Creusot, they were gradually becoming a powerful military-industrial complex, encompassing numerous factories in the ferrous metallurgy, machine building and the military industry in Lorraine, Normandie, Gironde, also in the vicinity of Paris. A number of companies abroad, including the Russian Putilov military plants, industrial enterprises in Poland, Yugoslavia, Romania and others were also under their control. At the end of the century, the company already had a broad network of representatives in more than 30 countries worldwide (Beaud, C., 1985).

At this stage of its development, when the Second Industrial Revolution was under way, Schneider also successfully implemented the strategy of applying the latest technical and technological inventions in the production process. In 1874 they managed to produce a special kind of steel with superior technical qualities, designed mainly for the production of heavy artillery and various types of armoured plates. In 1876, the first French two-cylinder locomotive (*la "Bayonne"*) was constructed by engineer A. Mallet in Creusot. A little bit later, Henri Schneider[2], convinced of the future of electricity, began electrifying the factories in Creusot. He created studios whose initial purpose was to meet the needs of electricity of mechanical constructions enterprises. A little later, in 1897, his son Eugène II opened the first independent studio for production of electrical materials. In 1900, the gas lighting in the plants was replaced by electric lights. For the development of the new electro technical industry, Schneider focused on purchasing licenses mainly from Westinghouse, which were a credible force on the international market at the time. As a result of the convergence and subsequent association of Schneider et Cie with the American company, in 1901 they acquired the electrical plant for production of alternators, transformers and engines in Champagne-sur-Seine, which was located relatively close to the centre of technical novelties - Paris (D'Angio, A., 1995).

In 1929, the joint venture *"Matériel électrique - Schneider-Westinghouse"* was founded, giving its fruitful results in the following years. The company underwent a major restructuring after World War II under the leadership of Charles Schneider. Later in 1975, the Schneider group acquired the ownership of *Merlin Gerin*, one of the leaders in electrical distribution equipment at that time. Subsequently (1981-1997), the company abandoned steel production and shipbuilding and focused mainly on electricity through a series of strategic acquisitions. The historical review shows that there is continuity in Schneider et Cie's innovative management strategy, which is the basis for the upward and sustainable development of the company during the First and Second Industrial Revolutions.

[2] Henri Schneider (1840-1898), son of Eugène Schneider, inherited his father's entrepreneurial spirit and courage for innovation.

1. The Challenges of Industrie 4.0: qualified workforce and digital innovations in the product portfolio

The tradition continued with their successor in the electrical industry "Schneider Electric", which revived the glory of its predecessors and became a world leader in the course of the Third Industrial Revolution in the twentieth century. The company is currently facing the new technical and social challenges of Industrie 4.0. in an increasingly changing world, and it responds accordingly. While “Industrie 4.0” was publicly discussed in 2011[3] for the first time (Hermann at al., 2015) Schneider Electric further strengthened its position in software applications, critical power and smart grids immediately after 2010. And if the first three industrial revolutions occurred as a result of mechanization, electrification and information technology, Industrie 4.0 originates from connected devices, the consolidation of previously unseen data sets, and the ability to analyse data in real-time, automated solutions respectively, based on information processed in real-time (Industrie 4.0 Working Group, 2013). It is not yet possible to address fully all the consequences these new opportunities have on the business and society. The speed at which the changes occur is exponential (Schwab, K., 2016), and the question of adaptation to the new situation is fundamental in relation to the competitiveness of both legal entities and individuals. At the same time, new opportunities are emerging and the old ones are fading - within a professional life cycle a profession can be transformed to an extent that the person exercising it can retrain repeatedly in order to maintain their competitiveness on the labour market. This dynamic environment leads to deepening of social contrasts, puts to a serious test of the ability of people to adapt to new conditions and to constantly study, as well as to the shifting of market positions (of goods and services, labour, etc.). All citizens - including "corporate" ones - have to learn quickly and adapt to the new environment (Industrie 4.0 Working Group, 2013). More than ever, the qualification of the workforce is on the agenda as an absolute prerequisite for the implementation of competitive strategies based on innovations. Traditional education systems do not have the ability to respond to the changes at the speed at which they are happening. In this context, large corporations that have strong traditions in the accumulation and transfer of knowledge to their workforce, but are innovative and, at the same time, flexible because of their activity in conditions of continued competition, are addressing this issue to a high degree.

Schneider Electric's CSR practices are rooted in the very beginning of its history in terms of education, increase of employees’ qualification and community competencies in the areas in which the company operates. This is another. illustrative example of mutual interest between the business and society. The company's interest in having a plenty of qualified human resources for the purposes of its business and its expansion is clearly expressed, and at the same time there is the public benefit of the company's actions through the creation of the Schneider Schools as early as 1837. Schneider Electric is currently developing intensively its staff, investing in modern digital platforms for continuous professional training and encouraging its employees to benefit from these resources constantly. This is another significant example of the CSR effects of the group's operations that are synergistic in terms of the company's public interest and social interest at the same time.

At present, Schneider Electric is one of the world's leaders in the energy industry and is undergoing an unprecedented in its history digital transformation both in terms of its internal

[3] An initiative dedicated to increasing the competitiveness of the German manufacturing industry represented by united representatives of the business, scientific and political circles in Germany. Subsequently, supported by the German federal government and regarded as the main structural part of High-Tech Strategy 2020 for Germany.

standard business processes (the qualification of the human resources is an essential prerequisite) and in relation to its innovation strategy in its product portfolio (in order to make it “smart”). The new conditions resulting from IoT, IIoT and Big Data are fomenting a market revolution in the direction of integrated sensors, the ability to analyse data in real-time, automated behaviour of multiple linked systems based on analysis, and so on. The group is addressing this challenge by actively acquiring a number of key software application development companies for the purpose of developing integrated "smart solutions" that are the base "EcoStruxure" platform is built on - an innovation in the energy industry. This platform enables data collection, analysis, and automated solutions in real time by bringing together the operation of different configurations of devices Schneider Electric offers on the market. The main effects of implementing this solution are: increased efficiency in the operation of systems and equipment, cost minimization, increased energy efficiency, lowered carbon emissions, etc. or in other words: it makes a significant contribution to protecting the environment and reducing carbon emissions. The company is both acting as the user of these solutions (implementation with the aim of optimizing production, etc. at Schneider Electric factory plants) and as an innovator who develops and challenges others on the market with its innovative portfolio. Both aspects are absolutely and simultaneously necessary to maintain its competitiveness. The traditional image of a responsible and innovative organization is combined with all the concomitant advantages of the current sustainability topic at a time when more and more consumers and shareholders prefer to support companies with such values - "The Ratings Game" (Porter, M. and Kramer, M., 2006), while at the same time there are benefits for society. In the group's annual shareholders' reports, this fact is even explicitly highlighted as a competitive advantage: “*We believe that sustainability is a business - a pillar for every successful company. This is so because, by working for a more sustainable world, we not only provide healthy life to our planet for future generations, but also encourage innovation and prosperity here and now.*” (Tricoire, J.P., Chairman & CEO, Schneider Electric). In this sense, the public interest and the commercial interests of the company are in line.

2. **“Sustainability is business”**

The incorporation of CSR into the company's strategy has taken place in the course of its overall development, but at the end of the 1990s of the 20th century it also expanded considerably its scope in view of the formulation and creation of purposeful structures. Schneider Electric Foundation dates back to 1998 and was set up to implement sustainable practices on the part of the organization and was followed in 2002 by the establishment of a unit in the organization dedicated also to sustainable development. In 2005, the company implemented the first Planet & Society barometer, a tool to measure the results of its activity in this area, and the introduction of the CSR criteria in the executives' compensation (Schneider Electric SE, 2015) dates since then approximately. In 2016 the group published its first integrated report, detailing the strategy of "introducing significant innovations in response to several megatrends” among which: the forecasted highest population growth in big cities; reaching over 50 million connected machines and devices; the possibility for consumers to produce energy (Schneider Electric SE, 2016).

In many studies and reports funded or prepared entirely by the company, as well as in its annual reports it is stated very specifically and purposefully that its strategy is completely based on the concept of sustainable development because it is seen as a synergy focal point of social interests and business interests. This is of course communicated actively and is a positive image strategy, but it is definitely not an end in itself, because in reality the industry itself, in which the group operates, in combination with the main challenge of our time - reducing the footprint of human activity on the planet and limiting climate change - has a high synergy power. The targets[4] set for reducing carbon emissions are a strong incentive in terms of the financial performance of the business by encouraging increased operational efficiency, reducing raw material input in

[4] Paris Agreement, United Nations, 2015

production, and reducing energy consumption in manufacturing activities. This has a significant role in the performance of more and more companies due to their desire to eliminate the interdependence between economic growth and rising emissions. The commitment to SBT[5] (Schneider Electric SE, 2018) not only assists in securing future revenue but also represents a long-term competitive advantage for companies that are dedicated to what the Schneider Electric group is. There are analyses proving that companies demonstrating leadership in the fight against climate change are more profitable - accounting for an 18% higher ROI[6] than others which are not committed to solving this problem (Schneider Electric SE, 2017). The arguments related to the business benefits that a corporate strategy based on sustainable goals and practices brings to its company are much more and can be studied more thoroughly and they refer to the preparedness of such company in the context of the forthcoming regulatory changes, the transparency as an advantage when presenting the company to potential investors, a better reputation with the introduction of pricing mechanisms based on carbon emissions as well as the ability to influence and take the lead in policy making in this area, etc.

The company set targets for sustainability for 2018-2020 (Schneider Electric SE, 2018), which clearly reflect the main trends in this direction. The group points out that its activity affects simultaneously the planet, the profits of the company and the activity of its customers. Through its sustainability strategy, the company formulates its responsible role, and in practice introduces a standard for measurement and self-encouragement of its behaviour (the Schneider Electric Declaration of Sustainability for the period 2018 - 2020 is subject to an independent audit whose results are updated four times per year). In this way, Schneider Electric adopts one of the best practices of a corporate citizen – it not only declares commitment to sustainability but also materializes it in concrete actions with measured results.

Conclusion

The interweaving of the public interests and the interests of business is not absolute. However, it is too significant to be reduced to mercantile hypocrisy when it comes to implementing sustainable practices on the part of the business. Such traditional behaviour of a company undoubtedly adds positive aspects to its image as well as financial results. Competitiveness strategy, based on innovations, undoubtedly require qualified staff to carry it out. The historical development of the international company Schneider et Cie is an example of successful diversification of activities in line with the new achievements in technology and the market requirements, which is made possible to a large extent thanks to their qualified human resources. Schneider Electric continues the strategy of high-tech and at the same time social innovations, which in turn determine their corporate civic position, and vice versa.

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[6] Return Of Investment

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The impact of the learningorganization on product innovation performance : an Empirical assessment in the French biotechnology industry

Paru dans l'International Management en 2016

Yacine HANNACHI
yachannachi@gmail.com

Abstract

This paper examines the role played by the learning organization culture in generating product innovation performance. It also aims at assessing the moderating effects of environmental turbulence, export intensity and public innovation support on the aforementioned relationship. We use structural equations modeling with partial least squares technique to test our hypotheses on a data set from the French biotechnology industry. The results generally support theoretical predictions and emphasize the key role that learning organization has for product innovation performance.

Keywords: learning organization, product innovation performance, environmental turbulence, export intensity, public innovation support

Résumé

Ce papier examine l'impact du fonctionnement en entreprise apprenante (EA) sur la performance des innovations des produits (PIP). Il vise également à explorer les effets modérateurs de la turbulence de l'environnement, de l'intensité exportatrice et du soutien public à l'innovation sur ce lien. Nous utilisons la méthode des équations structurelles avec la technique des moindres carrés partiels pour vérifier nos hypothèses sur un ensemble d'entreprises de biotechnologie en France. Les résultats sont généralement en ligne avec les prédictions théoriques et mettent en relief le rôle clé que joue l'EA pour la PIP.

Mots clés : entreprise apprenante, performance des innovations des produits, turbulence de l'environnement, intensité exportatrice, soutien public à l'innovation

Resumen

Esta articulo examina el impacto del funcionamiento de la empresa aparente en el rendimiento de la innovacion de productos. Su objectivo es igualmente de explorar los efectos moderadores de la turbulencia del entorno, de la instensidad exploratoria y del apoyo publico a la innovacion en este enlace. Utilizamos el metodo de las ecuaciones estructurales con la tecnica de los mínimos cuadrados parciales para comprobar nuestras suposiciones en un grupo de empresas de biotecnologia en Francia. Los resultados son generalmente de conformidad con las predicciones teóricas y destacan la función clave que desempeña el empresa aparente a la el rendimiento de la innovación de productos.

Palabras Claves: empresa aparente, rendimiento de la innovación de productos, turbulencia del entorno, instensidad exploratoria, apoyo publico a la innovacion

Ce papier examine l'impact du fonctionnement en entreprise apprenante (EA) sur la performance des innovations.

The literature on management points out the critical role that organizational learning plays in improving a firm's competitive advantage (Bolivar-Ramos et al, 2012). In this regard, the resource-based view postulates that the capability to activate learning processes is the basis of the strategic performance of firms (Lopez et al, 2005). Thus, in order to survive and thrive in a turbulent environment and in front of a tough competition, several authors advocate the model of the learning organization (LO) culture (Watkins and Marsick, 1996; Ortenblad, 2004). Its aim is acquiring, creating, disseminating, and transforming new knowledge in order to improve the firm's capabilities (Yang et al, 2004). LO models are usually presented as the antecedents of organizational learning, performance and innovation. The linkages between LO, performance and innovation have been the subject of several studies (Jiménez-Jiménez and Sanz-Valle, 2011). The pattern of results shows that the LO affects positively innovation, performance (Baker and Sinkula, 2002), and performance through innovation (Calantone et al, 2002).

Innovation is seen in many areas as the most critical driver of competitive success (Evanschitzky et al, 2012). Alegre and Chiva (2008, p.315) state: "Balachandra and Friar (1997) consider that the successful introduction of new products is the lifeblood of most organizations". Many companies earn more than a third of their profits from products introduced since less than five years (Schilling, 2005). This author reports that Baxter, a global leader in medical equipment, has achieved 37% of its sales in 2002 with products introduced after 1999. However, the number of companies that failed to meet targeted performance of new products is alarming (Evanschitzky et al, 2012). Over 95% of new product projects earn no return on investment (Schilling, 2005). According to Cooper (2011), several projects have never been completed, and among those completed, only 25% have succeeded to commercialize such products.

Calantone et al, (2002) define innovation as successfully implementing new ideas within an organization. Therefore, innovation is closely related to organizational learning and there seems to be an agreement that a learning orientation and firm innovation are highly linked (Calantone et al, 2002). In this regard, to foster product innovation performance (PIP), some authors have called for directing firms towards a learning organization culture (Baker and Sinkula, 2002; Alegre and Chiva, 2008). The basic assumption is that learning has a key role in enabling firms to make their innovation processes faster, more flexible and more efficient (Jimènez-Jimènez and Sanz-Valle, 2011).

Despite the abundance of theoretical developments and qualitative research, supporting the existence of positive relationships between LO and PIP, empirical studies, especially those quantitative, on the subject remain scarce. Therefore, further empirical analysis is a must as suggested by Calantone et al (2002), Alegre and Chiva (2008). Management literature assumes that organizational learning finds its legitimacy mainly in a turbulent environment, especially for companies that are active on a global scale. However, research that studies the likely intermediate effects of variables such as export intensity (EI) and environmental turbulence (ET) is still scarce and rarely simultaneously taken into consideration when studying the LO-PIP link (Tsai and Huang, 2008).

This paper seeks to fill these gaps in the literature by empirically assessing the impact LO culture has on PIP in a turbulent environment and providing new insights regarding the moderating role of export intensity on this link. To obtain more reliable results, we also aim at controlling the Public Innovation Support (PIS) effect on the LO-PIP link.

To this end, we use structural equations modeling with partial least square (PLS) approach to test our research hypotheses on a data set from the French biotechnology industry. Studies show that the United States is ahead of Europe in terms of turnover and investment in R&D (France Biotech, 2009). For instance, the United States has achieved 72% of the worldwide turnover of biotechnology in 2007 against only 21% in the case of Europe. More specifically, the challenge for the French economy is important since France, still lags behind, and occupies the third place across Europe behind the UK and Germany. Hence the importance of asking our research

question in this area full of economic, societal and human promises and challenges to national economies.

The paper is divided into five sections. Section 2 presents the conceptual framework and hypotheses of the research. Section 3 describes the adopted research methodology. In section 4, the main results are presented. Finally, section 5 discusses the implications of the study, its limitations and makes proposals for future research.

Conceptual Background and Hypotheses

The Learning Organization Concept

The concept of the LO is rooted in managerial thinking of the seventies and eighties (Harvey and Denton, 1999). However, its first explicit appearance was in the early nineties with Peter Senge (1990) and his book “The Fifth Discipline”.

An analysis of the definitions of this concept shows that the LO is one that promotes individual and collective learning in a global vision of continuous development (Watkins and Marsick, 1996). This learning takes place in a climate that is nurtured by the firm. In this way, individuals gain more efficiency and creativity yielding two phenomena. On one hand, the knowledge and skills of each individual become better and wider. On the other, the firm develops the ability to overcome challenges and transform itself permanently.

Neither can the LO be considered as a management technique, nor as an ideal organizational configuration that should be adopted (Ortenblad, 2004). It is rather a dynamic mode of organization characterized by general principles and is a management paradigm of a multidimensional nature involving a continuous co-evolution of people, teams and the organization (Yang et al, 2004). Several models of this concept have been proposed by some well-known scholars (Senge, 1990; Watkins and Marsick, 1996; Goh and Richards, 1997).

Our study is based on one of the most prevalent models in the literature (Ortenblad, 2004; Song et al, 2009). That is the model developed by Watkins and Marsick (1996): the Dimension of Learning Organization Questionnaire (DLOQ).

This choice is motivated by several reasons. First, the DLOQ covers dimensions of a LO at all levels. In fact, Redding (1997) evaluated some models of LO and stated that the DLOQ was the only model that covered all learning levels (individual, team and organizational). Second, Song et al (2009) indicate that this model includes most of the attributes of LO described in the literature since it takes into account models of Senge (1990), Pedler (1991), Garvin (1991), Goh and Richards (1997). Third, after doing a comprehensive review of literature on LO, Ortenblad (2004) suggested a typology that consists of four perspectives: organizational learning; learning at work; learning climate and learning structure. Among the twelve models evaluated by Ortenblad (2004), only that of Watkins and Marsick covers all these perspectives. Finally, Moilanen (2001) evaluated eight measurement tools of LO in terms of archetype, depth, scope and scientific validation. This author showed that the DLOQ obtained the highest score.

Watkins and Marsick (1996) defined the LO as “one that learns continuously and transforms itself. Learning is a continuous, strategically used process-integrated with and running parallel to work” (1996, p. 4). These authors identified seven dimensions that characterize firms striving to become LO. These seven dimensions and their items are presented in Appendix A.

The Product Innovation Performance

“Product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses” (OECD, 2005, p.156). The concept of performance means performing an action, the result arising from it or the success related to it. Understanding the relationship between innovation and performance in any type of organization has long been the subject of interest for researchers and managers (Jimènez-Jimènez and Sanz-Valle, 2011). The underlying rationale is that innovation is widely considered as a critical source of success, firm performance and its competitive advantage in an increasingly turbulent environment (Crossan and Apaydin, 2010).

The evaluation of the PIP questions the resourcesresults link. To this end, both academic and practitioners emphasize the importance of having a good measurement instrument of this concept. The PIP can be approached from a technical, financial, business, or global perspective (Storey and Easingwood, 1999). Although financial and business indicators are the most utilized in the literature, there is a call for more emphasis to adopt other types of indicators such as improved corporate image, the opening of new markets, customer satisfaction, etc. Several authors (Alegre and Chiva, 2008; Hsu and Fang, 2009) suggest that different aspects of the PIP are best reflected by a multidimensional measurement rather than by a unidimensional one.

To construct our measurement instrument of the PIP, we submit our extended understanding of this concept to a qualitative test with some R&D responsible. We selected three representative measurement terminology adopted by different authors to assess the PIP. The first terminology was proposed by Griffin (1997), Storey and Easingwood (1999), Hsu and Fang, (2009) and focuses on market and customer performance, financial performance, technical performance, and overall performance. The second terminology was proposed by Alegre and Chiva (2008) and consists of two dimensions: efficiency and effectiveness of new products. The third terminology is adopted by the OECD (2005). It focuses on innovation impacts related to the market demand, competition among other dimensions.

Environmental Turbulence

Environmental turbulence has been defined in many ways. Elbanna et al. (2013) indicate that it is the result of two components: hostility and uncertainty. A hostile environment is perceived as unfavorable to the mission of the company and its products. It is characterized, for example, by fierce competition, oppressive regulations and limited growth prospects. An uncertain environment is characterized by rapid change and the scarcity of information. For Gotteland and Boulé (2006), among turbulence characteristics, they cite complexity and dynamism. Complexity refers to the diversity degree of agents making up the environment and dynamism refers to the variation degree in the time of the components of the environment. Duncan (1972) had defined the turbulence of the environment as “the degree and frequency of exchange occurring over time to the firm’s environment” (cited by Kim and Atuahene-Gima, 2010, p.523).

Regardless of the chosen definition, it is recognized, in the literature, that a turbulent environment induces increased difficulty of understanding and analysis. Moreover, the more dynamic, hostile, and uncertain the environment is, the more “informational sensitivity” increases. In fact, information held at a time “t” becomes less valid at a time “t +1”, individuals and organizations suffering from cognitive limitations and resources to understand their environment, the quality of information cannot be fully assured (Gotteland and Boulé, 2006). This could have serious repercussions on the decisions and thus, negatively affects firm performance.

Learning Organization And Product Innovation Performance

Inkpen and Crossan (1995) see that the achieved performances are a reflection of the effectiveness and efficiency of learning processes within the firm. McKee (1992) understands product innovation as an organizational learning process and claims that directing the organization towards learning fosters innovation effectiveness and efficiency. Thus, Baker and Sinkula, (2002); Alegre and Chiva, (2008); Hsu and Fang, (2009) indicated that LO is a relevant framework for generating efficient product innovation. In what follows, we will describe the impact of DLOQ on PIP.

The underlying assumption for activating the first dimension of the DLOQ, ***continuous learning***, - which concerns learning at the individual level - is that firm learns as long as each employee is carrying a learning ability and creativity. As individual learning is supposed to improve the human capital of the firm, we can consider that a firm with a better employee quality will have higher product innovation performance because its manpower can bring skills and capabilities into full play (Hsu and Fang, 2009).

The second dimension of the DLOQ is ***inquiry and dialogue***. The more this culture is initiated; the better will be the relationship between employees (Alegre and Chiva, 2008). This could lead to build trust in the firm. Trust is crucial for better collaboration between employees. In this regard, Jacob and Turcot (2000) note that the higher the level of trust is, the more the tacit knowledge is

shared and it becomes an asset to solve problems and leads to innovation. Calantone et al, (2002) showed that open mindedness positively affects the capacity of innovation.

Team learning is the third dimension of the DLOQ. The team, as a collective of individuals who identify themselves as part of this entity, is considered of strategic nature for its leading role in the acquisition, sharing and development of organizational knowledge (Senge, 1990). Analyzes of successful firms, both in terms of productivity and in terms of innovation, have shown that the transition from a work whose basic unit is the individual to another whose basic unit is the team is confirmed as one of the most important issues to master by companies (Jacob and Turcot, 2000).

The next dimension of the DLOQ is ***empowerment***. It is to create a work environment where employees have more responsibility and authority to act. Watkins and Marsick (1996) emphasize that LO should ideally develop a vision around which its members must unite. A common practice eliciting members to this vision is participative decision making. This practice promotes motivation, satisfaction and commitment to work and to innovate. The feeling of belonging and unity around common goals motivates members of the company to be voluntarily more committed in terms of learning and innovation by a constant effort to check their progress against the objectives that were set by themselves (Alegre and Chiva, 2008).

Embedded systems is the next dimension of the DLOQ. It consists in establishing a set of structures, procedures and tools to capture and share information and knowledge. Sharing learned knowledge is a fundamental means by which people can mutually exchange their knowledge to achieve innovation, and finally transform it into competitive advantage of the company (Calantone et al, 2002). Intra-organizational knowledge sharing can lead to respond faster to customer needs and to lower costs (Baker and Sinkula, 2002). Wang and Wang (2012) showed that the practices regarding the sharing of explicit knowledge positively influenced quality and speedto-market innovations. They also showed that the practices regarding the sharing of tacit knowledge were positively related to the quality of innovations produced.

The dimension of ***system connection*** reflects that the process of innovation has become more open and interactive. This dimension refers to the consideration by the firm of all its partners, such as suppliers, customers, distributors, investors, etc. (Yang et al, 2004). This results in a relevant understanding of the needs of all its stakeholders. By seeking to satisfy these latter, the firm will be naturally led to improve the performance of its products. Furthermore, knowledge stemming from cooperation with universities and research establishments, from alliances and networks might be an important factor in the successful enterprise of innovation projects. Yang et al (2004) showed that this dimension was the most critical of what they call “the knowledge performance”. This latter concept measures the improvement in products and services to customers and improvements in the intellectual abilities of employees.

The seventh dimension of the DLOQ model is ***strategic leadership***. It aims at stimulating strategically generalized and permanent learning processes in service of overall firm performance (Song et al, 2009). Several authors (GarciaMorales et al, 2012) see that transformational leadership is the most suitable for the dynamics of organizational learning. It refers to the ability of the leader to lead his subordinates to transcend their personal interests and to transform their beliefs, needs and values on behalf of a collective vision. Chen et al (2012) studied the impact of transformational leadership style on technological innovation and concluded on the existence of a direct and positive relationship. GarciaMorales et al (2012) reported that this style of leadership positively affects the capacity and quality of innovation through organizational learning. Yang et al (2004) showed that strategic leadership has a direct positive impact on the financial performance of the firm.

The dimensions of the LO are interrelated and influence each other directly or indirectly (Watkins and Marsick, 1996). Therefore, the action on the learning process from one of these dimensions implies others (Yang et al, 2004). In this vein, several authors (Turcot and Jacob, 2000; Ortenblad, 2004) state that for an organization to be classified as a learning one, the fundamental criterion is the level of practice consistency between each other. Jacob and Turcot (2000) illustrate their remarks by the results of a meta-analysis on the effect of LO dimensions when deployed in a “systemic” way. The results of this study showed positive effects on several indicators like global performance, productivity and innovation. In conclusion, these authors point out forcefully that the

implementation of some of these practices in isolation may not produce the desired effects. They suggest fewer practices to deploy, but that each level has to be affected by some practices. Calantone et al (2002) concluded that: on the one hand, the higher the level of learning orientation, the greater the degree of firm innovativeness; on the other hand, the higher the level of learning orientation, the greater the firm's performance. Alegre and Chiva (2008) showed that the more a firm tends towards the LO model, the more it is likely to achieve successful product innovations. Hence, we expect that the more a company tends towards the LO model, the more it is able to achieve high PIP. Thus, our first hypothesis is **H1**: *The higher the level of the LO, the greater the degree of PIP.*

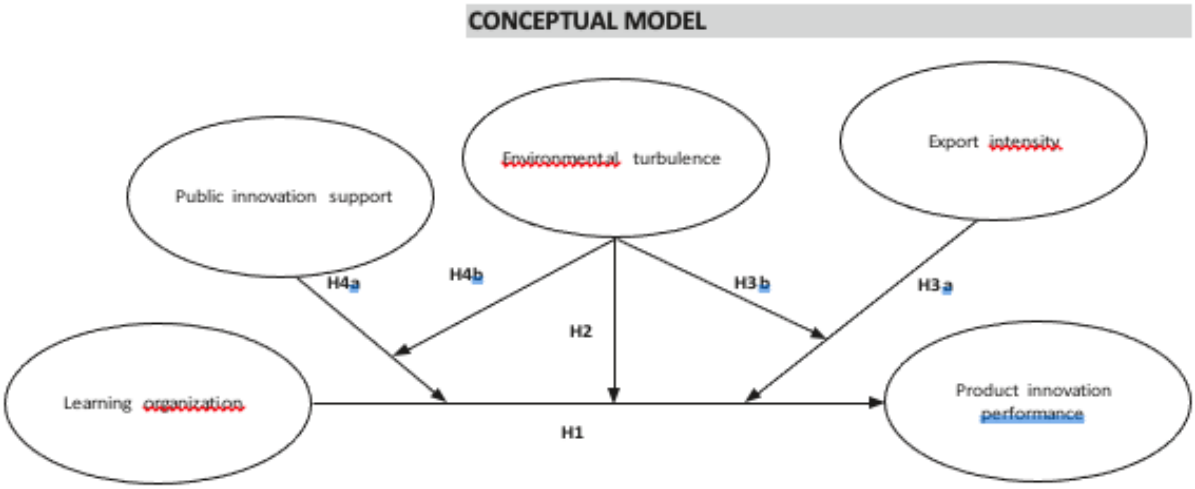
The LO-PIP Link And Environmental Turbulence

Given that understanding the environment is critical for creating innovations, its turbulence could negatively affect the PIP (Gotteland and Boulé, 2006). Nevertheless, operating according to the principles of LO enables firms to have a certain understanding, a vision of reality that will enable them to interpret the signals from their environment and thus determine appropriate strategies (Calantone et al, 2002). Thereby, turbulence acts as a stimulant of the organizational learning process, which in turn positively affects firm's performance (Kim and Atuahene-Gima, 2010). In addition, it is suggested that in such environments, in order to crown innovation by a success, it must be connected to the organizational learning (Jimènez-Jimènez and Sanz-Valle, 2011). "Among the various forms of managerial efforts of firms facing turbulent environments, taking the initiative in learning about new market opportunities is more distinctive than others in relation to creating feature benefits for new products" (Kim and Atuahene-Gima, 2010, p. 523). These latter showed that the learning orientation-PIP link is positively moderated by environmental turbulence especially when firms are focusing on explorative learning practices. In this regard, we believe that the more the business environment is turbulent, the more the firms are brought to adopt the LO model. Consequently, the link LO-PIP will be more established. Thus, we propose the second hypothesis, **H2**: *The higher the level of environmental turbulence, the stronger the link between LO and PIP*.

The LO-PIP Link And Export Intensity

Many studies show that "exporters are more productive than non-exporters and these exporter performance premia tend to increase with the share of exports in total sales, there is evidence in favor of self-selection of more productive firms into export markets, but nearly no evidence in favor of the learning-by-exporting hypothesis" (ISGEP, 2008, p. 596). Recently, Love and Ganotakis (2013) have argued, given that productivity as a dependent variable is extremely heterogeneous, studying export-productivity link provides an indirect test of learning by exporting. "Since learning by exporting is about learning, a better measure of the possible effect would be one which embodies a learning outcome, such as innovation" (Love and Ganotakis, 2013, p. 3) and it is innovation, which in turn, determines firm performance. Organizational learning and functioning in a LO are important factors that may improve the performance of exporting firms (Bolivar-Ramos et al, 2012). Export activity is considered as a process of learning and knowledge accumulation during which firms exploit opportunities abroad (Alegre et al, 2012). More specifically, the studies argue that exposure to foreign markets with a wide range of cultural perspectives offers additional information not accessible to non-exporters and can enrich technological and marketing capital knowledge, which in turn constitutes the basis for innovations (Love and Ganotakis, 2013). Nevertheless, for a company to benefit in a sustainable way from learning opportunities provided by its international activities on one hand and to remain competitive in these markets on the other, it has a keen interest to work as a LO (Bolivar-Ramos et al, 2012). This will not only permit maintaining a given competitive position, but it will also serve to improve it, especially, through generation of appropriate innovations (Alegre et al, 2012). In this regard, Bolivar-Ramos et al (2012) state that companies with good absorption capacity will be better positioned to learn from international partners and to use the knowledge learned and incorporate it into their business process. Empirically, Salomon and Shaver (2005) found that learning by exporting improved product innovation. Alegre et al, (2012) showed that the LO increased export intensity via PIP.

According to this latter reasoning, by making an instantaneous evaluation, it is expected that the relationship between LO and PIP will be more established for firms with high export intensity than for non-exporters or firms with low export intensity. Moreover, we argue that this latter relation will be stronger for firms with high export intensity especially in a turbulent environment. Thus, we propose to test the following hypothesis: **H3a:** *Export intensity moderates the link between LO and PIP;* **H3b:** *Export intensity moderates the link between LO and PIP in turbulent environments*.



The LO-PIP Link And Public Support For Innovation

Broadly, the literature demonstrates that the effect of public innovation support (PIS) on innovation performance is potentially large (Lee and Wong, 2009). This impact can take place through different mechanisms such as the improvement of firm's knowledge, human, relational and financial capitals (Roper and Hewitt-Dundas, 2005). These mechanisms may then improve business performance and enhance the firm's ability to manage future innovative projects. The rationale for the provision of PIS is based "on the assumption that R&D conducted within firms will, directly or indirectly, stimulate innovation that leads to the production of new marketable products, processes or services" (Cunningham et al, 2013, p. 5).

Given the importance of PIS on the recipient firm, its impact may be obscured mainly if this variable is omitted from analyses relating LO to PIP.

Although little is known about the interaction effect between PIS and firm's internal factors on PIP, we can hypothesize that firms benefiting from PIS will have a stronger relation between LO and PIP. The main thrust of our study is that while LO significantly influences firm's PIP, the bundling of PIS with the firm's internal resources and capabilities (LO) provides the key to higher innovative performance. While external resources in the form of PIS will stimulate firms to improve their innovative inputs in the form of R&D and innovative collaborations, the LO culture and its management practices themselves must be supportive of these inputs thus conducive to a better PIP. We think that PIS in a turbulent environment will have a stronger impact on the LO-PIP link. Based on the above discussion, we hypothesize : **H4a:** *Public innovation support moderates the link between LO and PIP*; **H4b:** *Public innovation support moderates the link between LO and PIP in turbulent environments*.

The conceptual model of this study is depicted in Figure 1.

Methodology

Measures

We used the LO measurement instrument (DLOQ) developed by Watkins and Marsick (1996). In this framework, LO is a second-order construct. Its first-order constructs are continuous learning (CL), inquiry and dialogue (ID), team learning (TL), embedded system (ES), empowerment (EM), system connection (SC) and strategic leadership (SL). Each of these first order constructs was measured by three items on a five-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The results of studies done to test the validity and reliability of the DLOQ have confirmed its applicability by providing internal consistency of each item's reliability and reliable factor structure of its dimensions (Song et al. 2009).

The measurement of the PIP was developed after submitting our extended understanding of this concept to seven interviews with R&D directors. Finally, this phase generated eighteen items based on their intervieweerated importance. These items were classified into five dimensions: Market performance (MP: 5 items), financial performance (FP: 3 items), customer performance (CP: 3 items), technical performance (TP: 4 items) and strategic performance (SP: 3 items). This scale is largely inspired from the studies of Griffin (1997), Storey and Easingwood (1999), Hsu and Fang (2009). The PIP is conceptualized as a secondorder construct and these latter dimensions constitute the first order constructs. We ask respondents to state the performance of their product innovation with regard to these dimensions on a five-point Likert scale ranging from "not achieved result" to "perfectly achieved".

Environmental turbulence was measured with four items, based on Pedon and Schmidt's (2003) instrument. The items in this instrument took the form of a five-point Likert scale ranging from "not turbulent" to "extremely turbulent". Export intensity is measured by the share of exports in total sales for a particular firm and PIS is measured by the number of public aids received by a given company.

Sample

We test the proposed model by focusing on the French biotechnology industry. France accounts for nearly 10% of worldwide turnover (Ricard, 2010). This area is a suitable ground for our problem because its companies are innovative in nature and their survival is dependent on their innovation performance. Biotechnology firms qualified as "technologybased" and "science-driven" belong to high-tech sector with high potential of growth (De Luca et al, 2010). Liao et al (2010, p.3792) suggest: "Organizational learning, especially in knowledgeintensive industry, not only leads to organizational innovation, but also becomes the only sustainable competitive advantage".

French biotechnology firms are classified in the national database of biotechnology, which was created in 1999 at the initiative of the Ministry of Higher Education and Research. At the time the research was carried out, this database included 808 biotechnology manufacturing firms. In order to obtain a homogeneous sample, we defined the profile of targeted firms. Indeed, are included in this study firms with at least three years of existence. This criterion is based on OSLO manual (OECD, 2005) advocating that since innovation is a time dependent process, it is recommended to take three year period into account to evaluate innovative, scientific and technological activities. Similarly, a small staff number reduces interpersonal interactions and thus weakens the learning potential of a firm. Are then excluded very small enterprises whose workforce does not exceed ten employees. Our final target population included 798 firms. The questionnaire was addressed to R&D directors since they are responsible for all activities regarding innovation and know the overall strategies in their firm. Fieldwork was carried out from February to April 2012. The survey was conducted in two phases. Each respondent received an introductory letter explaining the purpose of the study and a questionnaire by email.

Our final sample consists of 100 companies. Several characteristics of our sample are consistent with those of biotechnology firms in France and in Europe in general (France Biotech, 2009). This provides representativeness to our sample. This sample includes young companies (51% below

10 years), rather small (77% below 50 employees) and working mainly in red biotechnology (i.e., medical biotechnology) activities.

Analytical Procedures

In order to test the proposed model, we mobilize structural equation modelling (SEM) technique. SEM enables researchers to integrate unobservable variables (latent variables) measured indirectly by indicator variables. They also facilitate establishing relationships or structural equations among these latent variables. There are two types of SEM. Covariance-based SEM (CB-SEM) and Partial Least square (PLS-SEM). PLS, which is based on the Ordinary Least Squares (OLS) algorithm, was preferred as the methodological choice because of these reasons: First, it is in accordance with our objective, which focuses on prediction and explaining the variance of key target constructs (PIP) by explanatory construct (LO). Second, it is flexible in sample size and is not rigid with non-normal distributed data. Third, it is efficient in modelling hierarchical latent variables (second order constructs) and simultaneously assessing both measurement and structural complex models with reflective and formative variables (Chin et al, 2008). The software used in this study is SmartPLS package version 2.0.M3.

The estimation of PLS-SEM requires two steps: the evaluation of the measurement or "outer" models and the assessing of the structural or "inner" model. The measurement model determines the relationships between the latent variables and their indicators, whereas the structural model estimates the relationships between latent variables.

TABLE 1
Psychometric properties of LO scale

First order constructs										Second order construct		
Constructs	CR	AVE	1	2	3	4	5	6	7	wheight	t-value	VIF
CL	0,768	0,694	**0,833**							0,196	10,725	2.366
ES	0,825	0,613	0,597	**0,783**						0,182	7,517	2.3
SC	0,856	0,666	0,509	0,607	**0,816**					0,196	10,103	2.436
ID	0,845	0,646	0,631	0,452	0,484	**0,803**				0,174	8,898	2.029
SL	0,890	0,730	0,580	0,685	0,675	0,368	**0,854**			0,171	7,212	2.715
TL	0,849	0,653	0,534	0,554	0,586	0,570	0,561	**0,808**		0,188	11,043	2.095
EM	0,849	0,654	0,524	0,471	0,612	0,402	0,583	0,553	**0,808**	0,164	11,179	1.931

TABLE 2 sychometric
p roperties of PIP scale

First order constructs								Second order construct			
Constructs	CR	AVE	1	2	3	4	5	loading	t-value	AVE	CR
MP	0,887	0,612	**0,821**					0,913	48,170		
CP	0,894	0,737	0,728	**0,858**				0,880	26,513		
FP	0,912	0,777	0,785	0,606	**0,881**			0,830	19,514	0,767	0,942
SP	0,889	0,728	0,772	0,778	0,692	**0,852**		0,905	40,738		
TP	0,879	0,645	0,704	0,734	0,561	0,710	**0,803**	0,845	23,507		

Results

Psychometric Properties Of Measurement Scales

Given that LO and PIP are two-second order constructs (LO with reflective formative model; PIP with reflective reflective model), assessing the measurement models, requires two steps: evaluation of first-order model and evaluation of secondorder model.

First Order Constructs

To assess the convergent validity of the reflective measures, we evaluated, average variance extracted (AVE), factor loadings, and composite reliability. In PLS analysis, the loadings are interpreted as loadings in a principal component factor analysis (Chin et al, 2008). After having dropped two items (CL1 and MP5) because of their very small and insignificant loadings, for all first order constructs of LO and PIP, factor loadings (Appendix A) not only show values above the required thresholds of 0.7 (Hair et al. 2013), but are also significant (t>1.96).

As shown in table 1 and 2 respectively, for LO and PIP, the composite reliability (CR) exceeds the acceptable cut off point of 0.7 (Hair et al., 2013). For all constructs, the AVE is above the threshold of 0.5 (Hair et al., 2013).

To test discriminant validity, we use Fornell and Larcker (1981) criterion, which requests for a construct's AVE to be larger than the square of its largest correlation with any construct. All constructs satisfy this requirement (table 1 and 2). These results lend sufficient confidence that all first order constructs model fit the data well.

Second Order Constructs

For the second order of the PIP, reliability and convergent validity are well satisfied (table 2). Given that the relation between LO and its first order constructs is of formative type, criteria like reliability and convergent validity are not applicable and other quality criteria are required (Hair et al. 2013). Thus, we test for multicollinearity, as suggested by Hair et al, (2013). Multicollinearity does not play a role in the formative model as all variance inflation factors (VIF) are below the cutoff value of 5 (Table 1). Furthermore, all LO constructs have positive and significant weights.

TABLE 3
Discriminant validity of the model constructs

	LO	PIP	ET
CL	**0,812**	0,446	**0,247**
SC	**0,818**	0,409	0,142
ID	**0,702**	0,443	0,185
SL	**0,818**	0,331	0,255
TL	**0,783**	0,430	0,227
ES	**0,812**	0,391	0,292
EM	**0,730**	0,337	0,161
MP	0,452	**0,913**	0,019
FP	0,473	**0,829**	0,103
SP	0,435	**0,905**	-0,00
TP	0,394	**0,846**	0,095
CP	0,472	0,881	0,052
ET	0,279	0,059	**1**

In order to reduce model complexity, we averaged for each firm its environmental turbulence items in one indicator. Since the AVE for the formative model is not applicable, we used cross loadings of different constructs to test the discriminant validity of our research model (Hair et al, 2013). SmartPLS offers a table of cross loadings to test this feature. The interpretation of this table is similar to examining cross loadings in a traditional factor analysis (Hair et al, 2013). That is, indicators should load more strongly on their associated construct than on other constructs (i.e., the cross loadings).
As shown in Table 3, all indicators load more highly on their associated construct than on other constructs (loadings are higher than cross-loadings). Therefore, we conclude that the discriminant validity of our model is well fulfilled.

Test Of The Research Hypotheses
Having satisfied the requirement arising from measurement issues, the structural model was subsequently tested. The results with respect to H1 and H2 are presented in Table 4. Research hypotheses are tested by assessing the direction, strength and level of significance of path coefficients estimated by PLS, using a bootstrap resampling method with 1000 re-samples (Chin et al, 2008). We call the model without environmental turbulence “static model”.

The Static Model
The coefficient on the path from LO to PIP is.51 (t = 5.63; t>1.96) suggesting that H1 is supported. The structural model explains 26% (R2) of the variance in the endogenous theoretical construct: PIP. Exceeding the cutoff level of 19%, R2 is quite good (Chin et al, 2008). The Q2 test for predictive relevance measures how well observed values are reproduced by the model and its parameter estimates (Hair et al, 2013). Since Q2 of the static model is positive (.19), we can say that it has an acceptable predictive relevance (Hair et al., 2013).

The Dynamic Model
With respect to H1, we consider the contingent effect of environmental turbulence (ET) on LO-PIP link (table 4). Given that a formative construct (LO) is involved in this model, it is recommended to use a two-stage PLS approach for estimating moderating effects (Henseler and Fassot, 2010). In the first stage (Main effects model), the effect of ET on PIP is run in order to obtain estimates for the latent variable scores. In the second stage (Interaction effects model), the interaction term LO*ET is built up as the element-wise product of the latent variable scores of LO and ET. This interaction term as well as the latent variable scores of the LO and ET are used as independent variables in a multiple linear regression on the latent variable scores of PIP. A moderator hypothesis is supported if the path coefficient from the interaction term to the dependent variable has the assumed direction and is significant irrespective of other effects (Henseler and Fassot, 2010). The assumed direction in our research model is not only very weak, but also non-significant (β=.028; t<1.96). Furthermore, the inclusion of the interaction term does not improve neither R^2 (26.8%) nor Q^2 (20.2%) of the PIP implying that H2 is not supported. As proposed by Sharma et al (1981, cited by Wilson, 2010) in such case we examine the regression coefficient of the moderator variable (ET) on the explanatory variable (LO). If this coefficient is significant, ET is an antecedent, exogenous, intervening or a suppressor variable to the relationship between LO and PIP. In our case, this coefficient is not significant. Thus, in order to make a further analysis a subgroup analysis needs to be proceeded with.

TABLE 4
PLS-MGA path modelling results

Model	Relation	Overall (H1, H2) (100)	nsity (H3)				on support (H4)			
			High (43)	Low (57)	Comparison test		High (54)	Low (46)	Comparison test	
					Parametric	Henseler			Parametric	Henseler
Static	LO-PIP	.510***	.655***	.368***	1.797**	2.071***	.469***	.461***	.371 ns	.364 ns
R_2		26%	43%	13.6%			23.9%	23.1%		
Q_2		19.8%	31.5%	10.3%			23.7%	22.8%		
Dynamic	LO-PIP	.535***	.514***	.359***	.681ns	1.170ns	.377***	.429***	.451 ns	.677 ns
Interaction effects	TE-PIP	-.092 ns	-.067ns	-.251***	-	-	-.191*	-.129*	-	-
R_2	LO*T	.028 ns	.301**	-.187*	2.245***	2.924***	.322**	-.179*	2.295***	2.229***
Q_2	E-PIP	20.2%	48%	24%			27.2%	25.1%		
		20.2%	49.1%	24.3%			26.9%	24.8%		

*p<0.1 (one tailed) ; **p<0.1 (two tailed) ;***p<0.05 (two tailed) ; ns : no significant

Moderating Role Of Export Intensity

Given the dichotomous nature of the question we asked to determine the export intensity of the companies surveyed (The last three years, was the largest part of your turnover conducted nationally or internationally?), we used the technique of multigroup analysis (PLS-MGA) to test H3. “If one or both of the interacting variables is discrete, or can be made so, researchers can apply a ‘multisample’ approach, with the interaction effects becoming apparent as differences in parameter estimates when the same model is applied to different but related sets of data”(Henseler and Fassott, 2010, p.720). We estimated the path coefficients through PLS path modelling for each subsample. The differences between the path coefficients indicate whether export intensity acts as a moderating variable. The sample was split into two groups: high export intensity (43) vs low export intensity (57). The results (Table 4) indicate that for these two groups H1 is supported, but the LO-PIP link was stronger for the high export intensity group (β=.655; t=7.9). Similarly, the variance explained and the predictive relevance were better for this group (R^2=43%; Q^2= 31.5%).

We also studied the MGA under dynamic model. Results show that ET moderated positively the LO- PIP link (β=.301) for the high export intensity group. This link is negatively moderated by the ET for the other group (β =-.187). According to parametric and Henseler tests, export intensity represents a moderator variable in the static model (Δ=.287; t=2.071 and 1.797 for the Henseler test and the parametric test, respectively, p < 0.1 for both). Therefore, H3a was supported. Export intensity represents also a moderator variable in the dynamic model (Δ=.488; t=2.924 and 2.245 for the Henseler test and the parametric test, respectively; p <.05 for both). Therefore, H3b was supported.

Moderating Role Of Public Innovation Support (PIS)

PIS in the French context can take several forms such as grants, loans, R&D tax credits, subsidies. The French Association of Biotechnology (2012) reported that the research tax credit (CIR) and the “young innovative company” (JEI) are the most important forms of PIS. CIR is a tax reduction designed to promote R&D activities within French firms. JEI status consists of some tax and social security exemption for SME’s that allocate at least 15% of their total costs to R&D.

In our study, firms having received at least one PIS represent 54% of the sample. Out of these firms, 48% received a research tax credit (CIR) or other fiscal or social exemption, 31% received grants, loans, repayable loans and loan guarantees, 25% received both types of PIS. We have used PLS-MGA to test H4. The sample was split into two groups: group one having received PIS (group 1; 54 firms) and group two having not received such support (group 2; 46 firms). The results (Table 4) indicate that for these two groups H1 is supported, the LO-PIP link was of very similar levels (β1=.469 vs β2=.461). MGA under dynamic model showed that ET moderated

positively the LO-PIP link (β=.322) for the firms having received PIS. For the other group, this relationship is negatively moderated by the ET (β =-.179). According to the parametric and Henseler tests, PIS does not represent a moderating variable in the static model (Δ=.008; t=.364 and.371 for the Henseler test and the parametric test, respectively; p >0.1 for both). Therefore, H4a was not supported. But, PIS represents a moderator variable in the dynamic model (Δ= 0.501; t=2.229 and 2.295 for the Henseler test and the parametric test, respectively; p <.05 for both). Therefore, H4b was rejected.

Discussion

This study has shown that the DLOQ is an appropriate measure for LO in the French biotechnology sector. This is the first study validating the DLOQ in French context. This result is in line with previous studies done in a variety of contexts (Watkins and Marsick, 1996; Song et al, 2009) confirming the robustness of the DLOQ and lending further generalizability to it.

In addition, we have developed and empirically examined a measurement scale of PIP based on five dimensions: market, financial, customer, technical and strategic performance. If the stability of its structure should be tested on other samples, the proposed scale shows, at this stage of development, satisfactory psychometric qualities. Validation of the PIP scale as a multidimensional concept is in line with the work of Alegre et al, (2006). These authors showed that PIP can be modeled as a second order latent variable consisting of two dimensions: effectiveness and efficiency. It is worth mentioning that the PIP scale proposed by Alegre et al, (2006) has been validated originally in the French biotechnology sector. This gives more value to our study. Indeed, in addition to the validation of the same reasoning in the same context with similar results, our model goes deeper and is more comprehensive.

Furthermore, this research supports the viewpoint that innovation performance is dependent on the organizational learning abilities of the firm. Confirmation of H1 is consistent with theoretical developments of several authors (Baker and Sinkula, 2002; Alegre and Chiva, 2008; Hsu and Fang, 2009) arguing that adopting the LO culture is a critical factor for the development of successful product innovation. Otherwise, the LO dimensions are likely to generate a good level of PIP, when they are implemented together. Operating according to the LO principles provides the organizational framework for learning.

Learning as an organizational capability, combining tangible and non-tangible resources, is a strategic issue for firm performance. Ultimately, the survival of knowledgeintensive firms, such as biotechnology ones, is based on their organizational learning capabilities. That is to say their ability to create, improve, transform and exploit knowledge.

Environmental turbulence had no influence on the LO-PIP link in the general model (H2). This result contradicts what is stated in the literature (Kim and Atuahene-Gima, 2010). A possible explanation may be that the good level of LO had achieved the studied firms already allowed them to integrate ET to their daily business processes, to the extent that this variable is no longer a determining disability that may hinder their innovation activities and performance.

The PLS-MGA showed that this latter result should be seen under a contingency relationship. Indeed, the LO had shown its value especially for highly exporting firms. Our findings, in line with Alegre et al. (2012), show that, for highly exporting firms, the LO is more likely to improve PIP. Thus, it is strategic for internationally active firms to adopt the LO in order to generate successful product innovation. Operating as a LO had demonstrated its importance mainly for the highly exporting firms under environmental turbulence. Otherwise, environmental turbulence, as a stimulant of the organizational learning process, positively moderates the LO-PIP link especially for heavy exporters. PIP was explained as a direct function of the LO only for these latter firms. Thus, there are other explanatory factors, not taken into account here, such as R&D efforts.

We have shown that PIS had no effect on the link LO-PIP. Indeed, there were no significant differences in path coefficients of the firms having received PIS (group 1) and those having not received it (group 2). This result may be explained by the fact that firms of the second group are of larger size. Because they usually have more resources to invest in innovation, larger firms depend

on PIS less than smaller firms. PIS has demonstrated its value mainly when the environment is turbulent. In fact, operating as a LO in a turbulent environment affects positively (negatively) the PIP for the group having (not) received PIS. This means that, in a turbulent environment, the effect of age is mitigated and that what makes the difference is the public innovation support. One possible explanation for the negative effect of LO * PIS on PIP for the second group is that facing hostile, complex and dynamic environments, which require more flexibility, large firms might be less willing to respond quickly and effectively. On the other hand, the combined effect of the LO with PIS was able to cope with the turbulence of the environment and to exploit it in stimulating the PIP. Hence, it is important to leverage the PIS for both small and large companies in order to improve the LO effect on PIP.

In summary, the present study contributes to the literature, first, by examining the links between learning organization and product innovation performance and, by using broad measures of them. Second, it provides additional evidence to previous literature that learning organization has a positive effect on product innovation performance. Third, it contributes to the literature by analyzing the likely moderating effect of export intensity and public innovation support under static and dynamic models (i.e: under environmental turbulence) on the relationship between LO and PIP. The results show that the LO-PIP link should be seen under contingent models. On one hand, this link was stronger for highly exporting firms under static and turbulent environments. On the other, it was moderated by the PIS only under environmental turbulence. Fourth, we have shown that the universality of the LO is relative. Indeed, MGA have shown that PIP produced by firms was not always strongly explained by the LO. The effect of other variables on the PIP is obviously to be explored. Finally, the present study uses a sample of French biotechnology firms, a context in which the empirical literature is especially scarce and difficult to access due to its informational sensitivity.

Beyond theoretical contributions, this work also presents some methodological contributions. First, the appropriateness of PLS in the treatment of a complex model, consisting of formative and reflective constructs, with a relatively small sample, demonstrates the flexibility of this technique and calls for a more frequent use of it in the estimation of structural equation models in management science. Second, using an innovative approach (Henseler test, 2010) to assess the moderation between two groups has demonstrated its validity, especially for non- normally-distributed data.

This work also provides managerial contributions. Since its results indicate that DLOQ is a valid and useful measure of LO characteristics, it can be used as a diagnostic tool for carrying out internal audits in firms seeking to move towards this model. The proposed product innovation measurement scale could be used by firms in setting goals or in a subsequent assessment of achievements in relation with new products. Managers have to be more aware that the generation of successful innovations is dependent, at least in part, on the ability of their firms to improve their organizational learning process and culture. Thus, they should take the seven dimensions of the DLOQ into account when setting their firms' innovation goals, especially when being internationally active under environmental turbulence.

This research presents a number of limitations, however. Because the study was carried out in the same environmental and cultural context, generalization of the results is relative. On the empirical side, a first limitation comes from the perceptual perspective of measures adopted in this research with a single respondent which could cause a bias of subjectivity. A second limitation is induced by the goodness of fit of the model with the PLS approach; even the index used to address this problem (GOF) is still controversial (Hair et al, 2013).

These limitations open perspectives for future research. First, in order to generalize the results, we can test the model based on objective measurements, especially in relation to the PIP, on larger samples and in other contexts. Then, as firms operate in a knowledge and technology intensive sector, we assumed that the generation of innovation is an inherent activity to their existence. In other traditional sectors, it would be better to test the ability of the LO to influence innovation before testing its effect in terms of performance. Finally, given that organizational learning requires time to take place, and as far as innovation affects the performance after a

certain time, we believe that a longitudinal study would contribute to a better and a deeper understanding of the applicability of this research model.

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Entrepreneurial intentions – theory and evidence from Asia, America and Europe

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_____ **Justin PAUL, Philippe HERMEL & Archana SRIVATAVA** _____

justin.paul@upr.edu, philippe.hermel@uvsq.fr & archanashri@uprrp.edu

Abstract

This paper examines the antecedents of entrepreneurial intentions and its strate- gic drivers with reference to country culture and proactive personality in a cross-country context. Our research is based on primary data from four distinct and strategically important countries: India, Japan, the USA, and France. We examine and compare entrepreneurial intentions of young managers within the context of the theory of planned behavior. We then postulate a theoretical framework to link entrepreneurial intention, and its drivers, to motivate further research in this area. The findings of the study indicate that a country's culture and an individual's proactive personality directly determine the degree of entrepre- neurial intention and therefore contribute to competitiveness.

Keywords Country culture · Entrepreneurial intention · Proactive personality· Theory of planned behavior

Summary highlights

Contributions : The study is useful in understanding the effect of different cultures and values on the entrepreneurial intention. Based on the literature review and measures of proactive personality among young managers in four culturally different countries sampled, we establish a relationship model
Entrepreneurial Intention (EI) = *f* (CC, PP), where CC stands for country culture and PP stands for proactive personality.

Research questions/purpose: The purpose of the study is to analyze the linkage between entrepreneurial intentions, business acumen, and country culture with insights from managers.

Theoretical or conceptual framework: On the basis of the literature review and results of the analysis, we have constructed a theoretical framework to highlight the anteced- ents of entrepreneurial behavior.

Basic methods and information/data: The present study is based on interview-based, primary data. We have used multilevel techniques such as reliability test using Cronbach's alpha, validity test methods such as principle component analysis and factor analysis, ANOVA, and post hoc tests for empirical analysis. We have measured proactive behavior using Bateman and Crant scale.

Results/findings: The findings of the study indicate that a country's culture and an individual's proactive personality directly determine the degree of entrepreneurial intention and therefore contribute to competitiveness.

Limitations (if there is any): We studied France from Europe. However, we use French data as a representative of Europe for comparison with the USA and Asia (Japan and India). For generalization purpose, we use Europe in the title despite the fact that we study only France from Europe.

However, we did not measure the cultural differences for the countries selected.
Theoretical implications and recommendations : We build and illustrate a theoretical framework for antecedents of Entrepreneurial Intention and Activity.

Practical implications and recommendations: In order to encourage entrepreneurship, the countries can work on institutional framework conducive to entrepreneurship development.

Suggestions for future research: Future researchers can measure cultural differences of different countries and compare and contrast it with proactive personality and entre- preneurial intentions. Similar studies can also be carried out in more European and Asian countries with larger sample size. Researchers can test our model/equation using samples from different countries.

Introduction

The nature of entrepreneurship is heterogeneous across countries. It explains outcomes at both firm and country levels through firm performance and such indicators as a country's economic growth. Entrepreneurial intention can be defined as intention to start up and engage in entrepreneurial behaviors and carrying out entrepreneurial activities, which can be affected by several factors such as needs, values, wants, and beliefs (Liñán and Chen 2009; Fayolle et al. 2006). The antecedents such as culture at the country level explain the entrepreneurial intention (Terjesen et al. 2013). National culture reflects the underlying system of values, beliefs, and preferences that are common among residents of a country (Hofstede 2010). The effect of national culture on entrepreneurship is a well-researched topic (Beugelsdijk 2007; Stephan and Uhlaner 2010, Autio et al. 2013, etc.), as cultural differences between countries are able to explain a substantial part of the difference in levels of entrepreneurship between countries (Okamuro et al. 2011; Saeed et al. 2014). The study of entrepreneurship, within the context of culture and institutional framework within the countries, has relevance today not only because it helps entrepreneurs better fulfill their personal needs but also because of the economic contribution of the new ventures. More than increasing national income by creating new jobs, entrepreneurship acts as a positive force in a firm's growth plan by serving as a bridge between innovation and market place. Entrepreneurship also serves as a catalyst for internationalization (Paul and Shrivastava 2015).

According to McClelland (1961) and Say (1963), an entrepreneur is one who brings together the factors of production, provisions of continuing management, and bears risk to create a new enterprise. Schumpeter (1950) envisioned that an entrepreneur is the agent who provides an economic leadership that changes the initial conditions of the economy and causes a discontinuous dynamic change. Entrepreneurial effort and determination are the key factors that get the economy back on track after economic slump (Kuratako 2006) An entrepreneur is often considered an innovator. Through innovation, hard work, and willingness to accept financial and opportunity cost and risk, the entrepreneur tries to leverage previously undiscovered opportunities for arbitrage and profit (Kirzner 1997). This quest for profit and the possibility of personal and financial failure aid in ensuring that an economy's resources are utilized efficiently. It is worth noting that successful entrepreneurs create job opportunities for others, which in turn contributes to a country's government in the form of tax revenue and economic growth.

Entrepreneurship research has emerged as one of the most widely cited subjects in the management discipline (Bruton et al. 2008). Scholars and those concerned with its practical application have shown interest in researching entrepreneurship (Ma and Tan 2006). The field of comparative international entrepreneurship across different countries is badly in need of theoretical development (Keupp and Gassmann 2009; Terjesen et al. 2013; Paul and Shrivatava 2016). Following prior research, we identify research gaps to develop theoretical linkages to advance the development of theory and context in this area. It is important to recognize that entrepreneurs need proactiveness, confidence, capability, and competence to meet unforeseen and difficult conditions. Can these traits be linked to country culture and proactive personality? To answer this question, we compare entrepreneurial intention of young managers from a spectrum of four completely different countries, with respect to the personality and cultural factors. For the measurement of these personality and cultural factors, we employ Bateman and Crant's (1993) questionnaire, consisting of 17 traits.

This study follows the holistic approach through the application of an entrepreneurial intention model. A number of works have been published lately about this issue. However, a lot of research is still needed to better comprehend what are the factors that affect entrepreneurial intentions in different country contexts. First and foremost, cross-cultural studies comparing entrepreneurs in different continents/countries in America, Europe, and Asia are very useful for the effect of different cultures and values on the entrepreneurial intention to be better understood. In order to fill this research gap, we analyze the linkage between entrepreneurial intentions, business acumen, and country culture that could be imbibed through an institutional framework and answer the abovementioned pertinent question. Our goal is, by use of primary data, to contribute to the comparative cross- country entrepreneurship literature with insights from managers from four different regions and cultures in the world. The scope of the study not only includes data analysis, but following Doh (2000), we construct a model and provide illustrations to support a theoretical framework development and make suggestions for future research.

Literature review, theory, and hypothesis

According to the theory of planned behavior (TPB), entrepreneurial intention refers to the effort that the person will make to carry out an entrepreneurial activity. And so, it captures the three motivational factors, or antecedents, influencing behavior (Ajzen 1991; Liñán and Chen 2009) as given below.

- *Attitude toward entrepreneurship* (*personal attitude, PA*)*:* This indicates the degree to which the individual holds a positive or negative personal valuation about being an entrepreneur (Ajzen 2001; Autio et al. 2001).
- *Subjective norm* (*SN*) measures the perceived social pressure to carry out—or not to carry out—entrepreneurial behaviors (Ajzen 2001).
- *Perceived behavioral control* (*PBC*) is defined as the perception of the ease or difficulty of becoming an entrepreneur.

Attitude is defined as a mental and neural state of exerting readiness, a directive or dynamic influence upon an individual, with regard to all objectives and situations (Allport 1935). Entrepreneurial attitude consists of broad dimensions such as achievement, self-esteem, personal control, and innovation (Tamizharasi and Panchanatham 2010). Creativity and innovative mindsets are the two basic preconditions that can change an organization's mission and solve problems (Durand and Shea 1974). Harris and Gibson (2008) examine the entrepreneurial attitudes of students enrolled in multiple universities in the USA and found that the majority of the students studied possess entrepreneurial attitudes. Furthermore, both student characteristics and entrepreneurial experience were found to be associated with certain entrepreneurial attitudes. Rauch et al. (2013) test the cross-cultural validity of the relationship between innovation and growth in a sample of 857 business owners from five different countries:

China, Germany, the Netherlands, Peru, and Russia. They find that innovation is effective in each country, therefore suggesting universal relationships. Additionally, cultural vari- ables moderated the innovation–growth relationship. Finally, their cross-level operator analysis reveals that both cultural orientations of owners and national culture explain variance in innovation–growth relationships (Paul and Kapoor 2008).

Entrepreneurship has emerged as an increasingly prominent characteristic of developed nations. As a natural outcome, research in the field of entrepreneurship has traditionally focused on resource formation and opportunity recognition that foster and nurture new ventures (Hoskisson et al. 2011). Global Leadership and Organizational Behavior Effec- tiveness (GLOBE) researchers have made efforts to understand the relationship between cultures and implicit leadership theories across the countries (House et al. 2002; Gupta et al. 2002). Estay (2004) provides a cross-cultural analysis of the entrepreneurial envi- ronment in France and the USA. He notes that the USA has experienced a greater level of entrepreneurship than France. His argument is that the relative sluggishness in France is mainly due to two reasons: (i) financial difficulties faced by small firms and (ii) differing perceptions of the entrepreneurial environment. Context impacts entrepreneurship and is significant for understanding when, how, and why entrepreneurship occurs and who gets involved (Welter 2011). We identify the research gap in this area of comparative interna- tional entrepreneurship and problematize this gap following established ways for arriving at research questions (spotting or constructing gaps in existing theories), as highlighted in the widely cited article of Alvesson and Sandberg (2011)).
People do not engage in entrepreneurship by accident; they do it intentionally as a result of choice (Krueger 2007). Noorkartina et al. (2014) found out that factors such as economic and education influence choice of entrepreneurship. Accordingly, *entrepreneurial intentions* (defined as the conscious state of mind that directs personal attention, experience, and behavior toward planned entrepreneurial behavior) (Bird 1988) are seen as the strongest proximal predictor of entrepreneurial activity and serve as a central and widely studied outcome variable in contemporary entrepreneurship research (Krueger et al. 2000).

Country culture, theory of planned behavior, and entrepreneurship

Culture has emerged as an important concept within the entrepreneurship literature to help explain differences in the entrepreneurship process observed between regions, industries, and socio-cultural groups. Culture is defined as the set of learned behaviors and beliefs that characterize a society or a people group. It includes the tangible and intangible institutions, beliefs, and attitudes that make them a people group. Included in a culture are norms, standards, or rules about acceptable behavior. An individual's attitude varies with time and shaped from exogenous factors like culture (Crant 1995 ; Crant and Bateman 2000) Cultural difference affects the new firm formation rates (Davidsson and Wiklund 1997). Despite voluminous research on the topic, theories about how culture affects the entrepreneurship process remain underdeveloped (Spigel 2013). Although national culture has great influence on entrepreneurship, there is a paucity of studies that explore the effects of national cultural practices on entrepre- neurial behaviors by individuals (Autio et al. 2013).
Institutional changes emanating from evolving political landscapes within individual countries and pressures from supranational bodies have been instrumental in the liberalization of the economies of developing countries and their integration into the global economy (Aulakh and Kotabe 2008). The works of both Baumol (1990, 1993, 2005) and North (1990, 1994, 1997, 2005) have highlighted the relationship between the institutional environment and entrepreneurship development. Aidis et al. (2008) explore this relationship empirically in Russia relative to developed, other transition, and emerging economies. They utilize Global Entrepreneurship Monitor (GEM) data to study the effects the weak institutional environment in Russia has on entrepreneurship; comparing it first with all available GEM country samples and second, in more detail, with Brazil and Poland. Their results suggest that Russia's weak institutional environ- ment

explains its relatively low levels of entrepreneurship development, where the latter is measured in terms of both number of start-ups and of existing business owners. These institutional changes result in more freedom for entrepreneurs in those countries. However, this is a debatable topic. For instance, Stuetzer et al. (2014) examined the link between regional characteristics and individual entrepreneurship combining the individual-level Global Entrepreneurship Monitor data for Western Germany with regional-level data, using multilevel analysis. They found no direct link between regional knowledge creation, the economic context, and an entrepreneurial culture on the one side and entrepreneurial intentions and start-up activity on the other side.

Based on Lumpkin and Dess' conceptualization of entrepreneurial orientation (EO), Lee and Peterson (2001) proposed a cultural model of entrepreneurship. They found that a society's propensity to generate risk-taking, innovative, and proactive entrepreneurs and firms will depend on its cultural foundation. The role of economic, political, legal, and social factors as moderators of the relationship between culture and EO are also considered. Overall, it is proposed that only those countries with specific cultural tendencies will engender a strong EO, hence experiencing more entrepreneurship and global competitiveness. Gabrielsson et al. (2014) found that various international entrepreneurial cultural dimensions affect the growth of International New Ventures (INV). They show that although international motivation, inno- vation propensity, risk attitude, market orientation, and proactiveness positively affect the early INV growth phases, their effect is negative in the later phases. Besides, international learning and networking positively affect INV growth throughout.

Similarly, some researchers (e.g., Krueger and Carsrud 1993; Paul and Shrivastava 2016) have argued that Ajzen's (1991) TPB serves as a suitable theoretical framework for understanding the impact of distal variables (e.g., personality) on entrepreneurial intentions. The TPB assumes that attitudes (personality factor), social norms, and perceived control (together constitutes culture) are the most significant predictors of behavioral intentions. Based on these predictors, we decided to examine the antecedents of entrepreneurship, by linking the culture, personality, and entrepreneurial intentions for three reasons. First, they represent a key cause-effect relationship in entrepreneurship research, in terms of both predictors and mediators (Zhao et al. 2005). Second, the TPB has received strong empirical support (Armitage and Conner 2001) and was earlier utilized as the theoretical model for the prediction of entrepreneurial intentions (Krueger et al. 2000). Third, the extended theory of planned behavior also assumes that the entrepreneurial intention of people in developing countries is stronger than that of people from developed countries. For instance, Liñán and Chen (2009) redefined Ajzen's theory of planned behavior to introduce an Entrepreneurial Intention Questionnaire (EIQ) and analyzed its psychometric properties. The entrepreneurial intention model was then tested on a 519-individual sample from two countries: Spain and Taiwan. Engle et al. (2010) suggest that Ajzen's (1991) model of planned behavior does successfully predict entrepreneurial intent in different countries. Their study, which used primary data from business students and covered 12 countries representing all ten of the global regional clusters as identified in the GLOBE project, found one element, i.e., Bsocial norms,^ to be a significant predictor of entrepreneurial intent in each country. Similarly, Lakovleva et al. (2011) used the theory of planned behavior to predict entrepreneurial intentions among students in developing and developed countries. The findings indicate that respondents from developing countries have stronger entrepreneurial intentions than those from developed countries. Moreover, the respondents from developing countries also score higher on the theory's antecedents of entrepreneurial intentions—attitudes, subjective norms, and perceived behavioral con- trol—than respondents from developed countries. Their findings support the theory of planned behavior in developing and developed countries. There are recent attempts to study and model the link between country culture, entrepreneurial activity, economic outcome, and growth (Guiso et al. 2009; Doepke and Zilibotti 2013; Zapkau et al. 2015). Zapkau et al. (2015) draw on the theory of planned behavior to examine whether attitude, norm, and perceived behavioral control in fact mediate the influence on entrepreneurial intention. This was accomplished using data from 374 individuals and offered an under- standing of how prior entrepreneurial exposure influences entrepreneurial intention. Through its influence on beliefs, motives, and behaviors, culture can magnify or mitigate the impact of institutional and

economic conditions upon entrepreneurial activity. Under- standing the impact of national culture, alone and in interaction with other contextual factors, is important for refining our knowledge of how entrepreneurs think and act (Hayton and Cacciotti 2013).

Countries are grouped by the three stages of economic development as defined by the World Economic Forum's Global Competitiveness Report: factor-driven, efficiency-driven, and innovation-driven. This classification in phases of economic development is based on the level of GDP per capita and other related variables. All the innovation-driven economies are characterized by production of new and unique goods and services that are created via sophisticated and unique methods. As countries grow economically, they tend to shift from one economic stage to the next. India is still a factor-driven economy, whereas countries such as Japan, the USA, and France are categorized as innovation-driven economies. The economic reforms in 1991 and the information technology boom during the second half of the 1990s have been significant factors leading to a wave of entrepreneurship in the Indian sub-continent (Paul and Gupta 2014). On the other hand, Bentrepreneurship^ has been nurtured for many years in countries such as the USA, Japan, and France with the support of Venture Capitalists (VC) and various forms of government interaction. The institutional framework in Japan is more favorable to entrepreneurship when compared to European countries such as the Netherlands (Okamuro et al. 2011). Stuetzer et al. (2014) noted that regional characteristics might operate as background factors and affect entrepreneurial behavior. They further emphasized that background factor may not determine entrepreneur- ial behavior if not valued by an individual.

India, a developing country with 1.2 billion people, has emerged as the second fastest growing economy in the world (Paul and Gupta 2014). With the GDP growing at an average of 8% during the last 15 years, the Indian economy has recorded remarkable growth in exports and foreign direct investment (FDI) as compared to developed countries, despite severe restrictions on FDI. According to the GEM 2006, one in every ten Indians is engaged in some type of entrepreneurial activity. India is listed ninth in the GEM survey of entrepreneurial countries. The country is ranked as the highest among 28 countries in necessity-based entrepreneurship and fifth from the lowest in opportunity-based entrepreneurship. On the other hand, Japan, France, and the USA are ranked relatively high in opportunity-based entrepreneurship.

Many entrepreneurship activities are centered on information technology (IT) and IT-enabled service industries in India (Kedia and Lahiri 2007). However, there are a few globally successful firms in other industries as well. This new breed of entrepre- neurs seems to revolutionize the way business is done. They used a winning combi- nation of customer insight, industry knowledge, and out-of-the-box thinking to create innovations. To a large extent, the society appears to be risk averse in India. People in India, compared to Japan and the USA, usually seek secure and long-term employment such as government jobs, since they do not receive substantial social security benefits from the government. Social attitudes, lack of capital, inadequate physical infrastruc- ture, and lack of government support, among other influences, appear to be major hindrances to entrepreneurship (Paul and Gupta 2014).

There are country-specific factors that can influence the entrepreneurial intention and behavior, for instance, the drive for wealth that may prevail in a society (Hessels et al. 2008). Entrepreneurial waves date back to the eighteenth and nineteenth century in France and the 1950s and 1960s in Japan. In Japan, society and government undertook efforts for growth with slogans such as BSell to the strangers^ and BDouble income,^ from the 1960s to 1980s (Kanno and Alfaro 2008). On the other hand, India, with its abundant supply of talent in IT and management, has in the last few decades emerged as the global hub of outsourcing of services from developed countries such as the USA and Denmark (Jensen 2009; Lahiri and Kedia 2009). Indian entrepreneurs have continually gone global in recent years, whereas many Japanese, US, and French firms had gone or grown global in the 1970s and 1980s. The policy changes enabled a scalable and sustainable model for creating a new breed of entrepreneurs in the years to come. Despite the widespread assumptions of the positive relationship between start-up rates and innovation, the empirical support for this conjecture in the cross-country context is largely lacking. Anokhin and Wincent (2012) draw upon recent advances in the entrepreneurship literature to propose that the relationship between start-up rates and innovation

is not uniformly positive, as expected by the early scholars of entrepreneurship, but instead depends on the country's stage of development. The relationship is positive in the developed countries but negative in countries in early developmental stages.

Rauch et al. (2009, 2013) conducted the first meta-analysis on the EO-Performance relationship and found that firm size and industry adherence were the major drivers of EO. The strength of this relationship varies across different studies and country contexts (Wales et al. 2013). Taking into account considerable variance in the meta-analysis across studies, Saeed et al. (2014) show how national cultural and macro-economic drivers impact the entrepreneurial orientation, building upon 177 studies with data from 41 countries. Simi- larly, Stenholm et al. (2013) establish the relationship between country level institutional arrangements and type of entrepreneurial activity. However, based on the limited available literature, we agree with the argument that the field of international entrepreneurship is in desperate need for further theory development (Keupp and Gassmann 2009).

Most research about the influence of culture on entrepreneurship has followed Hofstede's (1980) work on cultural dimensions (Hayton et al. 2002; Mitchell et al. 2000; Mueller and Thomas 2001). However, Hofstede et al. (2004) found two alterna- tive forms in which this influence may be analyzed: (i) a positive aggregate effect when culture shapes economic and social institutions, making them more favorable toward entrepreneurial activity. Thus, Bintegrated^ individuals may find it easier to become entrepreneurs. (ii) Where culture is relatively unfavorable toward entrepreneurship, Bdissatisfied^ individuals would seek personal realization through self-employment.

Hayton et al. (2002) and Busenitz et al. (2000) point out that the cultural dimensions would influence the relationship between economic situation and entrepreneurial activity. Thus, the relative presence of integrated and dissatisfied entrepreneurs in any given culture may change substantially depending on its economic situation. In this sense, support found by Hofstede et al. (2004) for the Bdissatisfaction^ theory might partly be due to their measure of entrepreneurship. Thus, a culture unfavorable to entrepreneurship might lead to a higher proportion of self-employed individuals. On the other hand, it may be argued that a supportive culture would lead to higher entrepreneurial intentions among the population and, therefore, more new ventures being attempted.

Values shared within a culture, according to the TPB approach, would affect the motivational intention antecedents. In this sense, a supportive culture would help in the legitimating entrepreneurship (Etzioni 1987). As SN reflects the perceived social pressure to start a firm, the influence of cultural values might be stronger on this motivational antecedent (Ajzen 2001; Begley and Tan 2001). Kristiansen and Indarti (2004) argue that SN tends to play a stronger role in explaining intention in collectivist cultures and weaker in individualistic societies.

Therefore, following the previous studies grounded in institutional theory (Baumol 1990; Begley and Tan 2001; Kristiansen and Indarti 2004; North 2005; Aidis et al. 2008; Liñán and Chen 2009; Engle et al. 2010; Autio et al. 2013; Okamuro et al. 2011; Stenholm et al. 2013; Saeed et al. 2014) and rooted in the cultural models of entrepre- neurship (Busenitz et al. 2000; Mitchell et al. 2000; Lee and Peterson 2001, Mueller and Thomas 2001; Hayton et al. 2002; Hofstede et al. 2004), we propose our first hypothesis :

Hypothesis 1: Country culture (which has its roots in institutional and cultural theoretical schools) is an antecedent of entrepreneurial behavior and activity.

Proactive personality and entrepreneurial behavior

Proactive personality can be defined as taking initiative for improving current circum- stances or creating new ones. Bateman and Crant (1993) developed the proactive person- ality index, defining it as a relatively stable measure to effect environmental change that differentiates people based on the extent to which they take action to influence their environments (Prieto 2011). As work becomes more dynamic and decentralized, proactive personality and initiative become even more critical determinants of organizational success. For example, companies will increasingly rely upon employees' personal

initiatives to identify and solve problems if new forms of management are implemented that minimize the surveillance function Frese et al. 1997). McCrae and Terracciano (2005a, b) study personality profiles of cultures and demonstrate that Europeans and Americans generally score higher in extraversion than Asians and Africans. Persinger et al. (2011) report that an individual's entrepreneurial orientation is composed of personality traits (the internal environment), perception of the external environment (cognition), and actions or behaviors (manifestation of the internal into the external environment). They posit that the more proactive the entrepreneur, the more perseverance the entrepreneur will exhibit in over- coming the business environmental constraints of an emerging market.

The proactive personality scale measures a personal disposition toward proactive behav- ior, an idea that intuitively appears to be related to entrepreneurship. Proactive persons tend to identify opportunities and take initiative. Crant (1996) reports that there is a positive relationship between proactive personality and entrepreneurial intentions. This may be the case because proactive people may have a greater desire to become business leaders in order to create value for their firms. In recent times, organizations have been keen on hiring employees who have entrepreneurial traits because they believe that such people can bring changes by providing innovative solutions and new practices (Claar et al. 2009).

Individuals with a proactive personality identify opportunities, take initiatives, and are action-oriented. On the contrary, less proactive individuals might be passive and reactive, preferring to adapt to circumstances rather than change them (Crant 2000). Proactivity has emerged as a principle topic of interest among organizational researchers and practitioners in recent years (Van Dyne et al. 2003; Fuller and Marler 2009; Thomas et al. 2010). Thomas et al. (2010) conduct a meta-analysis of 103 independent samples to provide a comparative evaluation of the relationships associated with four emergent proactive constructs including proactive personality, personal initiative, voice, and taking charge. Results reveal significant correlations between proactivity and performance, satisfaction, affective organizational commitment, and social networking.

Fuller and Marler (2009) provided a comprehensive review of literature examining proactive personalities. The authors use career success as a broad organizing frame- work, meta-analyzing 313 correlations from 107 studies. Results indicate that a proac- tive personality is positively related to one's objective and subjective career success. Furthermore, results also indicate that this personality relates to variables consistent with contest mobility (e.g., job performance) and sponsored mobility (e.g., taking charge or voice behavior) avenues to career success.

Following Miller (1986), Crant (1996, 2000), and McCrae and Terracciano (2005a, b), we posit our second hypothesis :

Hypothesis 2 : Proactive personality is an antecedent of entrepreneurial intention and behavior.

Method

It is worth noting that, although government agencies and others use the concepts of comparative entrepreneurial competencies widely in their drive for success, the subject area is in need of further rigorous research and development in practice (Engelen et al. 2009; Mitchelmore and Rowley 2010; Jones et al. 2011; Terjesen et al. 2013). Following those studies, we compare entrepreneurial intention and the resultant activity of young managers in different countries including India, Japan, France, and the USA and examine their antecedents to test the theory, derive new insights, and analyze the implications. The main hypothesis is that entrepreneurial intention is greatly influenced by country culture and personality factors. On the basis of the literature review and results of the analysis, we put forward a theoretical framework (see Fig. 1) to highlight the antecedents of entrepreneurial behavior. We use multilevel techniques such as

reliability test using Cronbach's alpha, validity test methods such as principle compo- nent analysis and factor analysis, ANOVA, and post hoc tests for empirical analysis.

As primary data is considered to be more robust than secondary data, instead of relying upon the secondary data from the sources such as the GEM, we carried out the present study using interview-based, primary data, collected in the year 2014. We also followed the guidelines suggested by Hult et al. (2008) in terms of measurement equivalence. We administered a survey containing 17 questions (Bateman and Crant 1993) to over 500 managers from different industries between the ages of 22 to 30. These managers were based in India, Japan, France, and the USA. We selected young managers from four culturally diverse countries located in different regions because young managers are considered to be the most appropriate people for studying entre- preneurial intentions and resultant behavior (Engelen et al. 2009; Liñán and Chen 2009; Jones et al. 2011; Autio et al. 2013). Bateman and Crant (1993) developed their scale as a measure of proactive behavior and it is used widely as an index to examine a person's disposition as a general construct that predicts behaviors intended to effect change. The prior literature (for instance, Crant 1996, 2000; Paul and Shrivastava 2016) shows that proactive personality can be used as a proxy variable to predict entrepreneurial intentions. Crant (1996) presented the Bateman and Crant's proactive personality scale as a predictor of entrepreneurial intentions in a widely cited article in *Journal of Small Business Management*. Thus, we use proactive personality as proxy for measuring entrepreneurial intention and resultant behavior. An individual's total score range is between 17 and 119 on this instrument. A higher the score indicates stronger entrepreneurial intention. Previous work by Bateman and Crant (1993) has determined that scores above 85 indicate fairly high proactivity and the resultant entrepreneurial intention.

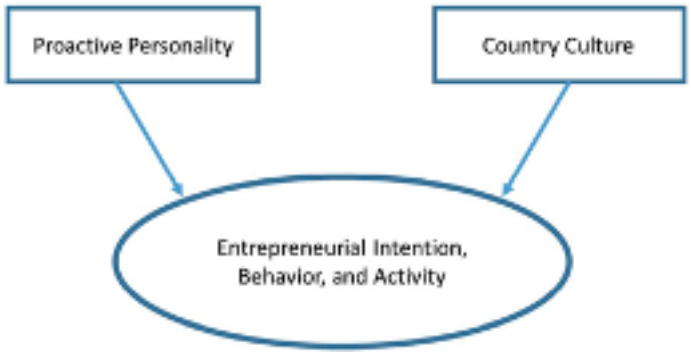

Fig. 1 Antecedents of entrepreneurial intention and activity. Source: Theoretical Framework developed by the authors

We selected four culturally different countries located in different regions in the world. To test hypothesis 1, we assume that country culture is a significant predictor of entrepreneurial intention and behavior if the scores on the Bateman and Crant instru- ment vary from country to country. It is also well known that Japanese culture is completely different from American culture, which has nothing to do with either Indian or French culture (Hofstede 1984). The choice of four distinct countries with unique culture and diverse features in this study is done with the intention of avoiding countries with similar culture, in order to establish the link between culture and entrepreneurship. As the questions in the survey instrument are directly related to proactive personality, we relied upon those answers and the mean score to test the second hypothesis.

All of the managers who participated in our survey hold MBA degrees. Most of the respondents are recent MBAs from premier schools in those relevant countries, such as the University of Washington (USA), Universite De Versailles (France), Nagoya University of Commerce and Business (Japan), and the Indian Institute of Management (India). Participants were contacted in person, as each of the researchers undertook the responsibility of collecting the data from their respective countries of employment or birth. We had approximately 60% males and 40% females in our sample from the USA, Japan, and India, while French data consisted of 65% females. The

response rate was over 70%. Based on the responses received, we conducted our analysis with a sample that consisted of 104 managers from France, 106 from India, 95 from Japan, and 95 from the USA. Additionally, we verified the reliability of the scale measuring Cronbach's alpha and conducted principle component analysis to validate this scale.
After calculating the aggregate index mean scores and standard deviation for all four countries separately, we used SPSS to perform one-way ANOVA and post hoc tests on all four groups to discover if there is a statistically significant difference between each item of the Bateman and Crant personality index.
Despite recent attempts to analyze the entrepreneurial intentions using cross-country data (Liñán and Chen 2009; Engle et al. 2010; Lakovleva et al. 2011), our method and study are robust and novel because we have taken into account the following factors :

1. Our sample consists of young managers with MBA degrees, while the authors of the abovementioned papers relied upon data from university students.
2. We collected data from four different countries of strategic importance, with very different cultural and social structures. Nevertheless, all of the sample countries are creditworthy economies when we take into consideration their population (India 1.237 billion, Japan 127.6 million, France 65.70 million, and the USA 313.9 million) or total GDP in terms of current US dollars (India 1.859 trillion, Japan 5.961 trillion, France 2.613 trillion, USA 16.24 trillion; according to the World Bank data for 2012).
3. We put forward a theoretical model (equation) to stimulate further research.
4. We take into account both culture and proactive personality simultaneously unlike other studies that consider either culture or personality, in isolation.

Results and discussion

The results of the statistical analysis and tests conducted are reported in this section under separate sub-sections, as follows: mean scores, reliability and validity tests, ANOVA, and post hoc tests.

Mean scores

The overall average score on the Bateman and Crant index is 85.06 for young managers in India. According to Bateman and Crant, this score is close to a fairly high proactive score, i.e., 85. The young managers in Japan scored 88.66 on the same index, which is significantly higher than the young Indian managers. The same index score is 89.49 and 80.26 in the case of the young managers from the USA and France, respectively. The young managers in the USA have a relatively higher proactive score than the young managers from France and India, though it is very close to the Japanese score. The empirical findings reported in Table 1 show the scores of each country.
As reported in Table 1, there is only one individual question with particularly high ratings (mean scores of 5.5 or higher on a 7-point Likert-type scale) for young Indian managers :

1. I enjoy facing and overcoming obstacles to my ideas. (5.68)

Individual questions with particularly high ratings (mean scores of 5.5 or higher on a 7-point Likert-type scale) of young Japanese managers are:

1. I feel motivated to make a difference in my community and, maybe, the world. (5.63)
2. Nothing is more exciting than seeing my ideas turn into reality. (5.56)
3. I love being a champion of my ideas, even against others' opposition. (5.76)
4. I am always looking for better ways to do things. (5.68)

Individual questions with particularly high ratings (mean scores of 5.5 or higher on a 7-point Likert-type scale) of young US managers are:

1. I feel motivated to make a difference in my community and, maybe, the world. (5.53)
2. I enjoy facing and overcoming obstacles to my ideas. (5.69)
3. No matter what the odds, if I believe in something, I will make it happen. (5.59)
4. I love being a champion of my ideas, even against others' opposition. (5.56)
5. When I have a problem, I tackle it head-on. (5.62)
6. If I see someone in trouble, I help out in any way I can. (5.98)

Individual questions with particularly high ratings (mean score of 5.5 or higher) of young French managers are:

1. Nothing is more exciting than seeing my ideas turn into reality (6.29)
2. If I see someone in trouble, I help out in any way I can (5.90)

Table 1 Average score of different countries—indicator of strong/weak entrepreneurial intention and activity

Item	Bateman and Crant instrument	India average score	Japan average score	France average score	USA average score
1	A. I am constantly on the lookout for new ways to improve my life	5.38	5.29	5.04	5.33
2	B. I feel driven to make a difference in my community and maybe the world	4.83	5.63	4.44	5.53
3	C. I tend to let others take the initiative to start new projects	3.85	4.43	3.20	4.22
4	D. Wherever I have been, I have been a powerful force for constructive change	4.73	5.02	3.77	5.22
5	E. I enjoy facing and overcoming obstacles to my ideas	5.68	5.28	5.18	5.69
6	F. Nothing is more exciting than seeing my ideas turn into reality	5.16	5.56	6.29	5.36
7	G If I see something I don't like, I fix it	4.6	4.92	5.13	5.02
8	H. No matter what the odds, if I believe in something, I will make it happen	5.37	5.44	5.18	5.59
9	I. I love being a champion for my ideas, even against others'. I love I opposition	5.2	5.76	4.35	5.56
10	J I excel at identifying opportunities	4.92	5.04	4.58	5.17
11	K I am always looking for better ways to do things	5.2	5.68	5.34	5.17
12	L If I believe in an idea, no obstacle will prevent me from making it happen	5.04	5.24	4.72	5.28
13	M. I love to challenge the status quo	4.72	4.88	4.36	5.41
14	N. When I have a problem, I tackle it head-on	5.04	5.30	4.77	5.62
15	O. I am great at turning problems into opportunities	4.92	4.88	4.03	4.23
16	P. I can spot a good opportunity long before others can	4.96	5.04	3.97	5.11
17	Q. If I see someone in trouble, I help out in any way I can	5.44	5.25	5.90	5.98
	Sum	**85.06**	**88.66**	**80.27**	**89.49**

Data rendered in bold text indicates overall score on the Bateman and Crant index for each country

Reliability and validity tests

Next, we verified the reliability of the scale by measuring Cronbach's alpha. Reliability concerns the extent to which a measurement of a phenomenon provides stable and consistent results. The reliability score was found to be well above the acceptable criterion of .50. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items is as a group. A Bhigh^ value of alpha .842 for France, .793 for India, .847 for the USA, and .797 for Japan is evidence that all 17 items measure an underlying proactive behavior construct (see Table 2). Thus, the results of the study as shown in Table 2 establish the reliability of a total of 17 items for the four countries taken from the proactive personality index developed by Bateman and Crant (1993).

We conducted principle component analysis to validate the scale. The ratio of cases to variables in a principle component analysis should be at least 5 to 1. With 17 variables and 104 cases from France, 106 from India, 95 from the USA, and 95 from Japan, the ratio of cases to variables for all the four countries exceeds the requirement

Table 2 Reliability test results

Reliability statistics			
Country	Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
France	.842	.845	17
India	.793	.795	17
USA	.847	.869	17
Japan	.797	.813	17

for the ratio of cases to variables. Kaiser-Meyer-Olkin (KMO) and Bartlett's test establishes that the sample is adequate as the value of KMO is .59 for India, .811 for France, .771 for the USA, and .600 for Japan which is greater than the required measure of .5 for all the four countries (see Tables 3, 4, 5, and 6). Principle Component Analysis requires that the probability associated with Bartlett's test of sphericity be less than the level of significance. The probability associated with the Bartlett test for all the four countries is <.001, which satisfies this requirement.

Factor analysis indicates that there are six groups of variables among the 17 items of the scale used for India and five groups of variables for France, the USA, and Japan. The cumulative proportion of variance criterion can be met with five groups to satisfy the criteria of explaining 60% or more of the total variance. A five-component solution for France and Japan would explain 63.340 and 64.791% of the total variance. A four- component solution for the USA would explain 63.241% of the total variance. A six- component solution would explain 75.61% of the total variance for India, as shown in Tables 7, 8, 9, and 10.

Communalities represent the proportion of the variance in the original variables that is accounted for, by the factor solution. The factor solution should explain at least half of each original variable's variance, so the communality value for each variable should be .50 or higher. Table 11 shows that communality variable is more than .50 for all the four countries. The rotated component matrix (Tables 12, 13, 14, and 15) indicates factor loading for each variable. As shown in the tables, a score greater than .4 establishes the validity of the scale as it meets the criteria of having more than 17 items (the total number of variables) that have factor loading greater than .4. We have used Varimax with Kaiser Normalization Rotation Method.

Table 3 KMO and Barlett's test results for India

Kaiser-Meyer-Olkin measure of sampling adequacy		.595
Bartlett's test of sphericity	Approx. chi-square	659.359
	df	136
	Sig.	.000

Table 4 KMO and Bartlett's test results for France

Kaiser-Meyer-Olkin measure of sampling adequacy		.811
Bartlett's test of sphericity	555.065	659.359
	136	136
	.000	.000

ANOVA and post hoc tests

We have performed the one-way ANOVA test at a 95% confidence interval to confirm whether or not there are any statistically significant differences between the scores on each item between the four groups from the sampled countries. For ease of accommo- dating large data on a single page, instead of writing the complete items of Bateman and Crant Scale, we have used letters to represent the 17 items of Bateman and Crant personality index. The 17 items correspond to letters A through Q, respectively. For example, letter A corresponds to item 1, i.e., BI am constantly on the lookout for new ways to improve my life^, and letter B corresponds to BI feel driven to make a difference in my community, and maybe the world^ and so on. All 17 items corre- sponding to each letter are reported in Table 1.
Since the results from the one-way ANOVA do not indicate which of the four groups differ from one another, we ran a post hoc test to perform multiple comparisons of entrepreneurial attitudes among countries. The results of the ANOVA and post hoc tests are summarized in Table 16.

Discussion

The insights from our study can be discussed point by point as follows:

1. Based on the scores of respondents from India (a developing country), it was found that respondents from developing countries do not always have stronger entrepre- neurial intentions than those from developed countries. This is contrary to the findings of Lakovleva et al. (2011). However, our findings corroborate with the results of Estay (2004) in regards to France and the USA.
2. The average index score of the USA is higher than other countries. This corrob- orates with the widespread perception that entrepreneurial intention would be relatively stronger in countries with low job security (USA) and weaker in countries with higher job security (France, India and Japan).
3. In a recent study, Okamuro et al. (2011) show that the institutional framework in the Netherlands is considerably less favorable to entrepreneurship as compared to Japan. Similarly, our findings indicate that countries such as France and India have a long way to go compared to developed countries, such as Japan and the USA, where entrepreneurship is widespread. It can be interpreted that institutional frameworks in France and India are not yet fully developed for entrepreneurs, compared to Japan and the USA. Therefore, countries such as France and India need to create better institutional framework to encourage entrepreneurs.

Table 5 KMO and Bartlett's test results for the USA

Kaiser-Meyer-Olkin measure of sampling adequacy		.771
Bartlett's test of sphericity	694.720	659.359
	136	136
	.000	.000

Table 6 KMO and Bartlett's test results for Japan

Kaiser-Meyer-Olkin measure of sampling adequacy		.600
Bartlett's test of sphericity	595.764	659.359
	136	136
	.000	.000

Table 7 Total variance explained for India

Item	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	4.601	27.066	27.066	4.601	27.066	27.066	3.508	20.634	20.634
2	2.462	14.481	41.547	2.462	14.481	41.547	2.167	12.745	33.379
3	1.815	10.679	52.226	1.815	10.679	52.226	2.018	11.873	45.253
4	1.536	9.035	61.261	1.536	9.035	61.261	1.935	11.385	56.638
5	1.326	7.801	69.062	1.326	7.801	69.062	1.680	9.882	66.520
6	1.114	6.551	75.613	1.114	6.551	75.613	1.546	9.093	75.613
7	.759	4.466	80.079						
8	.637	3.746	83.826						
9	.585	3.443	87.269						
10	.547	3.220	90.489						
11	.418	2.457	92.946						
12	.306	1.798	94.744						
13	.286	1.681	96.425						
14	.214	1.258	97.683						
15	.176	1.037	98.720						
16	.132	.777	99.497						
17	.085	.503	100.000						

Extraction method: principal component analysis

Table 8 Total variance explained for France

Item	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.446	32.035	32.035	5.446	32.035	32.035	2.406	14.150	14.150
2	1.537	9.041	41.075	1.537	9.041	41.075	2.217	13.039	27.190
3	1.450	8.528	49.603	1.450	8.528	49.603	2.168	12.755	39.945
4	1.274	7.496	57.099	1.274	7.496	57.099	1.996	11.742	51.687
5	1.061	6.241	63.340	1.061	6.241	63.340	1.981	11.653	63.340
6	.897	5.278	68.617						
7	.847	4.984	73.601						
8	.731	4.301	77.902						
9	.616	3.625	81.528						
10	.564	3.317	84.845						
11	.489	2.876	87.721						
12	.477	2.806	90.527						
13	.436	2.562	93.089						
14	.390	2.295	95.384						
15	.304	1.786	97.170						
16	.272	1.599	98.769						
17	.209	1.231	100.000						

Extraction method: principal component analysis

Table 9 Total variance explained for the USA

Item	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.165	36.262	36.262	6.165	36.262	36.262	4.001	23.535	23.535
2	2.074	12.197	48.460	2.074	12.197	48.460	3.144	18.495	42.030
3	1.306	7.681	56.141	1.306	7.681	56.141	2.142	12.599	54.629
4	1.207	7.100	63.241	1.207	7.100	63.241	1.464	8.612	63.241
6	.850	5.001	73.987						
7	.764	4.491	78.479						
8	.686	4.037	82.515						
9	.561	3.300	85.815						
10	.531	3.125	88.940						
11	.498	2.928	91.867						
12	.332	1.954	93.821						
13	.323	1.899	95.720						
14	.239	1.408	97.128						
15	.227	1.338	98.466						
16	.142	.838	99.304						
17	.118	.696	100.000						
1	6.165	36.262	36.262	6.165	36.262	36.262	4.001	23.535	23.535

Extraction method: principal component analysis

Table 10 Total variance explained for Japan

Item	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.826	28.390	28.390	4.826	28.390	28.390	2.725	16.027	16.027
2	2.243	13.193	41.583	2.243	13.193	41.583	2.433	14.313	30.340
3	1.444	8.495	50.079	1.444	8.495	50.079	2.430	14.297	44.637
4	1.297	7.627	57.706	1.297	7.627	57.706	2.014	11.845	56.481
5	1.205	7.086	64.791	1.205	7.086	64.791	1.413	8.310	64.791
6	.869	5.112	69.903						
7	.839	4.935	74.838						
8	.764	4.495	79.332						
9	.706	4.151	83.484						
10	.654	3.849	87.332						
11	.598	3.519	90.851						
12	.510	3.002	93.853						
13	.360	2.119	95.972						
14	.252	1.480	97.451						
15	.165	.973	98.424						
16	.152	.895	99.319						
17	.116	.681	100.000						

Extraction method: principal component analysis

Table 11 Communalities

Item	Initial	Extraction France	Extraction India	Extraction USA	Extraction Japan
1	1.000	.634	.663	.537	.599
2	1.000	.581	.769	.698	.813
3	1.000	.468	.881	.743	.715
4	1.000	.601	.640	.568	.621
5	1.000	.670	.843	.521	.679
6	1.000	.569	.704	.739	.545
7	1.000	.612	.717	.569	.596
8	1.000	.742	.703	.703	.698
9	1.000	.708	.679	.580	.623
10	1.000	.607	.674	.554	.725
11	1.000	.664	.806	.687	.794
12	1.000	.612	.884	.681	.574
13	1.000	.712	.682	.701	.596
14	1.000	.611	.847	.756	.621
15	1.000	.646	.824	.645	.780
16	1.000	.688	.841	.689	.510
17	1.000	.644	.696	.679	.524

Table 12 Rotated component matrix for India

Item	Component					
	1	2	3	4	5	6
1	.680	−.176	.216	.302	−.015	.177
2	.434	.314	.318	.495	.206	.305
3	−.015	.074	.167	.909	−.137	−.040
4	.737	.135	.226	.088	.132	.046
5	.143	−.141	−.151	.030	.883	−.021
6	.296	.688	−.266	.099	.017	.250
7	.772	.165	−.105	.161	−.099	−.218
8	.727	−.161	.166	.060	.340	.041
9	.188	−.697	.021	.250	.192	.241
10	.170	.754	−.031	.014	.174	.213
11	.222	.104	.005	.053	−.064	.860
12	.283	−.371	−.081	.785	.210	.029
13	.756	.213	.169	−.109	−.043	.152
14	−.059	.420	.296	−.021	.748	−.138
15	.227	−.006	.861	.163	−.065	.040
16	.215	−.195	.847	.014	.084	−.180
17	.464	−.071	.280	.063	.087	−.621

The overall average scores on the Bateman and Crant index are 85.06 in the case of young managers from India, 88.66 for Japan, 80.27 for France, and 89.49 for the USA. Our findings do not go hand in hand with the results of Lakovleva et al. (2011). Thus, we find that the theory of planned behavior does not hold true in the case of people from all developing and developed countries. However, there could be exceptions. The index score of India, being a developing country, should have been higher than that of other three developed countries in our study in order to corroborate with the theory of planned behavior. This is not the case, as it is higher than that of just one country, France. On the other hand, our findings are in accordance with the results of Engle et al. (2010), who show that social norms (for which we use the term country culture) are a significant predictor of entrepreneurship in each country.

The differences in the scores also indicate that entrepreneurial intention is greatly influenced by the culture of a country. However, as three groups (countries) out of four are above the threshold of a score of 85 on the index, it is possible to state that the findings indicate the role of both country culture and proactive personality. Accord- ingly, we postulate a theoretical framework as depicted in Fig. 1.

Limitations and suggestions for future research

Based on the literature review and measures of proactive personality among young managers in all four of the countries sampled, we established that country culture and proactive personality are the most important antecedents of entrepreneurial activity.

Table 13 Rotated component matrix for France

Item	Component				
	1	2	3	4	5
1	.160	−.067	.758	.128	.114
2	−.109	.333	.656	.124	−.110
3	.011	.137	−.008	.094	−.664
4	.167	.211	.706	.040	.168
5	.280	.151	.312	.544	.419
6	.184	.383	−.040	.594	.183
7	.601	−.368	.287	.167	.078
8	.807	.163	−.065	.227	.090
9	.728	.374	.187	−.031	.038
10	.176	.728	.117	.177	−.025
11	.182	.120	.473	.626	−.007
12	.657	.317	.119	.160	.201
13	.258	.417	.096	.277	.621
14	.114	.153	.045	.266	.708
15	.193	.516	.238	−.029	.535
16	.265	.670	.346	−.035	.220
17	.051	−.100	.071	.791	.010

Table 14 Rotated component matrix for the USA

Item	Component			
	1	2	3	4
1	−.016	−.218	.613	.119
2	.009	−.204	.406	.701
3	−.066	.843	−.006	−.169
4	.552	−.014	.483	−.173
5	.112	.120	−.022	.627
6	.785	.290	.193	−.035
7	.182	.549	.471	.112
8	.476	.217	.528	−.389
9	.488	.233	.016	.433
10	.377	.626	.118	.081
11	.237	.403	.670	.141
12	.437	.679	.077	.151
13	.222	.792	−.140	.067
14	.644	.199	.498	.231
15	.795	.068	−.060	.072
16	.724	.379	.016	.141
17	.746	.105	.301	.145

Table 15 Rotated component matrix for Japan

Item	Component				
	1	2	3	4	5
1	.160	−.067	.758	.128	.114
2	−.109	.333	.656	.124	−.110
3	.011	.137	−.008	.094	−.664
4	.167	.211	.706	.040	.168
5	.280	.151	.312	.544	.419
6	.184	.383	−.040	.594	.183
7	.601	−.368	.287	.167	.078
8	.807	.163	−.065	.227	.090
9	.728	.374	.187	−.031	.038
10	.176	.728	.117	.177	−.025
11	.182	.120	.473	.626	−.007
12	.657	.317	.119	.160	.201
13	.258	.417	.096	.277	.621
14	.114	.153	.045	.266	.708
15	.193	.516	.238	−.029	.535
16	.265	.670	.346	−.035	.220
17	.051	−.100	.071	.791	.010

However, we did not measure the cultural differences for the countries selected. Our interpretation of the results is based on five main points:

1. The notion that we received different scores for the chosen countries
2. The usage of a standardized questionnaire in English, in India, Japan, and the USA, while the questionnaire was translated to French for data collection in France. This was done based on the assumption that all the managers in Japan were comfortable to answer questions in English. Language was not a constraint in India, as English is the medium of instruction in most universities and educational institutions
3. The selection of a relatively small sample size within each country
4. The use of proactive personality as proxy variable for entrepreneurial intention
5. The analysis is cross-sectional in nature, and thus the results could be subject to common method bias, as suggested by Podsakoff et al. (2012)
6. We studied France from Europe. However, we use French data as a representative of Europe for comparison with the USA and Asia (Japan and India). For general- ization purpose, we use Europe in title despite the fact that we study only France from Europe. As it may be biased to generalize the French data for all the European countries (managers from other European countries may have different personal- ities), we consider this as a limitation of this study

We recommend that future studies incorporate these aspects while developing their research methodologies. There is a wide scope for integrating measures of culture and modeling it within the mathematical model framework. Based on the literature review

Table 16 Results of ANOVA and post hoc tests

Item A	ANOVA test shows that respondents are significantly different from each other. The post hoc test for item A shows that if we compare France with India, the USA, and Japan, then respondents from France are significantly different from the USA. If we compare respondents of India from rest of the countries, then respondents from India are significantly different from the USA. Similarly respondents of Japan are significantly different from the USA.
Item B	ANOVA test shows that respondents are significantly different from each other. Post hoc test for item B shows that the respondents of France significantly differ from the USA and Japan. Respondents from India are significantly different from the USA and Japan. Respondents from Japan are different from the rest of the three countries. Similarly, respondents of the USA are different from other three countries.
Item C	ANOVA test shows that respondents are significantly different from each other. Post hoc test for item C shows that respondents from India are marginally different from Japan. Rest of the countries is significantly different from each other.
Item D	ANOVA test shows that respondents are significantly different from each other. Respondents of France are significantly different from rest of the three countries. Respondents of India are significantly different from France and the USA. Respondents of the USA are significantly different from France and India. Respondents of Japan are significantly different from France.
Item E	ANOVA test shows that respondents are significantly different from each other. Post hoc for item E shows that respondents of France are significantly different from the USA. Respondents of India and the USA are significantly different from rest of the three countries, respectively. Respondents of Japan are significantly different from that of India and the USA.
Item F	ANOVA test shows that respondents are significantly different from each other. Post hoc for item F shows that respondents of France are significantly different from rest of the three countries. Respondent of India are different from Japan.
Item G	ANOVA test shows that respondents are significantly different from each other. Post hoc for item G shows that respondents of France and Japan are significantly different from India and the USA. Respondents of India are significantly different from rest of the three countries. Respondents of the USA are significantly different from rest of the three countries.
Item H	ANOVA test shows that respondents are significantly different from each other. Post hoc for item H shows that respondents of France, Japan, and India are significantly different from the USA. One possible explanation for the difference could be because the USA has more favorable business environment that encourages the young managers to venture as entrepreneurs. Indians and Japanese scored almost the same on this item.
Item I	ANOVA test shows that respondents are significantly different from each other. Post hoc for item I shows that respondents of France and India are significantly different from the USA and Japan. Respondents of the USA are significantly different from that of Japan.
Item J	ANOVA test shows that respondents are significantly different from each other. Post hoc for item J shows that respondents of France, Japan, and India are significantly different from that of the USA.
Item K	ANOVA shows that respondents are significantly different from each other. Post hoc test shows that Indians are significantly different from rest of the three.

Table 16 (continued)

Item L
ANOVA and post hoc show that respondents are not significantly different from each other.
Item M
ANOVA test shows that respondents are significantly different from each other. Post hoc test shows that respondents of France, Japan, and India are significantly different from that of the USA
Item N
ANOVA test shows that respondents are significantly different from each other. Post hoc test shows that respondents from France and Japan are different from the USA.
Item O
Post hoc test shows that respondents of France are significantly different from rest of the three countries. Respondents of the USA are significantly different from France and Japan.
Item P
ANOVA test shows that respondents are significantly different from each other. Post hoc test shows that respondents of France are significantly different from rest of the three countries.
Item Q
ANOVA test shows that respondents are significantly different from each other. Post hoc test shows that French managers are significantly different from managers from the USA and Japan.

and our study, we outline the need to develop new theories in this area which could serve as a benchmark tool for future research. Following prior research (Keupp and Gassmann 2009; Terjesen et al. 2013), we also suggest that the field of Comparative International Entrepreneurship is in desperate need of further theory development. There are also possibilities for comparing entrepreneurial intentions based on genders, which can be executed from a single or multiple country perspective, as was done in the current study.

Methodological suggestions include theory-based rationale for selection of coun- tries. We also agree with McMullen and Dimov (2013), who propose an entrepreneurial journey to distinguish the field horizontally from research on creativity and strategy and vertically from research on real life management functions.

Conclusions

Our sample has data from three different continents and four countries. The limitation of the study is that we could collect data from two countries of Asia and only France of Europe. The scores generated in our statistical analysis vary from country to country (India, Japan, the USA, and France). Since the scores are different for the four countries, the influence of country culture on entrepreneur- ship cannot be ignored.

Regardless of their differences, managers in three countries out of the four studied— the USA, Japan, and India—exhibit a relatively higher threshold limit for entrepre- neurial intention, based on the criteria score 85 on the Bateman and Crant instrument. Therefore, we accept hypotheses 1 and 2 and conclude that the young managers from those countries have stronger entrepreneurial intentions, particularly the respondents from the USA and Japan. However, how those attributes are then demonstrated or pursued may be driven by cultural realities. Thus, we conclude with the following mathematical equation :

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Les stéréotypes générationnels fondements, limites et dangers

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Gilles ROUET
Gilles.rouet@uvsq.fr

Mots-clés : Stéréotypes générationnels - Démarche normative – Recrutement – Comportements auto-réalisateurs

Résumé : Caractériser et/ou catégoriser des sous-ensembles des populations selon les âges ou les époques, par « génération » donc, n'est pas une démarche nouvelle. Les générations n'ont pas les mêmes histoires, et si les valeurs partagées changent, finalement, assez peu, les hiérarchies de ces valeurs évoluent au sein des populations, en fonction des changements de mentalité, des cultures, etc. Mais la généralisation de caractérisations générationnelles s'apparente actuellement à une production et à une diffusion de stéréotypes, pouvant induire d'ailleurs des comportements auto-réalisateurs : « puisque les personnes de ma génération sont ainsi, je dois donc m'y conformer ».

Cette démarche normative est développée par certains acteurs économiques, consultants ou encore cabinets de recrutement. Les stéréotypes générationnels, envisagés comme des évidences démontrées, s'imposent alors sous couvert d'une scientificité discutable, ce qui rend nécessaire le recours à des « experts » en génération X, Y ou Z, afin de tenter de maîtriser ces phénomènes…
Le constat et l'analyse des transformations des mentalités, des attitudes, voire des compétences au fil des générations aboutissent souvent à une recherche de caractérisation, de qualification et de catégorisation, voire de stigmatisation. Les expressions *Digital Natives*, Net génération, génération X, Y ou Z, *Millennials*, etc., à la fois métaphores et slogans, sont plus ou moins médiatiques et médiatisés et sont parfois érigés en concepts. L'idée semble simple, et c'est ce qui fait certainement son succès, en particulier en management, en marketing ou dans le champ des ressources humaines : la différence entre les jeunes d'aujourd'hui, les dernières « générations » donc, et les plus âgés résiderait dans des compétences, des capacités, des aptitudes, des connaissances différentes et distinctives, adaptées à l'environnement numérique, alors que les aînés doivent ou ont dû « immigrer » vers ce nouveau monde.

Le générationnel a ainsi envahi le monde de l'entreprise, de manière concomitante ou presque avec la généralisation des Technologies de l'Information et de la Communication, et de nombreux auteurs expliquent, d'une part que les entreprises doivent adapter leurs méthodes de management à ces nouvelles générations, d'autre part comment le faire, car les *Digital Natives* qui représenteront 75 % de la population active d'ici une dizaine d'années maîtriseraient parfaitement le digital (cf. par exemple, Victor & Babaci-Victor, 2017 ; Desplats & Pinaud, 2011).

Une scission générationnelle a-t-elle donc eu lieu, radicalement ? Les fractures au sein des populations, induites par l'évolution technologique et les outils à maîtriser, ne se limitent pourtant pas à un problème de génération. Mais l'important serait non pas « de définir une génération […], une partie de cette génération », mais plutôt de « caractériser une certaine pratique du numérique » (Stenger, 2015, p. 13), en tenant compte du fait qu'« un jeune né dans un monde peuplé d'ordinateurs ne comprend pas davantage la pensée algorithmique qu'un jeune né dans un mode peuplé de voitures ne maîtrisait le principe d'un moteur à explosion » (Coutant in Stenger, 2015, p. 151).

Qu'est-ce qu'une génération ?

La notion de « génération » est de l'ordre de l'évidence quand il s'agit de rassembler des individus selon leur âge, ou bien pour indiquer un rapport à un événement important, souvent difficile à vivre, une rupture politique ou sociale, une opportunité nouvelle proposée à une partie seulement du corps social : la « génération mai 68 », mais aussi la « génération Erasmus ». Le sens du mot a cependant évolué et de nombreux champs des sciences humaines et sociales l'ont investi.

Néanmoins, ce terme s'est imposé dans une démarche historique, quand il s'agit, en particulier, de donner des éléments d'explication à une situation particulière : l'engagement d'une grande partie des Allemands dans la politique nazie serait ainsi lié, en réaction, aux événements vécus par une génération née au début du XX^{e} siècle, privations, absence du père mort à la guerre, défaite, chômage, etc. (Loewenberg, 2017 [1983]). Les générations ayant subi les guerres, en particulier, ont ainsi été souvent mises en évidence, mais sans pour autant que le lien entre les événements et les caractéristiques générationnelles s'inscriraient dans une relation de causalité. Même si les événements ont des effets sur les populations qui en sont témoins ou acteurs, ce qui peut par la suite induire des comportements particuliers, la relation avec le générationnel n'est liée qu'à l'âge et à la durée de vie des personnes concernées. Il devient aussi assez commode de faire coïncider générations et périodes historiques : les générations, historicisées, devenant alors preuves supplémentaires du bien-fondé des périodisations proposées.

En effet, la génération d'âge, « cohorte », d'un point de vue démographique, est un ensemble d'individus nés une même année, ou bien pendant une même période, cette période pouvant aussi être fondée sur… la génération elle-même. Ce raisonnement permet alors d'arrimer les rythmes historiques aux générations successives.

Pour autant, on parle peu de « génération 11 septembre » ou de « génération Mur de Berlin », les événements retenus s'inscrivent souvent plutôt dans une certaine durée. De plus, le générationnel induisant une succession (voire une progression) historique (comme la périodisation), le temps en reste un élément fondamental : temps politique, social, économique, mais aussi biologique. La question de l'amplitude des générations reste largement ouverte, en particulier actuellement : quand sont nées les personnes de la génération Y ? De nombreux auteurs se contentent d'intervalles larges, sans précision… C'est qu'il n'y a ni rupture, ni événement circonscrit dans le temps historique : la généralisation des TIC a été rapide, certes, mais progressive, tout comme les mondialisations. Les historiens ont moins ce problème, car ils s'attachent, très généralement, à définir des générations *a postériori,* sauf peut-être dans le cadre des tentatives d'histoire à rebours…

Au XIX^{e} siècle, une vision des générations s'est imposée, dépassant le cadre de la construction historique. Le positivisme d'Auguste Comte met en relation le rythme du progrès social avec le générationnel : chaque génération contribue ainsi au progrès (Comte *et al.*, 2012). Dès la fin du XIX^{e} siècle, s'impose l'idée qu'un cycle de trois, quatre puis, plus récemment, cinq générations qui s'influenceraient mutuellement. Le renouvellement des générations, la question de la « relève », du « remplacement »[7], la mise en exergue des « seuils de renouvellement » liés à la reproduction des populations, sont autant de thématiques qui traversent le siècle pour nourrir des thèses politiques de défense identitaire, du repli nationaliste et de l'opposition à l'immigration.

[7] D'après l'INED, « une génération assure son remplacement si le nombre de filles dans la génération des enfants est égal au nombre de femmes dans la génération des parents. À cause du rapport de masculinité à la naissance (il naît 105 garçons pour 100 filles) et de la faible mortalité infantile, le niveau de remplacement est atteint lorsque les femmes ont environ 2,1 enfants dans les pays développés » (<https://www.ined.fr/fr/lexique/remplacement-des-generations>). Pour le Centre d'observation de la société, « si la descendance finale des femmes se maintient durablement sous ce chiffre, la population diminue lentement. Nous employons le conditionnel, car ce chiffre ne tient pas compte de l'immigration, qui peut constituer un apport notoire. En pratique, avec 1,8 ou 1,9 enfant par femme et un solde migratoire modeste, la population reste stable ». (<http://www.observationsociete.fr/definitions/renouvellement-des-generations.html>).

La thèse du « grand remplacement », complot dénoncé de substitution de population, s'appuie sur une conception spécifique du générationnel largement inspirée de la tradition positiviste, et qui n'admet aucun métissage, aucun dynamisme des populations. Le générationnel s'articule alors avec une conception statique et collective de l'identité, induite par un renouvellement démographique des sociétés fermées (Le Bras, 2017).

Les générations et leur succession constitueraient donc un moteur du progrès, scientifique, social, politique, les communautés d'âge se confondant avec des communautés de destin, selon le rythme trentenaire des générations familiales ou bien celui, de dix ans, des générations sociales (Mentré, 1920).

La sociologie a tenté de dépasser le cadre rigide de cette régularité qui induit une unification générationnelle. En particulier, Karl Mannheim développe trois concepts : la « situation de génération », l'« ensemble générationnel » et l'« unité de génération » (1928). La situation de génération, comme la situation de classe, est caractérisée par l'appartenance des personnes concernées à un espace historique et social qui, en circonscrivant le champ du possible, laisse apparaître des tendances spécifiques. L'ensemble générationnel est le lien réel entre les individus se trouvant dans une même situation générationnelle, participant donc à un destin commun. L'unité de génération, enfin, est un lien plus concret, par exemple celui d'un groupe qui s'approprie différemment les expériences communes à l'ensemble générationnel (pp. 58-60).

L'appareil conceptuel de Mannheim, centré sur les processus et les interactions sociales, permet ainsi de mettre en évidence des situations particulières, une relativité de l'unité générationnelle, avec des divergences et des hétérogénéités (Blavier, 2010). Pour autant, comme le met en évidence Claudine Attias-Donfut, cette analyse formelle « reste néanmoins dans l'esprit de ses prédécesseurs, du point de vue du double rapport à la pensée et à l'histoire » (1988, p. 41). Les générations au sens démographique, dont la jeunesse a lieu pendant des changements significatifs, sont alors aussi des générations au sens social. Il est difficile de ne pas faire le lien entre cette analyse et les présentations actuelles des générations X, Y et Z. Pour autant, les processus ne sont peut-être pas aussi réguliers que les renouvellements démographiques et ce sont alors les changements en eux-mêmes qui définissent les générations particulières.

Quel lien est-il possible d'établir, finalement, entre les changements sociaux et les générations et entre les individus et leur génération ? En considérant une génération définie par un cadre temporel, comment évaluer similitudes et divergences des individus la composant *a priori*, en particulier par rapport à l'évolution technologique, élément principal de contexte pour les tenants actuels du générationnel ?

Alors qu'actuellement le concept de génération reste mal défini et est souvent abandonné, en particulier en sociologie, la généralisation de notions voisines (classes d'âge, groupes d'âge, cohorte) n'aboutit à régler ni le problème des frontières des générations ni celui du rapport à la famille et aux groupes sociaux. Depuis la fin des années 1970, le terme « génération » est ainsi utilisé avec de nombreux sens plus ou moins explicités, en particulier par rapport à l'évolution des mentalités et des idées politiques (« génération Mitterrand »). S'il est ainsi difficile d'identifier une génération à une époque historique, avec ses aspects politiques, sociaux, économiques, technologiques, alors pourquoi user et abuser de ce terme, sinon dans le cadre d'une production idéologique et/ou symbolique spécifique ? Le discours générationnel a évidemment une fonction sociale. En faisant référence à la fois au temps et aux filiations des sociétés, il s'agit d'insister sur les ruptures, sur les dichotomies presque irréductibles au sein des populations. « En nommant les générations, on en fait des personnes collectives, nées de l'imaginaire » (Grimm-Gobat, p. 60).

Les stéréotypes générationnels en entreprise

La pertinence de l'utilisation de la notion de génération doit donc être discutée. Dans le champ des sciences de management, comme dans d'autres, les présentations des générations focalisent sur l'âge chronologique des individus concernés, d'une part, et sur les cohortes sociétales,

ensemble d'individus qui, dans des âges comparables, sont concernés par un même environnement, d'autre part. L'homogénéité des générations n'est pas, généralement, postulée ou démontrée en tant que telle, mais il s'agit souvent de mettre en évidence des similitudes de comportements, d'aptitudes ou de compétences, ce qui induit, par généralisation, une uniformisation.

Il n'est pas question de nier que chacun, selon l'âge, les événements auxquels il participe, les institutions qui le concernent, est influencé par des contextes familiaux, politiques, culturels, économiques et développe en conséquence des attitudes et des croyances, qu'il partage plus ou moins et qui sont susceptibles d'orienter ses comportements. Pour autant, il est important d'envisager toute approche générationnelle de manière critique : les comportements restent relativement hétérogènes et les attitudes et aptitudes envers les TIC ne sont pas seulement liées à l'âge, mais bien aussi à un ensemble d'autres caractéristiques, cognitives et sociales, notamment.

Sur l'Internet de très nombreux sites foisonnent qui décrivent (plutôt qu'expliquent) les particularités qui caractériseraient les différentes générations. Voici une rapide synthèse des éléments principaux :

- Les *Baby-boomers*, nés à la fin de la Deuxième Guerre mondiale (entre 1945 et 1960), pendant les Trente Glorieuses, sont désormais des séniors. Ils ont bénéficié du plein emploi, de la reconstruction, et n'ont pas connu de crise majeure. Ainsi ils se sont insérés dans des entreprises au développement rapide et à la structure hiérarchique rigide. Ces circonstances les auraient amenés à privilégier l'épanouissement, leur réalisation par le travail et au travail, en cultivant autonomie et convivialité. Loyaux envers leur entreprise, ils auraient tendance à considérer leurs proches collègues proches comme une seconde famille.

- La génération X, du titre du roman de Douglas Coupland (1993)[8], regroupe des personnes nées entre 1960 et 1980 qui doivent ou ont dû se contenter de petits boulots. Ils sont alors souvent peu payés, dans des positions peu prestigieuses, demandant une faible qualification et n'offrant pas d'avenir. Durant cette période, souvent qualifiée de transition, cette génération aurait tenté de s'imposer et de changer les codes, d'où une volonté d'évolution, par une mobilité verticale ou horizontale, avec un besoin d'apprendre et de relever des défis. En même temps, la recherche d'équilibre entre vie professionnelle et vie privée est une caractéristique très souvent mise en avant pour cette génération.

- La génération Y est certainement la plus médiatisée. Une requête dans Google Books fait apparaître plus de 21 000 résultats pour « Génération Y », soit dans le titre des ouvrages, soit dans les résumés (5 600 pour Génération X et 5 500 pour Génération Z)[9]. Cette génération du « pourquoi » (*why*, prononciation anglaise de Y) est caractérisée par son environnement technologique, d'où l'expression proposée par Marc Prensky, *Digital Natives*, en 2001. De plus, la graphie de la lettre Y rappelle les écouteurs, accessoires très largement utilisés (seulement par les natifs entre 1980 et 2000 ?). Cette génération a connu la libre circulation au sein de l'Union européenne, mais aussi une banalisation du projet européen (Rouet, 2017). Les membres de cette génération auraient besoin de dissocier leur vie privée et leur vie professionnelle. Il est donc facile, sur ce point, de constater une évolution logique, certainement rassurante pour les tenants de cette théorie générationnelle, entre les *Baby-boomers* qui investiraient leur vie professionnelle, la génération X qui chercherait un équilibre et la génération Y qui tenterait de séparer les deux aspects, même si ses représentants invitent pourtant leur vie professionnelle dans leur vie privée (Delaye, 2013), qui néanmoins passerait toujours en premier (Lahouze-Humbert, 2010). Ils ne seraient pas loyaux envers leur entreprise, voudraient imposer leurs conditions, n'hésitant pas à changer d'employeur quand leurs conditions de travail ou leurs missions ne correspondent plus à leurs attentes.

[8] Paru en 1991 au Canada avec le titre *Generation X : Tales for an Accelerated Culture*.

[9] Une recherche similaire en anglais donne 152 000 occurrences pour « Generation Y » et 34 000 pour « Generation Z ».

Ils sont souvent décrits selon « quatre i » : individualiste, inventif, interconnecté et impatient[10] . Pour autant, l'individualisme n'est pas l'individualisation (la recherche de reconnaissance personnelle dans le contexte actuel dépasse largement le cadre de la génération ciblée) ; l'interconnexion est une pratique généralisée qui n'induit pas forcément une appétence (ou une compétence) pour les technologies utilisées, ce que suggèrent ces descriptions ; l'inventivité peut s'appliquer à une grande palette de comportements avec des objectifs différents et l'impatience est certainement liée à l'évolution du rapport au temps, ce qui concerne l'ensemble des populations. Pour certains auteurs, la génération Y cherche avant tout à donner du sens à son travail (Desplats & Pïnaud, 2015), et revendique une bonne qualité de vie au travail (Delaye, 2013).

- La génération Z, aussi appelée *Millennials* (pour les auteurs qui considèrent le début de cette génération au début des années 2000) est décrite comme « hyperconnectée » (donc plus que les précédents ?) et se résume avec 4 C : « communication, collaboration, connexion et créativité »[11]. La pratique des réseaux sociaux la caractérise et elle serait alors plus ouverte au monde, s'affranchissant des distances réelles. Même si ces idées reçues ne sont pas confirmées par les recherches sur la réalité des pratiques (Cardon, 2010), il s'agit bien de mettre en évidence l'évolution des comportements de cette nouvelle génération qui ne mettrait plus de barrière entre vie privée et vie professionnelle. Les membres de cette génération seraient réticents à s'engager dans une entreprise, très sensibles à leur image, avides de flexibilité, d'autonomie et de travail collaboratif.

Limites, business et dangers

Ces caractéristiques générationnelles reposent, dans la plupart des cas, au mieux sur des études ciblées sur des entreprises ou des emplois spécifiques, au pire sur des observations sur quelques cas rencontrés. Cette « micro-sociologie » est cependant importante et de nombreux responsables des ressources humaines peuvent considérer que ces descriptions correspondent réellement à des tendances, mais il est possible qu'ils n'aient été en contact qu'avec des ensembles de personnes relativement homogènes, en particulier quand il s'agit de chercher à recruter.

Les schémas explicatifs sont à la fois simples et efficaces : les *Baby-boomers* ont été habitués aux rythmes imposés et à l'autorité, ils n'ont pas ou peu connu le chômage et se sont insérés dans des structures paternalistes, tandis que les suivants ont été confrontés à une pénurie des emplois et se montrent individualistes par rapport à cette quête, tout en souhaitant rompre avec leurs aînés et trouver des modes d'épanouissement en dehors du travail. Ceux de la génération suivante développeraient un autre mode de vie en liaison avec la généralisation du digital, ils sont connectés et ont ainsi un autre rapport à l'information, ils s'inscriraient dans le collaboratif et remettraient en cause la hiérarchie et le pouvoir d'autorité. Reste à mettre en perspective la génération Z qui s'insère actuellement sur le marché du travail.

Les environnements induisent donc des comportements collectifs qu'il est nécessaire de bien connaître pour anticiper, en termes de mode de recrutement comme de conditions de travail. Le marketing, puis les sciences du management, se sont emparés de ces démarches qui aboutissent à renforcer, voire à produire des stéréotypes. Rien d'étonnant à cela puisque la « relation client » comme le management des équipes sont, effets générationnels ou pas, de toute façon à repenser

[10] Selon Benjamin Cheminade, cf. <https://www.01net.com/actualites/recruteurs-attention-la-generation-y-debarque-378068.html>, repris en particulier par Desplats & Pinaud, 2015.

[11] Cf. par exemple, le site <https://www.cdesetudesetduconseil.fr/2016/02/11/communication-collaboration-connexion-et-creativite-ils-ont-tout-pour-eux/>, qui évoque une « cyber-génération » avec des tendances comportementales particulières : « la sélection et la création plutôt que la quantité », ou encore « les images avant les textes ». Sur le site <https://business-digest.eu/fr/2011/06/23/gen-c-collaboration-communication-connexion/>, cette « génération C », « change la donne », car, comme ils œuvrent « naturellement en réseau par leur usage intensif des nouvelles techno, ils ont tout pour bousculer l'organisation pyramidale de l'entreprise ».

avec les évolutions sociétales actuelles, qui ne concernent cependant pas que les Y ou les Z. Le projet de réunir des individus dans une homogénéité de comportements et de mentalité permet évidemment de réduire la diversité toujours difficile à cerner. Depuis une dizaine d'années, des études montrent les limites de ces généralisations. François Pichault et Mathieu Pleyers évoquent une « représentation managériale », un « mythe » et leur étude en Belgique permet de relativiser « le discours dominant sur la spécificité de la génération Y et sur celles des réponses managériales à y apporter » (2012, p. 52). Pour Jean Pralong, la génération Y n'existe pas, sa recherche montre que « les schémas concernant l'emploi des salariés de la ''Génération Y'' ne diffèrent pas significativement de ceux des salariés membres de la génération antérieure » (2010, p. 18). D'ailleurs, la littérature sur les générations provient bien plus des « récits de managers ou des recommandations des consultants » que de la communauté académique (*idem*, p. 1).

Comme cela a été signalé, la sociologie n'est pas convaincue, les enquêtes et études n'ont pas abouti à proposer des généralisations possibles. Les générations d'âge restent hétérogènes, en particulier par rapport aux conditions de vie et aux études suivies. Il est alors difficile de soutenir qu'il n'existerait qu'un seul rapport au travail évoluant génération après génération, ou bien que l'âge, principalement, serait le facteur explicatif principal. Le sentiment d'appartenance, élément de la construction identitaire, est intéressant dans une perspective d'étude d'éventuels phénomènes générationnels. Mélia Djabi et Sakura Shimada ont adopté cette approche, avec une enquête sur l'affiliation d'individus à des groupes générationnels. Elles concluent que « l'entreprise joue un rôle majeur dans la production et le modelage des générations au travail », et prend ainsi « activement part » à « la diversité générationnelle » (2015, p. 59), mettant ainsi en évidence de nouveaux enjeux managériaux avec ce dépassement des catégorisations « externes » rapides et mythifiées. Mais si ce sentiment d'appartenance fait défaut au plus grand nombre des membres de la supposée génération Y, alors en quoi s'agit-il bien d'une génération ?

Les caractéristiques générationnelles sont souvent définies à partir de rapports de causalité supposés, mais non fondés. Par exemple, ce n'est pas parce que des *Millennials* s'estiment moins satisfaits de leur emploi que d'autres salariés d'une génération précédente (X par exemple), qu'il est possible d'en déduire que leur génération est moins satisfaite que les autres. Il conviendrait, justement, d'établir des recherches par suivi de cohortes et d'envisager la satisfaction de leurs aînés au début de leur carrière ! Ce n'est pas parce que ce type de recherche est difficile, voire impossible à réaliser (sur une grande amplitude temporelle incluant plusieurs générations) qu'il faut ignorer le rôle de l'effet de l'âge. De la même façon, le supposé narcissisme des *Millennials* est peut-être, finalement, plus lié à la jeunesse qu'à la génération…

D'un point de vue méthodologique, il est difficile de pouvoir mettre en évidence des effets générationnels. Il faudrait pour cela collecter et analyser des données sur plusieurs échantillons longitudinaux, sur de nombreuses années, pour tenter de contrôler les effets du vieillissement, des évolutions de l'environnement, et des générations (au sens de cohorte).

Les frontières temporelles sont également un problème central : de nombreux auteurs proposent des dates, de manière arbitraire ou bien reliée à l'histoire de l'évolution technologique. Seuls les *Baby-Boomers* semblent disposer de marqueurs temporels liés à des événements et des situations qui peuvent effectivement être des éléments explicatifs d'évolution des comportements, mais pour la génération Y, en particulier, les frontières temporelles sont particulièrement mouvantes, de la fin des années 1970 pour les uns, à l'après-1985, pour d'autres, alors qu'il est évidemment difficile de mettre en évidence un événement particulier.

Alors, même si les limites de ces approches sont nombreuses, ne s'agit-il pas en fin de compte de fournir des éléments de réflexion aux managers, aux recruteurs, aux spécialistes du marketing pour qu'ils améliorent leurs dispositifs ? Les stéréotypes générationnels pourraient aussi fournir des éléments très lacunaires d'une évolution actuelle, en profondeur, des entreprises comme de toutes les sociétés ? Il pourrait s'agir non pas de générations successives, mais d'époques en mutation, avec de nouveaux rapports au temps, au travail, aux transports, etc., auxquelles les structures des entreprises comme des institutions ne seraient plus adaptées.

Mais les dangers à croire, à utiliser cette approche sont peut-être bien plus importants que les avantages. Si les personnes sont différentes en fonction de leur « génération » d'appartenance, imposée plus que ressentie, alors il est indispensable que les entreprises, mais aussi les enseignants, les agents des services publics, et même les parents s'efforcent de s'adapter à ces particularités, de l'ordre de la révélation.

Beaucoup de responsables d'entreprise témoignent de la difficulté à maintenir les employés les plus jeunes, les *Millennials*, qui sont justement réputés comme instables. La génération Y serait un véritable « péril jeune » pour les entreprises (Pralong, 2010). Comme il est impossible de les faire vieillir, ou bien de n'embaucher que des salariés des générations précédentes, qui sont supposés ne pas avoir les mêmes caractéristiques par rapport à l'entreprise et au travail, les responsables peuvent décider d'améliorer les conditions de travail et d'augmenter les salaires des plus jeunes pour éviter leurs départs rapides et redoutés. Mais quelles en seront alors les conséquences sur l'ensemble du personnel ? Cette importance accordée à ces différences entre les générations peut avoir des effets négatifs en encourageant les responsables à privilégier une approche différenciée à une approche intergénérationnelle. Il serait aussi plus indiqué de tenter de connaître les raisons, au-delà du générationnel, de l'instabilité des plus jeunes que d'avoir recours à des spécialistes qui vont proposer des solutions toutes faites.

Un site d'un éditeur de logiciels va très loin dans le stéréotype : les *Digital Natives*, ces « autochtones du Web », seraient « multitâches et polyvalents » (ceux des milieux populaires ayant des « pratiques du numérique moins variées que ceux des milieux aisés »), s'informeraient « principalement via internet » (et comme l'information y est « peu fiable », « leur sens critique est remis en question par leurs aînés »). « Ils ne lisent pas » (d'où leurs possibles lacunes en orthographe) et « ils sont toujours en quête de sens »[12]. Comment sont reçues ces caractéristiques ? Comment sont-elles perçues par les personnes qu'elles concernent ? Mis en application dans le cadre de recrutements, par exemple, ce type de démarche peut amener des demandeurs d'emploi à tenter de se conformer à ces stéréotypes. Suis-je un « vrai » représentant de cette génération X, Y ou Z, qui me fournit une explication des différenciations sociétales et qui doit avoir un fond de vérité, étant donné son succès et son impact ?

C'est l'effet Pygmalion : les attentes du recruteur peuvent déterminer le comportement du candidat qui cherchera à se conformer au stéréotype. Une erreur de perception des recruteurs, par effet de halo, peut également se produire quand les candidats mettent en avant des caractéristiques générationnelles, de manière artificielle. Le danger est évidemment réel, la mise en place de procédures de recrutement (ou de ventes dans certains cas) basées sur les caractéristiques des stéréotypes générationnels peut aboutir à des embauches finalement inadaptées aux profils recherchés. Un autre danger est de s'appuyer sur ces stéréotypes pour définir les besoins en termes de compétences ou de comportement.

Si un grand nombre de consultants et cabinets de conseil continuent de proposer des services qui reposent toujours sur ces stéréotypes dont les fondements théoriques restent discutables et qui peuvent s'avérer dangereux, certaines organisations revendiquent une autre approche et dénoncent ces « clichés intergénérationnels qui ont la vie dure »[13].

Il est à parier que les générations et leurs caractéristiques vont continuer d'inspirer de nombreux travaux, débats, médias et offre de services de consultants. La popularité du générationnel ne lui donne pas de légitimité, ni scientifique ni sociale. Alors qu'un dogme technocentré justifie certaines évolutions sociétales et un nouvel ordre progressiste, le succès d'une vision finalement positiviste des générations n'est pas fortuit. De plus, les replis identitaires induisent des relations difficiles à l'altérité. Dans ce contexte, il est urgent de remettre en cause certaines vérités plus révélées que démontrées, d'abandonner le mythe stéréotypé des générations et d'accepter, pour mieux les comprendre, que nos différences s'inscrivent à la fois dans des déterminismes multiples et sont la conséquence de nos choix individuels.

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[12] Cf. <https://www.oipsolutions.com/digital-native-qui-sont-ils/#>.

[13] Cf. <https://www.generationy20.com/attention-aux-cliches-intergenerationnels>.

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APPENDIX A

		ITEMS	OVERALL SAMPLE		
			MEAN	SD	LOADING
LEARNING ORGANIZATION	Continuous learning	People help each other learn	4,03	,717	-
		People are given time to support learning	3,67	,933	,822
		People are rewarded for learning	3,18	,999	,844
	Inquiry and dialogue	People give open and honest feedback to each other	3,57	,956	,849
		Whenever people state their view, they also ask what others think.	3,40	,953	,801
		People spend time building trust with each other	3,78	,927	,757
	Team learning	Teams/groups have the freedom to adapt their goals as needed.	3,26	1,041	,772
		Teams/groups revise their thinking as a result of group discussions or information collected.	3,83	,739	,767
		Teams/groups are confident that the organization will act on their recommendations.	3,40	,974	,878
	Embedded systems	My organization creates systems to measure gaps between current and expected performance	3,22	1,186	,745
		My organization makes its lessons learned available to all employees	3,62	1,052	,781
		My organization measures the results of the time and resources spent on training	3,27	1,221	,820
	Empowerment	My organization recognizes people for taking initiative	3,87	,928	,822
		My organization gives people control over the resources they need to accomplish their work	3,39	1,171	,743
		My organization supports employees who take calculated risks	3,51	1,049	,855
	System connection	My organization encourages people to think from a global perspective	3,72	,889	,821
		My organization works together with the outside community to meet mutual needs.	4,11	,852	,738
		My organization encourages people to get answers from across the organization when solving problems	3,99	,835	,881
	Strategic leadership	In my organization, leaders mentor and coach those they lead.	3,73	1,028	,858
		In my organization, leaders continually look for opportunities to learn.	3,69	,971	,849
		In my organization, leaders ensure that the organization's actions are consistent with its values.	4,19	,918	,855
PRODUCT INNOVATION PERFORMANCE	Financial performance	Profits attributable to new products are higher than those provided by the remaining products	3,25	1,104	,808
		New products have achieved the objectives set in terms of profit	3,30	1,005	,911
		New products have achieved the objectives set in terms of return on investment	3,22	,949	,920
	Market performance	New products sales are greater than those provided by the rest of the products	3,06	1,196	,770
		New products have achieved the objectives set in terms of sales	3,18	1,019	,890
		Compared with other products of your company, new products have achieved superior results in terms of market share	3,21	1,018	,839
		New products have achieved the objectives in terms of market share	3,12	1,018	,780
		New products have allowed the penetration of new markets	3,63	1,041	-
	Customer performance	Customers are satisfied with the performance of new products	3,85	,978	,883
		Compared with other products of your company, customer complaints regarding new products are fewer	3,69	,986	,871
		New products have improved customer loyalty	3,28	1,045	,819
	Technical performance	The quality of new products is better than the rest of the products	3,25	1,104	,772
		New products are launched in the deadlines	3,06	1,153	,878
		New products are launched within budget Development Goals	3,14	1,239	,810
		New products have reduced environmental damage, improved health and safety	3,46	1,147	,746
	Strategic performance	New products provide the company a competitive advantage	3,98	1,044	,852
		New products have reached all the goals set	3,18	1,175	,809
		New products have improved the reputation of the company	3,91	1,006	,894
Environmental turbulence		Market turbulence	4,05	,851	-
		Competition turbulence	3,97	,979	-
		Legal turbulence	3,94	1,071	-
		Technological turbulence	4,21	1,013	-

Le contrôle managérial dans le contexte de l'innovation collaborative : une approche par package

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Karim SAID & Soufiane KHERRAZI
Karim.said@uvsq.fr & sf.kherrazi@yahoo.fr

Résumé

La présente contribution s'articule autour du contrôle managérial (CM) de l'innovation collaborative. S'appuyant sur une approche package appliquée à un échantillon de consortia européens Horizon 2020, cette recherche propose un modèle de package de contrôle managérial (PCM) des consortia en R&D composé de trois mécanismes à savoir : le contrôle des résultats, le contrôle des comportements et le contrôle social. Combinés dans un package, ces mécanismes de contrôle managérial agissent positivement et simultanément sur la performance du consortium. L'efficacité du package apparaît dès lors tributaire à la fois de la combinaison des éléments qui le composent mais aussi de son adéquation avec le contexte dans lequel s'inscrit la collaboration.

Mots-clés : Consortium, R&D, Package, Contrôle managérial, Europe, Horizon 2020

Introduction

Dans la recherche sur le contrôle managérial (CM), une littérature s'est intéressée aux mécanismes par lesquels l'organisation assure sa viabilité (Otley et Berry, 1980) à travers la réalisation de ses objectifs (Fisher, 1995), la coordination des tâches collectives (Van de Ven et al, 1976) et l'adaptation permanente aux changements des environnements et des comportements (Simons, 1995). Pendant longtemps, le CM a été appréhendé à un niveau organisationnel où l'analyse était focalisée sur la manière dont la direction contrôle les unités opérationnelles et les comportements des employés (Malmi et Brown, 2008; Merchant et Van der Stede, 2007; Otley, 1999).

Avec la croissance significative des relations inter-organisationnelles (RIO), la littérature managériale s'est progressivement intéressée à la question de la mise en place d'un contrôle au sein des relations inter-firmes ; le contrôle managérial inter-firme. En effet, les RIO apparaissent comme des formes d'organisions qui n'obéissent pas aux mécanismes de contrôle classiques en raison de leur autonomie juridique, l'absence de l'autorité, la divergence des objectifs (Provan et Kenis, 2007 ; Jones et al. 1997), ce qui complique davantage la conceptualisation d'un CM inter-firme (Dekker, 2016).

Ainsi, le contrôle managérial inter-firme a été essentiellement analysé, d'une part, au travers de mécanismes formels et informels (Ouchi, 1979). Ces derniers ont été appréhendés de manière indépendante isolant les uns des autres (Chenhall, 2003 ; Chenhall, et al, 2011). En outre, peu d'études ont étudié empiriquement les relations entre les pratiques de contrôle et la performance au sein des collaborations (Dekker., 2016). D'autre part, les auteurs ont le plus souvent abordé le CM dans une perspective de contingence afin d'identifier les facteurs contextuels qui déterminent le dispositif de contrôle inter-firme. Dans ce cadre, les pratiques de contrôle et les mécanismes de régulation doivent être adaptés à l'environnement avec lequel les organisations doivent composer (Chehall, 2003 ; Dent, 1990 ; Miles et Snow, 1978 ; Khandwalla, 1972). De ce fait, l'efficacité du dispositif de contrôle est à rechercher dans son adéquation avec les facteurs de contingence.

Dès lors que les entreprises s'appuient sur des portefeuilles de contrôles inter-reliés, nous considérons que le CM est doit être considéré comme un ensemble interdépendant de pratiques et de mécanismes formant soit un système, soit un package. Cela fait écho à la perspective système qui tient compte des interactions découlant de la combinaison des mécanismes de contrôle et affectant ainsi l'efficacité du dispositif dans son ensemble (Langfield-smithe, 2008 ; Grabner et Moers, 2013 ; Bedford et Malmi, 2015 ; Bedfor et al, 2016).
Par ailleurs, le contrôle managérial de l'innovation a été très peu examiné dans la littérature, et encore moins dans un paradigme d'innovation ouverte ou collaborative (Chesbrough, 2003). Bien qu'une longue tradition du contrôle managérial ait considéré le contrôle comme préjudiciable à l'innovation (Roberts, 1991), les besoins du contrôle dans le processus d'innovation n'ont été reconnus qu'au cours des dernières décennies (Moll, 2015 ; Fried et al, 2017). En outre, le contrôle managérial de l'innovation collaborative pose des défis particuliers en exigeant à la fois de la souplesse pour faire face à l'incertitude technologique et de l'environnement, mais aussi les pratiques formelles de planification et de contrôle pour répondre aux besoins de cohérence et de coordination (Lovstal et Jontoft, 2017).
Dans ce cadre, cette recherche propose un modèle de package de contrôle managérial (PCM) adapté aux consortiums de R&D[1]. Elle s'appuie en cela sur l'étude quantitative d'un échantillon de consortia en R&D européens relevant du programme-cadre Horizon 2020. Pour ce faire, le papier sera scindé en trois parties. D'abord, nous reviendrons sur la littérature existante sur ce champ. Ensuite, nous présenterons la méthode de recherche et l'opérationnalisation du concept de package. Enfin, nous présenterons les résultats et discuterons les implications des conclusions tirées.

1. REVUE DE LITTERATURE

1.1 FINALITÉS DU CONTRÔLE MANAGÉRIAL INTER-FIRME

La littérature existante fournit une multitude de définitions du concept de contrôle managérial (*management control*). Otley et Berry (1980, p. 232), en mobilisant les travaux antérieurs, proposent une définition synthétique dans laquelle le CM désigne au niveau organisationnel l'ensemble des mécanismes qui visent à assurer la viabilité de l'organisation à travers la réalisation des objectifs, la coordination organisationnelle entre les différentes parties et la capacité d'adaptation aux changements internes et externes. De manière générale, le contrôle managérial est conçu afin de rassurer les parties prenantes (équipe dirigeante, coalition dominante, top management) sur la bonne conduite de l'organisation (middle management, comportement des employés, etc) (Malmi et Brown, 2008 ; Merchant et Otley, 2007), ce qui peut être également étendu aux partenaires externes et aux autres acteurs du réseau (Malmi et Brown, 2008).
Dans ce cadre, les coopérations apparaissent comme des formes hybrides d'organisation situées au milieu du continuum marché-hiérarchie. Elles n'obéissent pas aux mécanismes de contrôle classiques en raison de l'autonomie des membres (Jones et al, 1997), de l'absence d'actionnaires et de l'autorité au sens conventionnel ou encore de l'hétérogénéité des parties prenantes (Provan et Kenis, 2007). De plus, la transition progressive des organisations vers le réseau ont conduit les auteurs à appréhender le concept de contrôle inter-organisationnel et plus largement de gouvernance sous une dimension multilatérale caractérisant les formes hybrides d'organisation actuelles (Freeman, 1984).
Dès lors, le contrôle inter-organisationnel s'impose pour assurer l'efficacité et l'alignement des actions collectives. Transposant la définition de Fisher (1995) du contrôle organisationnel qui vise à créer des conditions favorables à l'atteinte d'objectifs, Dekker (2004, p. 30) décrit le contrôle inter-organisationnel comme la création des conditions qui amènent les partenaires à obtenir les résultats souhaités ou préétablis.
Face aux différentes acceptions de contrôle, nous pouvons définir le contrôle managérial inter-organisationnel par l'ensemble de mécanismes de contrôle conçus et mis en œuvre pour influencer le comportement et la conduite des partenaires de manière à conduire à la réalisation

des objectifs, ce qui s'inscrit dans la lignée des travaux de Malmi et Brown, (2008), Grabner et Moers, (2013), Bedford et Malmi, (2015), Bedford et al, (2016) et Dekker (2016). Le contrôle managérial selon ces derniers met l'accent sur l'alignement des objectifs, la coordination des tâches et le contrôle des comportements. Cela implique, d'une part, de ne pas considérer les pratiques ayant pour but d'alimenter le système d'information et/ou de décision et relevant du *management accounting* (MA) ou *management accounting system* (MAS). Par ailleurs, nous pouvons considérer le contrôle managérial comme une partie du contrôle organisationnel ou inter-organisationnel. Ce dernier peut inclure d'autres types de contrôles non destinés uniquement à la congruence des objectifs et des actions tels que le contrôle de la qualité, le contrôle des stocks, le contrôle de la chaîne logistique, etc.

Les finalités du CM peuvent être appréhendées suivant plusieurs perspectives théoriques. Dans la perspective économique, la théorie des coûts de transaction considère que les relations sont exposées à plusieurs risques dont principalement l'opportunisme (Williamson, 1985). Dans une alliance inter-firme, l'opportunisme apparaît lorsqu'il n'est pas possible d'anticiper les actions des partenaires, de prédire leurs intentions (Longfield-Smith, 2008) ou encore d'évaluer leurs investissements effectifs dans la coopération (Chen et Chen, 2002). L'incertitude comportementale peut apparaître aussi dans les situations d'asymétrie et de dépendance stratégique qui engendrent des risques d'appropriation (Das et Teng, 2001) ou d'absorption (Souidi, 2012). Dès lors, le principal objectif du contrôle inter-organisationnel consiste à atténuer l'opportunisme et les risques d'appropriation (Dekker, 2004), assurer la stabilité et la sécurité de la relation protégeant ainsi les intérêts des parties prenantes (Vidot-Delerue et Simon, 2005).

Toutefois, l'atténuation des risques d'appropriation ne peut être la seule finalité du CM. Dans une perspective organisationnelle, les partenaires dans une RIO mettent en commun des ressources, définissent une structure d'organisation et décident de la division des tâches. Il en résulte donc une interdépendance des tâches et une complexité liée à l'organisation et l'agencement des activités de manière cohérente et coordonnée. Les différents niveaux d'interdépendance engendrés nécessitent différents degrés d'adaptation et d'ajustement (Borys et Jemison, 1989), d'où les besoins de coordination des différentes chaînes de valeur pour assurer l'adéquation des contributions (Dyer, 1996 ; Thompson, 1967). Cette coordination implique une communication continue et une prise de décision conjointe entre les partenaires (Dekker, 2004). Ici, le CM a pour objectif d'assurer la coordination des activités entre les membres et l'adéquation de leurs contributions, surtout en situation d'incertitude, de complexité et d'interdépendance élevée (Thompson, op.cit).

Dans la perspective relationnelle, les auteurs tels que MacNeil (1980), Granovetter, (1985), et Gulati, (1995) soutiennent l'idée que les transactions ne sont pas ponctuelles dans le temps mais restent largement influencées par les relations antérieures. Les relations apparaissent encastrées dans un système social et relationnel produit par de multiples interactions anciennes et/ou espérées dans le future entre les partenaires. Le contexte social ainsi que la fréquence et la répétition des transactions amènent les partenaires à prendre en compte d'autres objectifs dans l'établissement d'un partenariat comme la construction de la confiance (Van der Meer-Kooistra et al, 2000), le développement du capital relationnel (Gulati, op.cit), la création de la valeur institutionnelle (Aliouat et Taghzouti, 2007) ou encore le développement de ressources politiques (Attarça, 2002). Pour achever de tels objectifs, le CM doit garantir la stabilité et la continuité de la relation entre les partenaires dans un climat favorable en renforçant la confiance mutuelle, la réputation des parties prenantes, la visibilité de l'écosystème, etc. afin de faire

aboutir les transactions actuelles et assurer l'établissement de collaborations bénéfiques dans le futur et par là même le développement du réseau.
En résumé, les risques d'appropriation avec les exigences de coordination d'une part et le contexte socio-relationnel d'autre part, expliquent pourquoi les RIO nécessitent la mise en place d'un contrôle managérial inter-firme. Ces éléments déterminent, en outre, la nature des mécanismes de contrôle à mettre en œuvre ainsi que l'effet de leur combinaison.

1.2 MODALITÉS DU CONTRÔLE MANAGÉRIAL DANS L'INNOVATION COLLABORATIVE

Le contrôle managérial inter-firme est conçu au sein des alliances afin d'assurer la viabilité de la collaboration en alignant les objectifs des partenaires, coordonnant leurs chaînes de valeur, mais aussi en favorisant l'adaptation des différentes parties face à la complexité et l'incertitude de l'environnement. Cela étant, pour étudier les mécanismes et les pratiques de contrôle mis en place au sein d'une collaboration d'innovation, nous mobilisons les travaux de Ouchi (1979), Smith et al., (1995), Dekker (2004, 2016) sur le CM inter-firme ainsi que ce ceux de Van der Meer-Kooistra et al, (2015) et Sutton et Brown (2015) sur le CM dans les coopérations en R&D, nous définissons trois mécanismes de contrôle à savoir : le contrôle des résultats (*outcome control*), le contrôle des comportements (*behavior control*) auxquels on ajoute un control informel d'origine sociale ; le contrôle sociale (*social control*).
Dans la lignée de la théorie organisationnelle, le contrôle des résultats (*outcome control*) répond aux exigences de coordination des tâches interdépendantes. (Dekker, 2004 ; Das & Teng, 1998). Au niveau des consortia de R&D, cela se traduit par la mise en place d'une structure collaborative, i.e. fonction ou département en charge des alliances et des collaborations, pour favoriser l'action jointe, la convergence des intérêts, l'alignement des objectifs ainsi que la coordination externe entre les partenaires du consortium. Selon la théorie des coûts de transaction (TCT), le contrôle des comportements (*behavior control*) permet de faire face aux risques d'appropriation et d'opportunisme (Dekker, 2004). Dans les consortiums, cela se traduit par la mise en place d'un contrat légal, *consortium agreement*, qui constitue un accord commun contractuel dans lequel sont stipulées les différentes règles de conduite. La théorie relationnelle (MacNeil, 1980), quant à elle, préconise un contrôle exercé par le contexte socio-relationnel de la coopération. Les relations collaboratives fondées sur la confiance, les valeurs, les normes et l'engagement mutuel facilitent l'adaptation et l'ajustement face à la complexité et à l'incertitude technologiques caractérisant les consortiums de R&D.
La mise en place de ces mécanismes de contrôle managérial inter-firme, est le plus souvent appréhendée dans la littérature à travers deux perspectives distinctes : la perspective de la contingence et la perspective systémique. Les tenants de la contingence affirment que l'organisation est influencée par les variables de son contexte et que ses pratiques de contrôle et ses mécanismes de régulation doivent être adaptés à l'environnement avec lequel elle doit composer (Chehall, 2003 ; Dent, 1990). Ces pratiques sont déterminées par les facteurs de continence et leur efficacité est à rechercher dans leur adéquation avec le contexte. La perspective systémique, quant à elle, admet que l'efficacité du contrôle managérial est affectée au moins par un facteur contextuel et tente, en outre, de comprendre le caractère construit des dispositifs de contrôle et l'émergence de formes structurées. Elle se focalise sur les combinaisons optimales des mécanismes de contrôle et leur cohérence interne comme facteurs d'efficacité et de pertinence du CM.
En examinant donc les interrelations entre les pratiques de contrôle, les travaux relevant de la perspective systémique adoptent deux approches complémentaires. Dans l'approche système, ces pratiques sont considérées comme interdépendantes et forment un système de contrôle, i.e. l'apport d'une pratique dépend de la valeur d'une autre (Otley, 1980 ; Chenhall, 2003 ; Grabner et Moers, 2013). L'approche package, quant à elle, repose sur une collection de pratiques de contrôle tant dépendantes qu'indépendantes (Otley, 1980 ; Malmi et Brown, 2008; Grabner et Moers, 2013 ; Bedford et Malmi, 2015). Le package offre une conception de contrôle plus large que celle du système (Bedford et al, 2016) dans la mesure où celui-ci peut inclure des pratiques à la fois indépendantes et interdépendantes (Malmi et Brown, op.cit).

Notre conception du contrôle managérial dans le cas des consortia de R&D s'est construite dans la lignée de la perspective système et plus particulièrement l'approche package.

1.3 HYPOTHÈSE DE RECHERCHE

L'efficacité du MC est analysée au travers de son impact sur la performance globale des consortiums de R&D. En effet, il existe une multitude d'approches sous-tendant l'évaluation de la performance d'une collaboration. Certains auteurs ont appréhendé la performance inter-organisationnelle à travers le concept de création de valeur comme Assens et Bouteiller (2006) pour le cas des organisations réticulaires, Lefaix-Durand et al., (2006) pour le cas des réseaux et Aliouate et Taghzouti (2007) pour le cas des alliances stratégiques. D'autres auteurs ont adopté l'approche reflétant la performance réalisée ou passée à travers des indicateurs liés aux effets escomptés induits par l'alliance comme le succès, la survie, la longitivité, etc. (Arino 2003 ; Das et Teng, 2003). Ici, nous nous intéressons à la performance réalisée au sens de Blanchort (2006). Pour ce dernier, la performance globale dans une coopération peut être appréhendée à travers la performance des partenaires (résultats individuels), la performance de l'objet de l'alliance (résultats collectifs) et la performance de la relation (la qualité des relations).

Selon la théorie des coûts de transaction et la théorie organisationnelle, les dispositifs formels de contrôle tels que les structures collaboratives pour contrôler les résultats (Barratt, 2004 ; Dekker, 2016) et les contrats complexes et complets pour contrôler les comportements (Poppo et Zenger, 2002 ; Klein Woolthuis, 2005 ; Lee et Cavusgil, 2006 ; Simon, 2009) sont un moyen efficace de management et de contrôle de la relation partenariale. D'une part, cela permet de formuler et d'aligner les objectifs des partenaires et de coordonner leurs activités et d'autre part, le contrat permet de clarifier les responsabilités et les obligations des partenaires et de prévoir les mécanismes de partage des résultats et de gestion des crises. La formalisation de ses pratiques constitue donc une incitation à la coopération. Lorsque les modalités d'évaluation de la performance et de contrôle des résultats ne sont pas prévues dans le contrat, cela aura pour conséquence de limiter l'engagement et l'investissement des partenaires.

Ainsi les hypothèses 1 et 2 relatives à l'impact des mécanismes formels sur la performance du consortium postulent ce qui suit :

- *H1 : Le contrôle des résultats a un effet positif sur la performance*
- *H2 : Le contrôle des comportements a un effet positif sur la performance*

Toutefois, l'incertitude technologique et la complexité de l'environnement auxquelles les consortiums de R&D font face, rendent difficile l'adoption de dispositifs formels et explicites rédigés ex-ante (Hagedoorn et al, 2007). La nature précompétitive et le stade très en amont de la R&D ainsi que l'imprévisibilité de l'output et son caractère intangible (Mothe et al, 2001) constituent quelques-uns des facteurs empêchant la mise en place de mécanismes formels de contrôle complets et parfaits (Simon, 2009). Cela justifie le recours aux mécanismes informels, d'origine sociale (MacNeil, 1980), et plus particulièrement le contrôle social à travers la confiance, l'ajustement mutuel et le capital relationnel. Ces derniers réduisent les risques relationnels et assurent que les contingences et les difficultés à venir seront résolues en interne sur la base des normes relationnelles (MacNeil, op.cit) et de façon mutuellement avantageuse (*self-enforcing agreements*) (Ouchi, 1979). De plus, les relations sociales fondées sur la confiance et l'engagement mutuel facilitent le transfert et l'absorption de savoirs complexes difficilement codifiés et transmis *via* le marché (Maskell et al., 1999).

Sur la base de ces développements, nous formulons l'hypothèse 3 :

- *H3 : Le contrôle social a un effet positif sur la performance*

Dans la lignée de la perspective systémique, il convient de s'interroger sur les interactions des mécanismes de contrôle managérial, i.e. l'effet produit par leur combinaison. L'approche par package, plus large que celle du système (Bedford et al., 2016), amène à envisager ces pratiques comme un ensemble d'éléments à la fois indépendants et interdépendants. Dans le cadre de cette approche, ces pratiques de contrôle sont supposées être totalement ou partiellement autonomes. Alors qu'un système implique l'interdépendance des éléments qui le composent

(totale interdépendance), le package peut inclure des éléments indépendants (indépendance totale) ou un mélange d'éléments dépendants et indépendants (indépendance partielle). D'où les hypothèses 4 et 5 relatives respectivement à l'approche package (H4.1 et H4.2) et l'approche système (H5) :

H4.1 : Les mécanismes de contrôle managérial au sein du consortium sont totalement indépendants
H4.2 : Les mécanismes de contrôle managérial au sein du consortium sont partiellement indépendants
H5 : Les mécanismes de contrôle managérial au sein du consortium sont totalement interdépendants

2. METHODOLOGIE DE RECHERCHE

2.1 MÉTHODE DE RECHERCHE

Notre recherche se propose de tester un modèle de contrôle managérial de l'innovation collaborative et d'analyser les déterminants ainsi que les interactions qui peuvent influencer son design et son efficacité. Pour ce faire, la modélisation par les équations structurelles (SEM) a été adoptée pour le traitement et l'analyse des données issues de l'enquête. Le déploiement de cette méthode s'est fait en deux étapes à savoir : l'analyse du modèle de mesure et du modèle structurel.
Sur le plan empirique, notre étude s'intéresse aux consortiums européens issus du programme-cadre européen Horizon 2020. Il s'agit, en effet, du plus grand programme de l'Union Européenne pour la recherche et l'innovation. Horizon 2020 réunit en un seul programme toutes les actions de l'UE en faveur de la R&D dans tous les secteurs et vise globalement à améliorer le niveau de vie, protéger l'environnement et rendre l'industrie européenne plus durable et plus compétitive. Pour ce faire, il bénéficie du soutien politique des membres de l'UE et financier de la Commission Européenne (CE) et/ou des gouvernements. Dans ce cadre, le consortium constitue un accord regroupant au moins trois partenaires de trois Etats membres autour d'un projet de R&D financé par la CE ou par leur gouvernement respectif. En privilégiant un contact institutionnel et assistés dans notre démarche par les coordinateurs et des points de contact nationaux, le questionnaire a été diffusé auprès des participants (catégorie entreprise) aux consortia de R&D H2020. Ainsi, nous avons obtenu 153 réponses sur 230 destinataires initialement contactés (Tableau 1).

Tableau 1 : Echantillon par pays et par catégorie d'entreprise

COUNTRY	%
Belgium	2%
Czech Republic	1%
Finland	3%
France	13%
Germany	20%
Greece	8%
Hungary	1%
Italy	12%
Netherlands	6%
Poland	1%
Portugal	3%
Serbia	1%
Slovenia	3%
Spain	10%
Sweden	5%
UK	7%
Other	4%
CATEGORY[2]	**%**
Large	35%
Medium-sized	16%
Small	31%
Micro	11%
Subsidiary	7%

2.2 VARIABLES ET MESURES

Pour analyser la relation entre les éléments du package d'une part, et leur impact sur la performance d'autre part, l'opérationnalisation des construits a constitué une étape importante dans la construction du questionnaire. Pour ce faire, nous avons mobilisé une batterie de mesures issues de la littérature. Les dispositifs du package managérial de contrôle sont considérés ici comme des variables prédictives permettant d'expliquer la performance du consortium. Ils comportent le contrôle des résultats, le contrôle des comportements et le contrôle social.

S'agissant du contrôle des résultats, il est mesuré à travers l'existence d'une structure collaborative chez le partenaire, i.e. un(e) département ou fonction dédié(e) au management des collaborations et des partenariats (Kale, et al, 2002). Pour Zollo (1998), l'existence d'une telle fonction permet de tirer parti des leçons passées et en cours en matière d'alliance et, donc, facilite la codification et la formalisation des processus de gestion des collaborations. Selon Kale et al, (2002), les entreprises ayant des fonctions dédiées à la gestion de l'alliance ont tendance à codifier les mécanismes de gestion ex-ante et ex-post de la coopération : sélection des partenaires, la négociation, la rédaction et la résiliation du contrat, etc. Ainsi, l'existence d'une structure collaborative permet de répondre aux exigences de coordination et de contrôle des résultats ex-ante (fixation des objectifs communs, allocation des ressources et financements) et ex-post (évaluation de la performance) (Dekker, 2004 ; Das & Teng, 1998). Cette variable est binaire et prend 1 en cas d'existence de structure collaborative chez le partenaire et 0 dans le cas inverse.

Pour le contrôle des comportements, il est mesuré par 4 items liés au degré de complétude et de complexité du contrat de consortium (*consortium agreement*), notamment le caractère spécifique et juridicisé du contrat (items 1 : Poppo et al, 2002), la perception de l'importance du contrat dans la protection contre les comportements nuisibles (item 2 : Poppo et al, opcit ; Klein Woolthuis et al, 2005 ; Lee et Cavusgil, 2006 ; Simon, 2009), la formalisation des procédures d'échanges et de coordination (item 3 : Klein Woolthuis et al, opcit ; Brulhart, 2006 ; Souidi, 2012), et la mise en place de clauses résolutoires (item 4 : Simon, 2009 ; Poppo et al, 2002 ; Klein Woolthuis et al,

opcit). Les contrats complexes et complets sont un moyen efficace pour limiter les risques d'opportunisme et d'appropriation (Poppo et Zenger, opcit ; Klein Woolthuis et al, opcit ; Lee et Cavusgil, 2006 ; Simon, opcit) qui justifient un contrôle de type comportemental (Dekker, 2004). Ainsi, un contrat est jugé complet s'il intègre des clauses de résolution des conflits (Simon, opcit) et de conduite la définition des règles de conduite en cas de changements imprévus Souidi (opcit). Ces items sont évalués sur une échelle de Likert de 1 à 5.

Quant au contrôle social, il est mesuré par 3 items à savoir : le caractère incomplet et standard du contrat (item 1 : Macneil, 1978), le degré de confiance et d'engagement mutuel (item 2 : Macneil, 1978 ; Poppo, et al, 2002 ; Dekker, 2004 ; Klein Woolthuis et al, 2005 ; Brulhart 2006), et la fréquence des échanges d'informations fiables et des réunions informels (item 3 : Macneil, opcit; Ferguson et *al.,* 2005 ; Souidi, 2012). Ces éléments agissent comme des régulateurs informels des relations inter-organisationnelles (Powell et al, 1983 ; Poppo et al, 2002 ; MacNeil, 1980 ; Klein Woolthuis et al, opcit) et peuvent se substituer ou compléter les dispositifs formels. Chaque item est mesuré sur une échelle de Likert de 1 à 5.
En ce qui concerne la performance perçue par les partenaires considérée comme variable dépendante, elle est mesurée à travers les indicateurs de Blanchort (2006) sur une échelle de Likert (1-5) : la performance des partenaires relative à la perception des effets spécifiques induits par la collaboration à chaque partenaire (item 1), la performance perçue de l'objet de l'alliance à travers le degré de succès technologique (item 2) et la performance de la relation liée à la perception de la qualité des relations développées via l'alliance (item 3). A cela s'ajoute un 4^{e} item portant sur le niveau de satisfaction globale des partenaires à l'issue de la collaboration (Poppo et al, 2002 ; Blanchort, opcit).

3. RESULTATS

Nous proposons dans cette section d'analyser les résultats de la recherche en deux temps. Dans un premier temps, il s'agit de tester le modèle de mesure et s'assurer que les items reflètent bien les variables latentes. Dans un second temps, nous précédons au test du modèle structurel en estimant les dimensions prédictives entre ces variables.

3.1 RÉSULTATS DE L'ANALYSE FACTORIELLE CONFIRMATOIRE

Dans cette étape, on procède à l'analyse des propriétés empiriques du modèle externe à travers plusieurs d'indicateurs. En effet, les variables de mesures utilisées n'ayant jamais été testées dans des conditions similaires puisqu'elles ont été traduites, adaptées ou créées pour l'étude, il était nécessaire de vérifier la validité de leurs propriétés empiriques (Bruthard et al, 2006). Dans ce cadre, une première série d'indicateurs vise à vérifier la fiabilité des mesures pour s'assurer de la convergence des items entre eux et leur tendance à expliquer l'essentiel de la variation du construit qu'ils sont censés représenter. Pour ce faire, la fiabilité composite et le rho_A sont estimés et doivent être supérieurs à 0.7 (Fornell et Larker, 1981).
Une seconde série d'indicateurs vise à vérifier la validité convergente et discriminante. La validité convergente consiste à s'assurer que la variable latente est corrélée avec ses variables de mesures ou ses items. Elle est appréciée à travers l'AVE (variance moyenne extraite). Celle- ci est acceptable si elle affiche une valeur supérieure à 0.5 (Fornell et Larcker, 1981). Quant à la validité discriminante, elle consiste à vérifier que les construits du modèle et leurs variables de mesures respectives sont différents les uns des autres, i.e. les items ayant servi à mesurer un construit divergent de ceux servant à mesurer un autre construit. Pour cela, la racine carrée de l'AVE de chaque construit doit être supérieur aux coefficients sa corrélation avec les autres construits du modèle (Fornell et Larcker, op.cit).

A l'issue d'une analyse exploratoire, nous avons retenu 3 items pour la variable contrôle des comportements, et 2 items pour la variable contrôle social. Les items retenus sont confirmés par la CFA. Ainsi, les valeurs de la fiabilité composite CF (*composite reliability*) et rho sont supérieures à 0.7. Les valeurs de l'AVE sont supérieures à 0.5 et leur racine carrée sont aussi supérieures aux coefficients de corrélations entre les construits, ce qui vérifie les tests de validité convergente et discriminante (Tableaux 2 et 3).

Tableau 2 : Analyse des construits

	RHO-A	CR
Behavior Control	0.78	.87
Social control	0,857	.77
Performance	0,861	.86

Tableau 3 : Validité convergente et discriminante

	AVE	BEHAVIOR CONTROL	SOCIAL CONTROL	PERFORMANCE
Behavior Control	.69	**0.83**		
Social control	.63	.269	**0,79**	
Performance	.62	.358	.393	**0.78**

Note: Factor correlation matrix with the square root of AVE on the diagonal

3.2 RÉSULTATS DU MODÈLE STRUCTUREL

Pour analyser les relations prédictives entre les construits du modèle, à savoir l'influence de chaque éléments du package sur la performance du consortium, il a fallu d'abord tester la qualité de l'ajustement du modèle estimée par une série d'indices suivant les recommandations de Hair et al., (2010). Il s'agit principalement du χ^2 pour lequel on accepte l'hypothèse nulle ainsi que le χ^2 normé (χ^2/ dl) qui doit afficher une valeur inférieur, de préférence, à 0.3. Les indices GFI (*Goodness of Fit Index*) et l'AGFI (*ajusted*) qui expriment le pourcentage de variance/covariance expliqué par le modèle. Cet indicateur varie en principe entre 0 et 1, et indique une qualité d'ajustement lorsqu'ils supérieures ou égales à 0.90. Le CFI (*Comparative Fit Index*) constitue, lui aussi, un indicateur basé sur l'écart au modèle d'indépendance, i.e. l'écart entre le chi2 effectif et le chi2 théorique. Un bon ajustement est obtenu à partir d'une valeur de l'ordre de .90. Le RMR (*Root Mean Residual*) fournit une indication globale des résidus du modèle et donc des facteurs explicatifs non pris en compte dans celui-ci. Les auteurs considèrent qu'une valeur égale ou inférieure à 0.1 est signe d'un bon ajustement. Enfin, le RMSEA (*Root Mean Square Error of Approximation*) permet d'évaluer les écarts normalisés entre la matrice observée et celle estimée. Il doit afficher une valeur inférieure ou égale à 0.08 pour refléter une bonne qualité d'ajustement.

Tableau 4 : Indices d'Ajustement du Modèle

MODEL FIT SUMMARY FOR MEASUREMENT MODEL	RECOMMENDED VALUE HAIR ET AL., 2010)	INDEX VALUE
Chi-sq	non-significant at p<.05	42.34 /p=0.128
Degrees of Freedom	n/a	33
Chi-Sq/Degrees of Freedom	<5 preferable<3	1.283
Goodness of Fit index (GFI)	>0.9	0.95
Adjusted Goodness of Fit Index (AGFI)	>0.8	0.92
Comparative Fit Index (CFI)	>0.9	0.98
Root mean square residuals (RMR)	<0.1	0.06
Root mean square error of Approximation (RMSEA)	<0.08	0.04
Normed Fit Index (NFI)	>0.9	0.91

Le tableau indique que le modèle structurel présente un bon ajustement. En effet, les indices absolus affichent tous des valeurs bien supérieures à .90 pour le GFI et l'AGFI et inférieures à .80 pour le RMR et le RMSEA. Les indices incrémentaux (CFI, NFI) sont conformes au seuil de validité avec des scores supérieurs à .90. enfin, les indices de parcimonie et notamment le Khi-deux normé (χ^2/ dl) est inférieure à 3 (Hair et al., 2010), voire à 2 comme le préconisent d'autres auteurs (Roussel et al, 2002). Pris dans leur ensemble, ces résultats sont très satisfaisants et indiquent que le modèle présente une bonne qualité d'ajustement.

En ce qui concerne les relations entre les construits, nous avons testé dans un premier temps l'impact des dispositifs de contrôle sur la performance du consortium. Les résultats des régressions obtenus mettent en évidence l'impact positif et significatif de ces mécanismes de contrôle sur la performance (Tableau 5, SEM1). Les coefficients de détermination (>0.1) et les coefficients structurels (>0.2) sont significatifs (Chin, 1998). Concrètement, il apparaît que le contrôle des résultats à travers à la mise en place d'une structure collaborative améliore de manière significative la performance du consortium (β=0,174, t=2.326, p<0,02). De même, le contrôle des comportements à travers la présence d'un contrat juridique, complet et spécifique à la collaboration influe positivement sur la performance. Ce résultat semble hautement significatif (β=0,274, t=3.936, p<0,001). Quant au contrôle social, la confiance associée à une dynamique d'échanges informels sont positivement liées à la performance du consortium et ce, de façon hautement significative (β=0,389, t=6.259, p<0,001). Le coefficient de corrélation (R^2) indique que les trois types de contrôle ont un impact déterminant sur la performance du consortium. En conséquence, les hypothèses H1, H2 et H3 sont confirmées.

Tableau 5 : Coefficients de régression

	SEM1		SEM2	
	PERFORMANCE		PERFORMANCE	
Indep. Variables	**B**	**T-value**	**B**	**T-value**
Outcome Ctrl	0.174	2.326**	0.171	2.45**
Behavior Ctrl	0.274	3.936***	0.267	3.453***
Social Ctrl	0.389	6.259***	0.377	6.109***
Interaction effects				
Outcome * Behavioral Ctrl			-0.081	0.277
Outcome * Social Ctrl			-0.211	0.819
Behavioral * Social Ctrl			-0.014	0.223
R^2	**0.327**		**0.333**	
Delta R^2			**+0.006**	

** $p < 0,02$; *** $p < 0,001$. One-tailed test, df = 499

Dans un second temps, nous avons tenté d'examiner les liaisons et les interrelations entre les éléments du dispositif de contrôle et leurs effets sur la performance du consortium. Pour ce faire, nous avons testé l'effet modérateur de chaque dispositif sur l'autre dans sa relation avec la performance (Tableau 5, SEM2). Les résultats montrent que les dispositifs de contrôle n'ont pas d'effets modérateurs significatifs sur la performance. Les coefficients de causalité sont très faibles, voire quasi-nuls pour les relations entre le contrôle des résultats avec le contrôle des comportements (-0.081) ou encore entre le contrôle des comportements avec le contrôle social (-0.014). Toutefois, la qualité de prédiction est maintenue avec une valeur de R^2 de 0.333. Cela confirme l'hypothèse package (H4.1) et réfute l'hypothèse système (H5).

4. DISCUSSION

Les résultats de cette recherche montrent que les modalités du CM sont pertinentes en termes d'impact sur la performance. A la différence des recherches antérieures où l'efficacité de chaque dispositif de contrôle pris individuellement a été démontrée de manière isolée, les résultats de cette recherche mettent en évidence le fait que la combinaison de ces dispositifs dans un seul package (PCM) agit positivement et simultanément sur la performance. Cela peut s'expliquer par le fait que la structure collaborative permet, ex-ante, de formuler et aligner les objectifs des partenaires et, ex-post, d'évaluer leurs résultats tout en assurant la coordination des activités pendant la collaboration (Barratt, 2004 ; Dekker, 2016). La présence d'un contrat juridique spécifique au consortium, complet au sens de Simon (2009), permet ex-ante de spécifier les rôles et les responsabilités des parties prenantes, d'allouer les ressources et fixer les délais, prévoir les procédures de résolution de conflits et les modes d'attribution de la propriété (Poppo et Zenger, 2002 ; Klein Woolthuis et al, 2005 ; Lee et Cavusgil, 2006 ; Simon, 2009). Ex-post, le contrat permet de contrôler la conduite des partenaires, réduire les risques d'externalité et de fuite involontaire des savoirs (Williamson, 1985 ; Ferguson et al., 2005, p.220, Dekker, 2004). Cela constitue une garantie face aux risques relationnels (Brulhart et al, 2006), mais aussi une incitation à s'engager pleinement dans la coopération (Brousseau, 2000). Toutefois, l'incertitude technologique et des résultats caractérisant les consortiums de R&D (Mothe et al, 2001) nécessitent une capacité d'adaptation et d'ajustement mutuel. A leur tour, les besoins d'apprentissage et d'interaction nécessitent des mécanismes d'échange et de communication plus flexibles et moins formels. En ce sens, les normes socio-relationnelles amènent les partenaires à agir dans l'intérêt du consortium (Brousseau et al., 1997), permettent de gérer les différentes contingences de manière mutuellement avantageuse (MacNeil, 1987 ; Ouchi, 1979) et de s'adapter face à l'incertitude et au changement (Mohr et Spekman, 1994 ; cités par Brulhart et al,

2006). Combinés dans un package de contrôle, ces dispositifs semblent assurer la stabilité et la sécurité de la collaboration et, de fait, améliorer la performance du consortium.
Nos résultats corroborent ainsi la perspective systémique selon laquelle l'efficacité du dispositif de CM peut augmenter avec la combinaison ou l'usage conjoint des mécanismes de contrôle (Delta R, SEM2, cf. Tableau 5). Plus particulièrement, ils soutiennent l'approche package considérant ces éléments du dispositif de contrôle comme une collection de pratiques de contrôle qui peuvent être indépendantes ou interdépendantes Bedford et al, 2016). Cette approche peut donc présenter plusieurs avantages. D'une part, le package inclut une dimension informelle de nature socio-relationnelle non prise en compte dans les systèmes formalisés de contrôle. D'autre part, alors qu'un système reste spécifique à son environnement, le package peut être transposé dans d'autres coopérations. L'indépendance qui caractérise les différents éléments qui le composent permet une flexibilité dans l'adaptation au contexte de coopération. Par ailleurs, le package semble plus approprié pour répondre aux différentes préoccupations du CM, en particulier dans un contexte d'innovation collaborative. A la différence du système, le package permet de faire un dosage des différents mécanismes de contrôle dans le but d'atteindre la meilleure adéquation possible (*quasi fit*), et ce conformément à la perspective de contingence (Otley, 2016 ; Fried et al, 2017). Cela consiste à mobiliser les différents mécanismes dans le dispositif de CM dans des proportions différentes en fonction du contexte et de l'environnement. Ainsi, dans les phases d'exploration, le package peut renforcer davantage les pratiques informelles pour stimuler la nouveauté et la génération d'idées. Inversement, il est possible d'augmenter les proportions des mécanismes formels dans les phases d'exploitation (proches du marché) pour réduire les risques d'externalité et d'appropriation ou encore pour définir les modalités d'exploitation commerciale. La flexibilité du package permet d'adapter et de faire évoluer la configuration du CM en fonction des facteurs de contingence.
Enfin, la combinaison de l'approche package et la perspective de contingence dans le contexte de l'innovation collaborative amène à envisager les mécanismes du PCM comme des éléments dynamiques et évolutifs. Le package évolue, s'ajuste et s'adapte continuellement au processus de R&D, à la dynamique d'innovation, au contexte de la collaboration, à l'incertitude de l'environnement et à la complexité technologique de la R&D. De ce fait, l'efficacité du package est à rechercher à la fois dans son adéquation avec le contexte de la coopération (cf. perspective de contingence) et la combinaison des éléments qui le composent (cf. perspective système). Cela pourrait servir à expliquer la dynamique du contrôle dans un contexte d'innovation collaborative à l'image de la perspective dynamique de gouvernance dans les coopérations (Klein Woothuis et al, 2005).

CONCLUSION

S'appuyant sur une étude des consortiums H2020, cette contribution a testé un modèle de package managérial de contrôle (PMC) adapté aux consortia technologiques européens. Les résultats de cette recherche font ressortir deux principales contributions pouvant contribuer à avancer la recherche sur le management des consortia.
D'une part, nous avons validé un modèle de package de contrôle managérial des consortiums en R&D avec trois éléments à savoir : le contrôle des résultats, le contrôle des comportements et le contrôle social. Combinés dans un package, ces dispositifs agissent positivement et collectivement sur la performance du consortium.
D'autre part, l'indépendance des éléments de contrôle susmentionnés justifie encore le choix d'une approche par le package plutôt que par le système, en particulier dans un contexte d'innovation collaborative. Cela a pour avantage de permettre d'envisager plusieurs configurations du package selon le contexte de la collaboration. En outre, l'efficacité du package est à rechercher à la fois dans son adéquation avec le contexte de la coopération et la combinaison des éléments qui le composent.

Cette recherche est appelée, toutefois, à être reconduite en augmentant la taille de l'échantillon d'un côté, et, de l'autre, en intégrant d'autres dispositifs de contrôle inter-organisationnels. En retenant le modèle de package développé dans cette étude, il serait pertinent de distinguer parmi les dispositifs de contrôle ; le principal, le périphérique et le redondant, ou encore d'analyser l'impact ou l'effet modérateur du contexte de la collaboration sur l'efficacité du package. Les éléments du contexte peuvent être liés aux caractéristiques du consortium et de l'écosystème telles que la dynamique d'innovation, l'encastrement des relations, la protection des droits de propriétés, la proximité institutionnelle et culturelle, etc., et c'est là des pistes de recherches futures.

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LAREQUOI
ISM - IAE Versailles Saint-Quentin-en-Yvelines
Université de Versailles Saint-Quentin-en-Yvelines
47 boulevard Vauban - 78047 Guyancourt CEDEX - FRANCE

T + 33 (0) 1 39 25 55 34 - sylvie.yung@uvsq.fr

www.larequoi.uvsq.fr