specifics of the product in question. Moreover, Fujimoto (2014) states that the traditional industry-life cycle model applies to some of the history of the automotive industry, but not to all of it. Therefore he presents an additional framework that explains the evolutionary patterns of this industry: the long tail of the automotive industry.

3.4.2 Regional innovation.
The regional dimension of innovation has become very important in scientific debate and innovation policy; the influence of local factors on regional innovativeness has been attributed to the concept of a "technological infrastructure" present in the different regions. The combination of the geographical dimension and the nature of innovation have led to a new research branch called "innovation systems approach" (Buerger, Broekel & Coad, 2012). One of the reasons companies become multinational is by the fact that the transfer of innovation from the home country to the host country is empowered and provides several benefits and competitive advantages (Colovic & Mayrhofer, 2011). Correspondingly, Buerger et al. (2012) declare that it is a prerequisite to know about the processes in order to design the appropriate regional innovation policies and Navickas et al. (2011) add to this stating that in globalization conditions for each country it is very important to increase the level of its economy competitiveness, determined by the evaluation of various indicators: infrastructure, macro environment, activity and intensity of the market, innovations and others. This means that high-employment regions benefit more from an increase in patents (innovation). For the automotive industry, the growth of employment is associated with subsequent growth of R&D (Buerger et al., 2012). Location is one of the key elements in the automotive industry and it is guided by several elements such as the proximity to the local markets, the obligation to produce locally or the willingness of MNCs to tap into the local knowledge (Colovic & Mayrhofer, 2011).

Colovic & Mayrhofer (2011) also evidence that multinational companies have made their R&D efforts international adopting a dispersed approach to the company's innovative capacity. Kraft & Kraftova (2012) express that given the increasing competitiveness from emerging markets, companies from the developed countries have begun to implement the following survival strategies: 1) Reduction in production costs and product sale price; 2) Increase in productivity and effectiveness by a developing and implementing of new, innovative production technologies and processes; 3) Production or other activities transfer from high costs localization to cost-effective ones; and 4) Implementation of product innovations. In concordance with Godlewska-Majkowska & Komor (2017), it can be said that the globalization and integration processes, affect the development of national economies and increase the level of competition; thus development factors like innovation should be implemented to maintain or increase their competitiveness.

3.4.3 Open (cooperative) innovation.
According to van Geenhuizen, & Soetanto (2013), R&D and innovation happen in networks beyond the boundaries of a single firm, with consumers having an important role in the learning processes. This occurrence is defined by the term open innovation, which encompasses cost reduction and increased competitiveness opportunities. Spatial innovation theory however indicates that the potential of open innovation is not the same for all urban regions (van Geenhuizen, & Soetanto, 2013). The same authors say that open innovation, can be referred to as the purposive use of inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively. This concept implies that firms can search for new knowledge anywhere from city level to the external environment level. Also Basile (2012) adds that collaborative networking may increase companies' competitiveness, favouring productivity and innovation (Basile, 2012). Basile also evidences that size has a positive and significant effect upon R&D cooperation, since large companies enjoy more absorptive capacity (Basile, 2012): The growing literature on clusters highlights the relevance of networks of interrelated firms as key factors in the ability to produce innovative new products or processes for global markets, in a timely manner. The "cluster" concept incorporates several important dimensions of innovation: the increasing benefits generated by the accumulation of knowledge; recognition of the fact that accumulation is a process dependent on past choices, and is nonlinear and shaped by the interaction of market forces; the importance of organizational innovation in creating institutions and procedures capable of managing more complex forms of interdependence; the role of confidence in avoiding the escalation of transaction costs generated by increased levels of specialization; and the role of cultural and institutional variety in encouraging creativity (Colovic & Mayrhofer, 2011).

Likewise, Lacka (2013) asserts that through technological cooperation with the scientists, entrepreneurs obtain the possibility to manufacture a new innovative product or technological solution for the market, being possible at a lower cost than in the case of independent research and development works. Such cooperation guarantees the access to the support of innovative activities from public domestic and foreign resources. Lacka (2013) also adds that the implementation of innovative solutions in this way makes it possible for industrial partners to: strengthen their competitive position; gain significant economic benefits in the form of a growth in revenues from sales, or reduce

the cost of business; obtain unique skills and competences; export innovative products and technologies; launch innovative products into new markets through the application of innovative solutions in other sectors of economy than before; obtain development opportunities as a consequence of taking up subsequent joint projects with researchers; and achieve ecological benefits such as reduction of raw material consumption, reduction of waste, industrial waste recycling, limiting negative external impacts.

3.4.4. Knowledge transfer.
In terms of knowledge development in the new product development process, this important contribution illustrates the need for capabilities on both sides of an equation. If knowledge development is to be successful, then both disseminative and absorptive capacity must be present in the collaborative relationship (Townsend & Calantone, 2014). The experience of the leading countries in innovation (Nordic countries, United States, Japan, South Korea, Singapore and Taiwan) demonstrates that the innovativeness growth in a country relies on strong relations between scientific and research institutions and enterprises, financial and nonfinancial institutions of knowledge transfer support and technology commercialization, as well as local and regional authorities (Lacka, 2013). There is evidence that such knowledge transfer is more successful if the recipient firm has absorptive capability (Schulze et al., 2014).

Nevertheless, the source firm's disseminative capability is proportionally related to knowledge transfer success, while knowledge application in the recipient firm is inversely proportional (Schulze et al., 2014). According to these authors, the disseminative capability dimension is important not only for knowledge transfer success within firms, it is also important in R&D alliances (Schulze et al., 2014).

3.4.5 Government & consumers.
Townsend & Calantone (2014) declare that the key to the innovation process is found within the influences of consumers and governments.

On the government side, new product development and process innovation are also being affected by the government with energy, safety and environment policies (Townsend & Calantone, 2014). Furthermore, governmental involvement through standards, regulations and taxation shapes future innovations (Townsend & Calantone, 2014) and proves that government intervention has been and still is a major driver for industry innovation, whether by taxation, standardisation (of the industry) or any other similar constraint (Townsend & Calantone, 2014). According to Hemphill (2014), an 'Innovation Policy' approach can best be described by the public policy intervention categories of setting the ground rules and direction and building enablers. In contrast, an 'Industrial Policy' approach can best be described by the public policy intervention categories of tilting the playing field and playing the role of principal actor. One necessary condition for launching products on the high-tech market is their compliance with international rules and regulations, as confirmed by an accredited international agency. On the high-tech market there are specific indicators of quality for each type of product at a given time (Katerinich, 2016).

On the consumer side, it can be said that consumers' expectations are increasing in regards of sophistication of technologies and are being unified throughout the globe. They demand either extraordinary design on the luxury market or extremely low costs for basic features at the average market (Townsend & Calantone, 2014). In modern markets, high-quality but inexpensive products are required (Battini, Persona & Sgarbossa, 2012) and much of the forecasted innovation is driven by the preferences dictated by the consumer demand (Townsend & Calantone, 2014).

3.4.6 Management & organisational culture.
Regarding the strategic management of enterprises, the authors Colovic & Mayrhofer (2011) state that for many years, R&D was kept at the headquarters and was internationalized to a limited extent mainly because of its strategic nature. In general, managers follow a consistent downward trend when it comes to R&D expenditures (Industrial Research Institute, 2014). New business projects remain a key driver of investment as they have been in the past, but this year's data suggest a sizeable decline in support for this area. Meanwhile, the positive forecast in collaboration efforts supports the notion that companies are continuing to participate in coordinated research initiatives and alliances, boosted by open innovation programs. The strategic direction of innovation policies is the creation of information support in the business structure, according to Belarus' example presented by Katerinich (2016). Conversely, there is a big division of opinions concerning the impact of process management on innovation, especially on radical innovation. Additionally, organisational ambidexterity (organizational capability to undertake incremental as well as radical innovation activities) has been emphasized as a strategic foundation of competitiveness (Moreno-Luzon, Gil-Marques & Arteaga, 2014). Nowadays, managers need to redefine their strategies, products and processes and drive their companies towards sustainable development along with the

creation of higher value and improved performance on global and local markets (Vavra, Munzarova, Bednarikova & Ehlova, 2011).

On the side of organisational culture and in concordance with Moreno-Luzon et al. (2014), cultural divergence influenced by process management can affect organizational ambidexterity: the cultural context serves as a base for developing organisational ambidexterity. "Since organisational ambidexterity constitutes the capability of undertaking a rich variety of learning and innovation activities, these results could also have significant implications for practitioners, pointing to the need for close coordination between different functional areas in order to manage cultural change" (Moreno-Luzon et al., 2014, p. 1026). Having a balanced culture comprising cultural values in conflict can be a key for success, particularly in the current environment of global economic crisis, which calls for an increase in efficiency and learning (Moreno-Luzon et al., 2014).

3.5 Contributions in new knowledge generation in the research field.

Townsend & Calantone (2013) state that much knowledge is yet to be discovered in the realm of product and service development as well as Henriksen & Rolstadås (2010) say that the automotive industry is a complex system of suppliers related institutions and industries, and much less research has been addressed to them. Additionally, there is no agreement regarding which competitive factors are the most relevant (Lucato, et al., 2012). This proves that the formal definition of the relationship between the innovation factor and competitiveness within the automotive industry can be regarded as new knowledge generation. Moreover, research effort needs to be undertaken from an integrated and consolidated perspective if the issues are to be better understood, and resolved meaningfully (Singh et al., 2005). This implies that the holistic approach taken while consolidating the practices of the leading countries in this sector can contribute to the better comprehension of the current issues in the industry. "Furthermore, since the automotive industry is global to a large extent, it would be particularly interesting to investigate on an internationally comparative basis […] in terms of their impacts on company competitiveness" (Triebswetter & Wackerbauer, 2008, p. 42).

4. Conclusions.

Technology denotes the primordial force for firms and organizations in guaranteeing long-term competitiveness (Sköld & Karlsson, 2012). On one hand, technology has allowed for the improvement of time and integration; on the other hand, technology has also become a driver of product changes (Townsend & Calantone, 2014). Undoubtedly, innovation has experienced major changes, whereas it still involves being productive in R&D, improving management practices and delivery of new quality products and processes to the market, innovation today is not a linear process and is uniquely dependent on the discovery of scientific knowledge or formal R&D activities. (van Geenhuizen & Soetanto, 2013). Furthermore, developing activities and learning through research, fine-tuning and improvement of what already exists and utilizing new processes are crucial factors for the firm's survival (Moreno-Luzon et al., 2014). Currently, there has been increasing connection between economic growth and competitiveness of national economies and innovative processes as measured by the Global Competitiveness Report published by the World Economic Forum, together with Harvard University, as well as the World Competitiveness Yearbook published by IMD' in Switzerland. Innovation performance of the economy is usually evaluated by using input and output parameters such as the European Innovation Scoreboard (Kraft & Kraftova, 2012, p). On another branch, Basile (2012) showed that entrepreneurs and managers should be aware of the importance of R&D networking focused on specific agreements as the motor of firms' competitiveness. Also, it has been noted that "in order to effectively analyse and compare the industries of this century, investigating the design attributes of our artefacts, including their architecture, and the organizational attributes of design–production sites, including their manufacturing capability" (Fujimoto, 2014, p.15). Competitiveness is a crucial strategic feature for the automotive industry as part of the determination to remain in the top Category sector. Even though the competitiveness concept is fairly well understood, it has not become a common practice to measure the degree of competitiveness of a company (Lucato et al., 2012).

Throughout the development of this research, -the preliminary literature review, the systematic literature review, and the achievement of the specific objectives guided by the research justification, problem and hypothesis- the leading countries within the automotive industry were defined on the basis of their competitiveness on a macro and a microeconomic level (in alignment with Michael Porter's ideas) to further create a regional analysis on innovative capability reflected by the amount of available scientific research (constrained by the methodology parameters) and by their regional quality level analysis (based on the SCIMAGO ranking) to further narrow the investigation into the relevant and trustworthy sources that could provide the best knowledge to understand the dimensions of innovation

that affect proportionally (whether directly or inversely) to the manufacturing competitiveness of the automotive industry. After all this data was gathered and exposed, it can be said that the hypothesis is proven effectively: innovation has a positive impact in the manufacturing competitiveness of the leading countries in the automotive industry and that it can be further categorized in different interlinked dimensions such as product and process innovation, regional innovation, open innovation, knowledge transfer, government and consumer trends and behaviours and finally, management and organisational culture.

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