The perceived innovativeness of the manufacturing process and perceived product quality.

The case of creative and technology-intensive industries.

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by

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Abstract

Title: The perceived innovativeness of the manufacturing process and perceived product quality. The case of creative and technology-intensive industries.

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Keywords: manufacturing process; perceived innovativeness; perceived quality

Thesis Purpose: The main purpose is to analyze the relationship between the perceived manufacturing process (PMP) innovativeness and the perceived quality. Additionally, potential contingencies related to the industry and price are examined.

Methodology: The study follows an experimental design. The data is of a quantitative character, and for the analysis one-way and two-way Repeated Measures ANOVA is used for hypothesis testing. The dependent groups paired t-test served as a post hoc test following two-way repeated measures ANOVA.

Theoretical Perspective: This study combines and puts in use concepts from the field of marketing regarding the postmodern customer, perception of quality, product attributes, and innovativeness. These act as a base for understanding the complex problem studied in this research.

Empirical Data: The data were obtained through an online survey. The questions were of the 7 point attitude scale, and 100 valid responses were gathered. The target group was defined as both male and female over 18, residents of Central and Western Europe.

Conclusions: Perceived manufacturing process (PMP) innovativeness influences the perception of quality. In the case of the creative industries, the relationship is negative, meaning that the low innovativeness is associated with higher perceived quality. While in technology-intensive industries, high innovativeness is a factor that positively affects perceived quality. Additionally, while introducing the price as a product attribute, the direction of the relationship remains unchanged for both industries. However, for the creative industries the gap between the levels of quality depending on innovativeness becomes even bigger when the price is in a higher range. While for technology-intensive industries it is exactly the opposite. All that illustrates that the PMP innovativeness can, and should be treated, as a product attribute and an argument in the decision making process.

Practical implications: Perceived manufacturing process innovativeness should be treated as a product attribute and driver of perceived quality. It means that it may act as an asset while advertising the product and strengthening brand equity, which may lead to higher profit. It is crucial however, to differentiate the elements of the process we should market based on the industry.

Acknowledgments

No one can whistle a symphony. It takes a whole orchestra to play it

H.E. Luccock

At this point, we would like to express our sincere gratitude to everyone who has, directly or indirectly, contributed to us finishing this thesis.

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1 Introduction

This chapter aims to introduce the background and problematization around the correlation between the degree of innovativeness in the manufacturing process and the consumers' perceived quality, focusing on two industries: technology-intensive industries and creative industries. The chapter then presents the purpose and the research question, ending with an outline of the thesis structure.

> *What would be the best souvenir from Switzerland? We would say a watch. It does not necessarily mean "Rolex", but rather a more affordable one. Therefore, I (Author1), have spent nearly two hours staring at watches, but I could not decide. Finally, through the process of elimination, there were just two left. I would have spent another two hours just deciding between those two if it were not for the shop assistant telling me that one of the brands is using a traditional handmade manufacturing process. Then, the choice became obvious; I am going for the handmade one since there is craftsmanship behind the watch. It is more precise, is it not? The same month I found myself choosing the wheel rims for the mini-sumo robot. I happened to know that one of the companies uses CNC machining in their production (to put it simply, very innovative programmable robots). Therefore, my reasoning was that the precision of such a machine is higher than that of a human, who is prone to making mistakes. My train of thought seemed very logical (at least to me) until I realized that the quality I attributed to the handmade process in the watch's case was also attributed to the innovative machining when choosing rims. Funny as it may seem, it is logical since this "quality" is actually very subjective.*

Several firms aim at achieving a competitive advantage by improving quality. In order to do so, corporations invest in innovation: from product innovation to process innovation (Cho & Pucik, 2005). However, investing in innovative solutions might not always be enough, as it is debatable whether innovation pays a positive or a negative impact on product quality (Shi et al., 2018). On the one hand, investment in innovative manufacturing processes improves the product's actual quality. On the other, it may not enhance consumers' perceived quality. While from a production perspective quality means eliminating errors in product development, firms should also take into consideration how consumers define quality (Takeuchi & Quelch, 1983). Firms' investment in new technologies might not always result in enhancing consumers' perceived product quality.

Indeed, Aaker & Biel (2013, p.d144) define perceived quality as “consumer’s judgment about the product’s overall excellence or superiority”. Perceived quality cannot necessarily be fairly determined because the perceived quality in itself is a summary construct (Aaker, 1991). In fact, when evaluating a product, consumers are not objective, as several personal factors influence their perception. Therefore the concept of perceived quality is not only subjective but also very complex. In their evaluation, customers consider various aspects, one of which is the price, as it may serve for them as the indicator of the expected quality (Völckner & Hofmann, 2007).

One of the many factors influencing perceived quality is the price. The role that price plays in consumers’ purchasing behavior and perception of quality has been broadly researched (Erickson & Johansson, 1985; Gardner, 1971; Gerard J. Tellis, 1988; Peterson, 1970; Rao & Monroe, 1989; Völckner & Hofmann, 2007). This research has shown that consumers see price as both an indicator of the money they need to sacrifice, but also as a quality cue (Völckner & Hofmann, 2007). When it comes to the quality cue, researchers that have studied the relationship with perceived quality and price have found that most of the time, consumers attribute a high price to high quality, conversely, a low price to poor quality. However, this relationship is not always as straightforward, since it can be influenced by different other aspects, such as the type of product category, the country of origin, or the consumer’s familiarity with the product category (Völckner & Hofmann, 2007).

Brand equity is a measure of brand strength that is connected with its financial results, and it is crucial to consider all the factors that may affect it in order to build a successful brand (Bertilsson & Tarnovskaya, 2017). Perceived quality is one of the brand equity elements that can add value to the brand, and a key component of consumer-based brand equity (Aaker, 1991; Aaker & Biel, 2013; Pappu et al., 2006). The extensive amount of literature concerning brand and brand derivatives (Keller, 1993; Aaker, 1991; Aaker & Biel, 2013; Pappu, Quester & Cooksey, 2006; Pappu & Quester, 2016) further discusses the concept of perceived quality and the role that it plays in creating brand value. According to Keller (2003), the strength of a brand is determined by the consumers’ perception and understanding of what they have gained, which defines the concept of brand equity. In addition, perceived quality is significantly affected by the brand image, hence, the consumers' thoughts and feelings about the brand (Jacoby, Olson & Haddock, 1971; Roy & Banerjee, 2007). Since the perceived quality is constructed form intrinsic and extrinsic attributes, it is continually changing with the development of technology and changing trends (Aaker & Biel, 2013). Therefore, it is crucial to understand how perceived quality is changing in this current era as both technology and society are evolving faster.

Especially since we are now facing the 4th industrial revolution, which is redefining manufacturing processes, indeed, 3D printing, robotics, and the Internet of Things are becoming an everyday reality (Xu, David & Kim, 2018). All of these change our demands and standards on a daily basis. However, we do not know how innovations, and technology influences our perception of available products and services. Furthermore, it is essential to analyze how the degree of innovativeness in the firm's manufacturing process affects consumers’ perception of quality. However, innovativeness, as such, is complex to define, as it refers to several different aspects: specifically, technology-related innovativeness, behavioral-related, and product-related (Salavou, 2004). Here, we will focus on the technology-related aspect, and we will define the innovativeness of the manufacturing process as a degree of newness with the focus on the technology used (Garcia & Calantone, 2002).

Furthermore, it cannot be forgotten that different aspects are appealing to customers depending on the type of product category and industry. With various divisions of the industries, there is a need to choose the appropriate one. In our case, we would focus on the so-called technology-intensive industries and creative industries. The former comprises industries that invest much capital in R & D and use technologically more advanced types of equipment- e.g. medical, automotive, machinery, and electrical components industries (D’Auria, 2012), while the latter refers to those sectors that are shaped by creativity, skill, or talent. In addition, creative industries are a driving force for wealth and job creation. This category is based on intellectual property, e.g. fashion, jewelry, design, video games industries (Cunningham, 2002).

1.1 Research aim and question

Several research studies have been conducted to address the relationship between innovation and quality (Antunes, Quirós & Justino, 2017; Cho & Pucik, 2005; Lloréns Montes et al., 2003; Shi et al., 2018). For instance, a study conducted by Hanaysha et al. (2014) addresses the relation that product innovation and product quality have on the brand image, showing that there is a positive relationship between product innovation and brand image. We assume that the positive relationship between product innovation and brand image also shows a positive relationship between product innovation and perceived quality. Several studies have proven that perceived quality affects the brand image, which in turn has a positive effect on brand equity (Chen & Tseng, 2010; Tan, Ismail & Rasiah, 2011). Where existing research focuses more on the influence that product innovation has on perceived quality, and the effect that technological innovation has on product quality (Shi et al., 2018), we aim at researching how the manufacturing process innovativeness affects perceived product quality.

Furthermore, some research has shown a positive relationship between innovativeness and quality in the service industry (Boisvert & Ashill, 2011; Heath et al., 2011). Lloréns et al. (2003) aimed at analyzing how the perception of quality and innovative solutions are related, focusing on the service sector. Differently from the studies above, we would like to focus on the consumers' point of view on the innovativeness by considering perceived innovativeness. Indeed, taking a different stance than other researchers, we strive to assess how the degree of perceived manufacturing process (PMP) innovativeness affects consumer's perceived quality. Our aim is to give deeper consideration to the role that the perceived manufacturing process (PMP) innovativeness plays in the consumers' perception of quality. While innovativeness has been largely studied (Fort-Rioche & Ackermann, 2013; Hilmi et al., 2010; Knowles, Hansen & Dibrell, 2008; Lowe & Alpert, 2015; Salavou, 2004), the perception of innovativeness of the manufacturing process has not yet been researched.

Additionally, the effect that perceived manufacturing process innovativeness has on perceived quality can be influenced by other aspects, such as the type of product category or price. As mentioned in our introduction, the effect that price has on perceived quality has been broadly studied (Gardner, 1971; Jacoby, Olson & Haddock, 1971; Peterson, 1970; Peterson & Jolibert, 1976; Rao & Monroe, 1989; Render & O'Connor, 1976; Völckner & Hofmann, 2007). For instance, a study conducted by Peterson (1970), shows that there is a relationship between price and perceived quality, yet there are other factors influencing this relationship. Render and O'Connor (1976) research further proves this relationship, yet it also shows that it depends on several other drivers affecting perceived quality, like store and brand name, and it differs based on the classes of products, like apparel or electro-domestics. Therefore, considering the importance of price in the perception of quality, we would like to introduce this product attribute in our research, which is one of the drivers affecting perceived quality. Price was well-studied considering different product attributes, yet there is no research, as far as we know, on the effect that price has on perceived quality, also taking into consideration perceived manufacturing process innovativeness. Therefore, through this research, we aim to understand how price contributes to the manufacturing process innovativeness and perceived quality relationship; and how much the manufacturing process innovativeness depends on price.

This research can provide a new perspective on the interconnection of the manufacturing process and branding in the organization. However, the primary purpose of this study is to contribute to the research on innovativeness and perceived quality, analyzing how innovativeness in the manufacturing process affects consumer's perceived quality, and analyzing whether this main effect changes when the price is introduced, focusing on the technology-intensive industries and creative industries. The research and theoretical considerations strive to answer the following research questions:

Q1: What is the relationship between the perceived manufacturing process innovativeness and perceived product quality?

Q2: What is the relationship between manufacturing process types and perceived manufacturing process innovativeness?

Q3: What are the differences in the relationship between the perceived manufacturing process innovativeness and the perceived product quality based on the type of industry/product?

Q4: What are the differences in the relationship between the perceived manufacturing process innovativeness and the perceived product quality based on the price range?

1.2 Outline of the thesis

This thesis can be divided into three main parts, the theoretical and the practical, as well as the final part, synthesizing and combining both previous ones.

The theoretical part consists of the chapter explaining the theory connected to the topic of perception, quality, innovativeness, and manufacturing, as well as the outcomes of previous studies on related topics. We elaborate on the importance of the manufacturing process, the understanding of innovativeness, price as a product attribute, and its relation with the perceived quality. Those considerations lead to the hypotheses, which are the essence of the theoretical part.

The practical part consists of chapter 3 and chapter 4. Those two chapters cover methodology and data analysis. The methodology is where the research philosophy and the design are elaborated. There, information concerning the sample, survey design, measurement and scaling, study quality, and the analytical method is presented. Chapter 4 explicitly focuses on the results of the analysis, and their interpretation and effect on the research hypotheses.

The last part focuses on the discussion and conclusions while considering both the theory and practice. It reports all of the findings and the academic contribution of the research as a whole. The last part also reports all the limitations of the study that influence the final outcomes and the choices made on the ways. The limitation section is then divided into two subsections based on the limitations connected to the methodology and the analysis of the data.

2 Theoretical background

This chapter aims at presenting all the relevant theories and topics to this research. The chapter is divided into six sections. The first section reports the topic regarding Machine vs. Human, which allows the reader to have a clear picture of the research's context. The next five sections introduce the concept of Perceived and Actual Quality, New Product Development Process, Innovativeness, Industries, and Price from which hypotheses are drawn.

2.1 Machine vs. human

The development of technology made the world resemble sci-fi books/movies- or maybe another way around- and those abstract creations fuel development. E.M. Forster predicts Skyping in his 1909 novel *The Machine Stops* or W. Gibson's *Neuromancer* foresaw cyberspace and computer hackers; there are plenty of examples. Authors also write about machines replacing humans like in the case of S. Lem's *The Cyberiad* from 1965. The phenomena described by the aforementioned authors are happening now with Industry 4.0. However, technology development occurred in a different way than the one Lem imagined.

2.1.1 Industry 4.0

The first industrial revolution proved how vital machines are in the industry, and the following revolutions confirmed that and strengthened machines' position (Speringer & Schnelzer, 2019). Now, while facing the fourth industrial revolution, the concern about the machine and human labor relationship is very timeous. Smart factories, which are the goal for the Industry 4.0, are going far beyond automatization; in fact, they comprise Cyber-physical systems, the Internet of Things, and Artificial Intelligence (Speringer & Schnelzer, 2019; Xu, David & Kim, 2018).

There are a number of benefits, as described below, of this industrial shift listed in the literature. Such an approach to manufacturing is supposed not only to increase the productivity and flexibility of the production line but also to indirectly ensure better customer experience by establishing faster service and higher product quality (Fonseca, 2018). By nature, machines are consistent and, if needed, highly precise, which allows them to consistently yield high-quality products (Liebl & Roy, 2003). Also, in the machining manufacturing process, the personalization and customization is a rising trend, which used to be a handmade manufacturing process feature

(Yang et al., 2017). Machines are more and more advanced, but are they a threat to human workers in the industry?

2.1.2 Work division in manufacturing

As of now, not all areas of life are equally affected by automatization; some seem to be more prone to this kind of modernization than others. Dahlin (2019) and Jaimovich & Siu (2012) divide occupations based on the needed skills. The high-skill occupations are defined as nonroutine and cognitive, like managers or doctors. The Middle-skill category is for both routine and cognitive (office workers), as well as routine and manual tasks (production employees). The last category, low-skill, consists of nonroutine and manual tasks (retail workers, protective services). If we use this classification for interpreting McKinsey reports (Chui, Manyika & Miremadi, 2016) one can observe that the categories characterized as routine are more likely to be taken over by machines- in short, manufacturing (middle-skill) tasks.

Some authors (Acemoglu & Autor, 2010; Autor, Katz & Kearney, 2006; Dahlin, 2019), do not see any threat for humans. They claim that the machines help employees in all the categories above and add value to human labor. The influence differs depending on the category, high-skill occupations' employees would probably play a crucial role in developing and programming robots; middle-skilled workers are likely to work alongside industrial robots to ease human work tasks (Dahlin, 2019). Hence, there is no threat, but rather an opportunity to incorporate machines and robots in the work process. Technology has taken over not only some occupations more than others, but also it has affected some industries more than others. In fact, while the automation trend grows in some sectors, in others, we can detect a positive trend for handmade manufacturing.

2.1.3 Handmade effect

Ironic as it may seem in the era of science-fiction-like technology, there seems to be a renaissance of handmade manufacturing (Fuchs, Schreier & Van Osselaer, 2015; Hsu & Ngoc, 2016). It is worth considering what makes "handmade" products so attractive to the customers.

That may be connected with the transition from modern to the postmodern era. Modernism in society mainly focuses on economic growth and progress based on a scientific approach, rationality, and mass production (Tonder, 2003). On the other hand, postmodernism favors intuitiveness, diversity, and shifting from an industrial society to an information society (Tonder, 2003). Therefore, Tonder (2003) postulates that the postmodern customer values intangible and symbolic product value over functional value. He explains that consumption is more hedonistic and self-affirming, while the customer is expecting more from the product than its utility. Postmodern customers are individualistic and nonconformist in their purchase decisions.

Studies (Fuchs, Schreier & Van Osselaer, 2015; Hsu & Ngoc, 2016) show that consumers who worship handmade products love the conveyance factor mainly, but also value creativity and quality. They associate the handmade with love that the artisan puts into producing the product, as well as uniqueness and status symbol functionality (Hsu & Ngoc, 2016). The same studies point out that this so-called "Handmade effect," is not an omnipresent phenomenon, but it depends on many factors such as country or type of product, and that it should be further researched (Fuchs, Schreier & Van Osselaer, 2015; Hsu & Ngoc, 2016).

2.2 Perceived and actual quality

2.2.1 Perceived quality

Consumers, when determining the quality of a product, use an array of variables. These variables depend on consumers' perception. Consequently, to have a deep understanding of what consumers' perceived quality means, we first introduce the concept of perception.

According to Kotler (1997), consumers' perception varies from person to person, and it depends on the way we interpret stimuli. Besides, consumers' perception is influenced depending on which information reaches our senses. Several factors might attract the consumers' attention: external stimuli, such as the product features and internal stimuli, such as the consumer's motives and expectations (Agyekum, Haifeng & Agyeiwaa, n.d.). Understanding consumers' perceptions is crucial, as it is what influences perceived quality the most.

There are different approaches to describe the concept of perceived quality. According to Aaker, consumers' perception of the overall superiority of the product is based on different purposes and alternatives (Aaker, 1991). Aaker and Joachimsthaler (2000), add that perceived quality is a sort of association, as it affects both brand association and brand equity. There are two types of cues that affect the perception of quality: intrinsic and extrinsic. Intrinsic cues, for instance, are the perception that a consumer has of the product, in this case, perception of innovativeness, while extrinsic cues are the features of the product itself, such as price and brand name (Teas & Agarwal, 2000). Many studies have shown that most of the time, intrinsic cues are more important in the perception of quality for a variety of products (Fiore & Damhorst, n.d.). Many pieces of research attempt to define the elements that affect perceived quality, yet there is not a universal agreement on the specific factors influencing consumers' perception of quality. One may wonder then what is the relationship between perceived and objective quality.

2.2.2 The (Mis)alignment of qualities

Quality might seem like one of the crucial factors for product success and customer satisfaction (Ling & Mansori, 2018; Suchánek, Richter & Králová, 2015). The most straightforward example may be Toyota and its success due to the outstanding quality fix by implementing the Toyota production system (Ohno, 1988). The company became the leader and role model for the industry, but it was not a quick fix: it took much time to be recognized by the customers (Mitra & Golder, 2006). Why was it not an instant change? Because when we refer to consumers, we are not talking about actual quality, but rather their perception of quality (Aaker, 1991; ed. Kotler, 1997; Mitra & Golder, 2006; Suchánek, Richter & Králová, 2015).

Objective quality influences the perceived one, but they are not equivalent. The actual quality is the aggregate performance of product attributes, and it can be measured based on industry standards or expert rating; product attributes differ depending on the industry (Mitra & Golder, 2006). Nevertheless, the product attributes are not only of extrinsic character. As we explained before, perceived quality is much more than that, and it differs from actual quality since it includes both tangible and intangible factors.

Therefore, when looking for quick short-term results, it would be better to focus solely on perceived quality, not aligning it to the actual one (Mitra & Golder, 2006). The same research shows that even though the process of influencing customer perception by increasing quality takes years, it is crucial for long-term success.

2.3 New product development process

Before a product becomes widely available for the customers, there are various stages it needs to go through. The whole process is called the product development process, yet there is no universal model; stages differ depending on product, industry, or company. There are a number of general models defined in the literature (Cooper, 1983; Kotler & Alexander Rath, 1984; Priest & Sanchez, 2001). However, it is crucial to choose the model which suits one the most, and for the purpose of this study, there is a need to focus on product design and development for manufacturing.

Therefore, we will consider the model proposed by Priest and Sanchez (2001), which consists of the following stages:
(1) Requirement definition; (2) Conceptual design; (3) Detailed design; (4) Test and evaluation; (5) Manufacturing; (6) Logistics, Supply chain, and Environment.

According to Priest and Sanchez (2001), this process aims to identify end-users' needs and set both business and design objectives for the given product. The final output of this phase is product specifications or/and requirements, which serves as input for further work (Priest & Sanchez, 2001). The following stage is a Conceptual design, where the requirements are translated into the product by trade-off analysis, and factors such as producibility, quality, or reliability of the design are taken into consideration (Priest & Sanchez, 2001). Conceptual design is a base for the Detailed design that is where the product design is finalized and analyzed by, for example, failure modes and stress analysis (Priest & Sanchez, 2001). The next phase is Test and Evaluation, which is supposed to facilitate finding and to correct problems, as well as reducing technical risk. It is a crucial stage since, very rarely, the first design fulfills all the requirements, and improper design can lead to manufacturing defects and technical risks (Priest & Sanchez, 2001). When the design is made, the product can go to the Manufacturing stage, ensuring smooth material flow and a beneficial way of managing all manufacturing processes (Priest & Sanchez, 2001). The final stage- Logistics, Supply chain, and Environment- comprises the majority of indirect effort needed for the product to be developed and launched, and it covers the storage of materials, their flow or even their disposal (Priest & Sanchez, 2001; ed. Zbicinski, 2006). There are many companies that have a collective interest in a product's success; therefore, every aspect needs to be carefully planned and synchronized to achieve a goal (Priest & Sanchez, 2001). In the final stage, the environmental aspect of the product is also included, together with all the aforementioned services needed to develop the product (Priest & Sanchez, 2001; ed. Zbicinski, 2006).

For this research, we will cover the *Manufacturing* stage, since it concerns mainly the manufacturing processes, which is the focal point of this research. That is the step when one needs to take into consideration machining processes, manufacturing cost reduction, and actual product quality in its life cycle (Priest & Sanchez, 2001).

2.4 Innovativeness

2.4.1 Perceived innovativeness

Most frequently, innovativeness is perceived as a measure for the degree of newness, and accordingly, the "highly innovative" product or process is associated with a high degree of newness, and precisely the opposite happens for a "low innovative" product (Garcia & Calantone, 2002). There is, however, no agreement on how, and from whose perspective, the newness is judged (Garcia & Calantone, 2002).

The literature is focused mainly on the company perspective when considering the concept of innovativeness (Cooper, 1979; Cooper & Brentani, 1991; Hilmi et al., 2010; Mishra, Kim & Lee, 1996), yet, some studies show that it is the consumer view that matters the most (Lowe & Alpert, 2015). Indeed, in this research, we would like to take a less popular stand in this discussion and analyze the newness from the customer's perspective. Therefore, our focus will be on what is called perceived innovativeness. This term, as used in previous research, makes it possible for consumers to assess innovativeness when referring to the product itself, or the firm as a whole

(Shams, Alpert & Brown, 2015). It is, again, not an objective scale, but a subjective one as it refers to the customers' view.

In addition, perceived innovativeness is an important brand association that has a positive effect when consumers evaluate products (Shams, Alpert & Brown, 2015). Researchers have widely analyzed the concept of perceived innovativeness in different contexts, such as brand innovativeness and firm innovativeness (Boisvert & Burton, 2009; Hilmi et al., 2010; Shams, Alpert & Brown, 2015). Due to this concept being widely used in the contexts mentioned above, we would like to use it in our research, as well as introduce the notion of PMP innovativeness.

2.4.2 Degree of innovativeness

In her paper, Salavou (2004) distinguishes three main conceptual approaches to innovativeness in an organization: technology related, behavior-related, and product-related. As mentioned previously, the focus of this paper is a technology-related approach. In the literature (Kimberly & Evanisko, 1981; Kitchell, 1995; Salavou, 2004), this concept was treated as a willingness to adopt and utilize advanced technologies, even beyond the industrial standard.

The technology-related approach is one of the most associated with the manufacturing process. While considering manufacturing as a hard /physical process, the association with its development involves mainly technology, equipment, and machines (Yamamoto & Bellgran, 2013). This may also be connected with the industrial revolutions, especially the current one (Industry 4.0), which is greatly focused on technology. Therefore, one may associate the degree of innovativeness with the machine/human work ratio.

H_1: There is a positive relationship between machine intensity and perceived innovativeness of the manufacturing process

2.5 Industries

How consumers blend information concerning product attributes and make product evaluation, depends on their attention and comprehension employed in order to make sense of the information (Celsi & Olson, 1988). Consumers' attention and comprehension processes are to, a great extent, influenced by customer involvement in relation to the product in question (Celsi & Olson, 1988). In order to make the customer spend their time and analyze the purchase, the product needs to be of high importance to them.

Therefore, high-involvement products give a better picture of product attributes that are important for the customer, especially when the one of interest is not as apparent as the product's look or color. While there is no agreement of which are exactly the products that belong to the high involvement category, they can be generally characterized by the high price, the complexity of features, the significant difference between alternatives, the high risk perceived, and the buyer's self-concept being in line with the product (Saxena, 2005). Different aspects affect the involvement, such as current circumstances, the economic situation, or simply the mood (Martin, 1998).

Additionally, it needs to be pointed out that the importance of attributes for products delivered by a given industry, varies among different industries and products (Lehmann & O'Shaughnessy, 1974; Liesionis & Pilelienė, 2007; Zhang et al., 2002). Due to those differences, each industry must understand what customers worship in their case to develop better products, implement proper marketing strategies, or even predict customer behavior (Lehmann & O'Shaughnessy, 1974; Zhang et al., 2002).

Researchers and practitioners extensively studied drivers of perceived quality such as price, design, promotion, or country of origin across various industries (Erickson, Johansson & Chao, 1984; Liesionis & Pilelienė, 2007; Zhang et al., 2002). In doing so, some touched upon an important issue of customers' belief influencing their evaluation of the given product attributes (Erickson, Johansson & Chao, 1984). There are three main kinds of beliefs that differ based on the way they are created: descriptive, informational and inferential (Fishbein & Ajzen, 1975). The first kind is created based on direct observations, while the second one (informational) is created by the information obtained regarding a given thing (ex. a commercial, or someone's opinion) (Erickson, Johansson & Chao, 1984; Fishbein & Ajzen, 1975). Inferential belief is formed by linking one object and the belief regarding another object, using inference from a previous belief about the second object (ex. 1. I believe German products are of high quality. 2.

Audi is a german car. Thus, 3. Audi must be of good quality) (Dover, 1982; Erickson, Johansson & Chao, 1984; Fishbein & Ajzen, 1975). Huber and McCann (1982), proved that such inferences might affect customer judgment. Therefore, we would like to focus on the inference between PMP innovativeness and perceived quality.

There are various common beliefs concerning different industries and products those industries offer; they may be based on the media image or stereotypes. That is why we believe that depending on the industry, the relation between PMP innovativeness and perceived quality may be moderated.

Taking into account the theoretical aspects, we decided to consider industries providing high-involvement products that are possibly opposite to each other when considering the different product attributes, importance, and shared beliefs. Therefore, the focus is on the creative industries, represented by the jewelry industry and technology-intensive industries, represented by the automotive industry. The jewelry industry, as representative of the creative industry, is covering those sectors that originate in creativity, skill, and talent (Cunningham, 2002). Besides, as studies have shown that consumers who worship hand-made products, value this conveyance of love (see section 2.1.3) , which we believe can be connected with creativity and artisan craftsmanship skills (Fuchs, Schreier & Van Osselaer, 2015; Hsu & Ngoc, 2016). In the jewelry industry's case, some of the significant factors influencing customers' view is tradition, talent, and creativity.

H_2: There is a negative relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries.

Technology-intensive industries are significantly different from the creative industries mentioned above, as their core factors are safety and quality (Stylidis, Wickman & Söderberg, 2015). These two factors make us assume that the manufacturing process innovativeness, as there is a high chance of error in human work, may minimize the human error factor (Mital & Pennathur, 2004; Myszewski, 2010)

H_3: There is a positive relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries.

2.6 Price

The virtually most-studied product attribute is price; its relationship with perceived quality was extensively researched (Jacoby, Olson & Haddock, 1971; Peterson, 1970; Peterson & Jolibert, 1976; Render & O'Connor, 1976; Völckner & Hofmann, 2007).

There are two main approaches to price in studies considering a price-perceived quality relationship: the negative price role and the positive one. Price can be seen as a financial sacrifice customers must make to satisfy needs, and in this case, higher price negatively impacts the purchase probability (Erickson & Johansson, 1985; Völckner & Hofmann, 2007). However, there is another way price is seen by customers: it can be used as a quality cue, so a product with low price may be seen as inferior when it comes to quality as well (Erickson & Johansson, 1985; Völckner & Hofmann, 2007).

Due to this dual nature of the price, its relationship with quality is somewhat complicated and also affected by various aspects. The literature states that the price effect on quality varies in type and degree of interaction with the product class, for example, electrical devices vs. fashion items (Render & O'Connor, 1976). Moreover, the price effect on quality seems to decrease when considering other product attributes (Jacoby, Olson & Haddock, 1971; Peterson, 1970; Peterson & Jolibert, 1976). Furthermore, there is a tendency among customers to put more stress on price as a proof of quality when there is a more significant variation of price in the given product category (Völckner & Hofmann, 2007).

Another negative role that the price plays in the consumer's decision-making process is the role that it has on risk assessment. In fact, price dramatically contributes to the perceived risk of purchase as a financial risk element (Mitchell & McGoldrick, 1996). The higher the price, the higher the risk that the customer is perceiving. Besides, the higher the risk, the more time that the consumer spends on analyzing the product attributes and alternatives. This phenomenon mentioned before is a simplified version of the relation since the overall risk consists of various risk types, which all interact together and respectively moderate the interactions itself (Cox & Rich, 1964; Mitchell & McGoldrick, 1996).

As previously discussed in the case of creative industries, the focus is on design and craftsmanship. Those are aspects that are hard to put a price tag on since they go beyond the used materials; however, with the current trend, hence going back to the roots (see section 2.1.3), those skills have a higher value to the consumer. Therefore, considering the critical role that craftsmanship plays in the creative industries, and the aforementioned importance of price in constructing perceived quality, we believe that the lower the degree of perceived innovativeness of the manufacturing process (handmade process), the higher the consumers' perceived quality. In addition, it appears that this relationship is intensified in the case of a higher price range. However, price is associated with financial risk, so the lower the price, the lower the risk perceived. Thus, the lower price may decrease consumers' interest in other product attributes as well as their importance (Cox & Rich, 1964; Erickson & Johansson, 19859), so we assume that the perceived quality difference based on the perceived degree of the manufacturing process when considering the low price range is not as big as in the high price range. There are limited insights on this phenomenon that take into consideration the combination of drivers of perceived quality presented in this research. Therefore, we may conclude that:

H_{4a}: The negative direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries remains unchanged regardless of the price range.

H_{4b}: The higher the price, the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the creative industries.

While considering the automotive industry, which represents technology-intensive industries, we need to keep in mind customer priorities (see part 2.5). This industry is where customers pay for technology and safety (Stylidis, Wickman & Söderberg, 2015). These two factors are highly related to the machine manufacturing process; thus, it appears that no matter the price range, consumers will still associate a higher quality to the product that has been produced by machine. There are few brands from the top price range that are widely associated with the handmade manufacturing process (Okulski, 2020; Oliver, 2020; Specs, 2020; Vesentini, 2018). However, those brands are exempt from the industry standard since they belong to the luxury segment. Considering the previous discussion on the role of price as both an indicator of financial sacrifice and quality (Völckner & Hofmann, 2007), we conclude that consumers, when purchasing a product with a high price range in the technology-intensive industry, will pay more attention to other product attributes. Therefore, we conclude that when introducing price as a driver of perceived quality, similarly to the creative industry, the relationship between the degree of perceived manufacturing innovativeness (in this case, high innovativeness) and perceived product quality is intensified. Therefore, we may assume that the:

H_{5a}: The positive direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries remains unchanged regardless of the price range.

H_{5b}: The higher the price, the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the technology-intensive industries

3 Method

In this chapter, the research philosophy and methodology are described. The research philosophy is divided between ontology and epistemology. The methodology section starts with a description of the research approach, followed by the two operational frameworks based on the type of industry. A description of the target population and sample is provided, followed by an explanation of the measurement procedure, data gathering, and questionnaire design. Next, the quality of the study is discussed from both the validity and reliability perspective. Following, the analysis of the data is reported, with all the ethical implications of the study.

3.1 Research philosophy

In order to present the research's clear standpoint and the role of the researchers, it is imperative, especially in social sciences, to present the underlying assumptions and beliefs behind the study (Easterby-Smith, Thorpe & Jackson, 2015). Therefore, the following are the main philosophical concerns and the stand we decided to take in this research paper.

The most general aspect, which is an approach to the nature of reality, or so-called ontology, is the starting point of this discussion since it greatly affects subsequent elements of the research philosophy (Easterby-Smith, Thorpe & Jackson, 2015). In this thesis, we are leaning towards the realism perspective. Therefore, we assume that reality is external and objective (Easterby-Smith, Thorpe & Jackson, 2015).

Understanding the perspective of assessing reality, we shall develop our stand when it comes to the nature of the world and knowledge, which are two factors that represent the core of epistemology (Easterby-Smith, Thorpe & Jackson, 2015). Having on the ends of the scale positivism and social constructionism, we are unarguably on the positivism side, as it would be for more realism-based research (Easterby-Smith, Thorpe & Jackson, 2015). We strive to measure properties in the most objective way possible, omitting the intuition or sensations, since knowledge is of significance if it is based on observations of the external ontological reality.

Based on this ontology and epistemology, the only natural choice when it comes to methodology is leaning towards quantitative methods (Easterby-Smith, Thorpe & Jackson, 2015).

The exact methods and techniques used in this research are elaborated in the following methodological sections.

3.2 Research approach

The research approach is strictly connected to the previously described research philosophy, and mainly methodology.

There are two main approaches distinguished: inductive and deductive (Burns & Burns, 2008). The inductive approach aims at theory development, and it is used in the qualitative methodology. The deductive approach seeks to find confirmation to the existing theories, and it is mainly used for quantitative methods (Burns & Burns, 2008). Therefore, as it can be easily observed from the explanation above, the proper approach for this research would be the deductive one. Thus, we start with the existing theories in order to develop the hypotheses, and then we go through the observations and finally look for confirmation.

Moreover, in line with the research philosophy and the approach, the research design is of experimental character (Easterby-Smith, Thorpe & Jackson, 2015). The research follows an experimental design since it aims at making inferences about what contributes to the changes in the product's perceived quality based on the type of industry, hence creative and technology-intensive industries. Thus, the research aims to observe possible changes in the perceived product quality by manipulating the PMP innovativeness level, taking into consideration the role that the different price levels play in the main effect.

For this purpose, the research survey used in this experiment was divided into two sections based on the two industries.

3.3 Operational Framework

CREATIVE INDUSTRIES / JEWELRY INDUSTRY

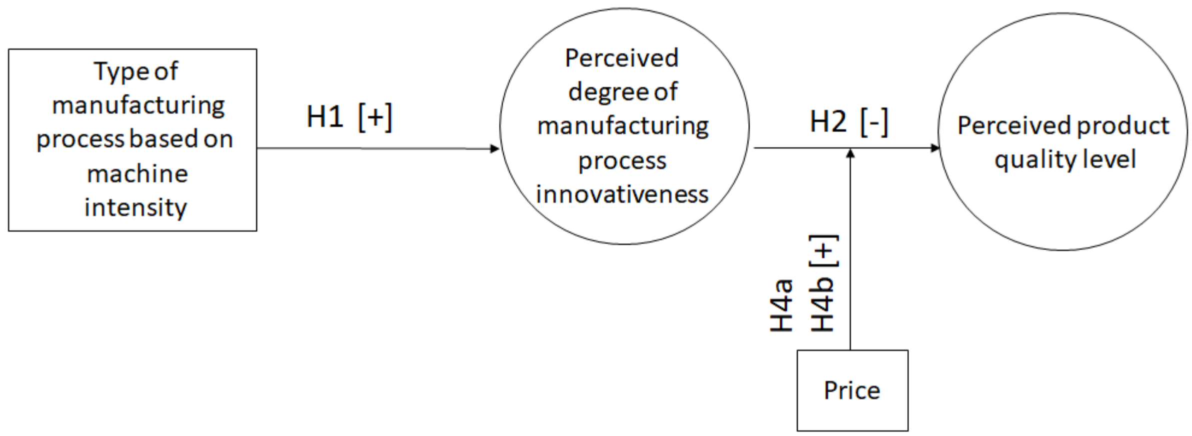

Fig. 3.1 Operational framework for creative industries

TECHNOLOGY-INTENSIVE INDUSTRIES / AUTOMOTIVE INDUSTRY

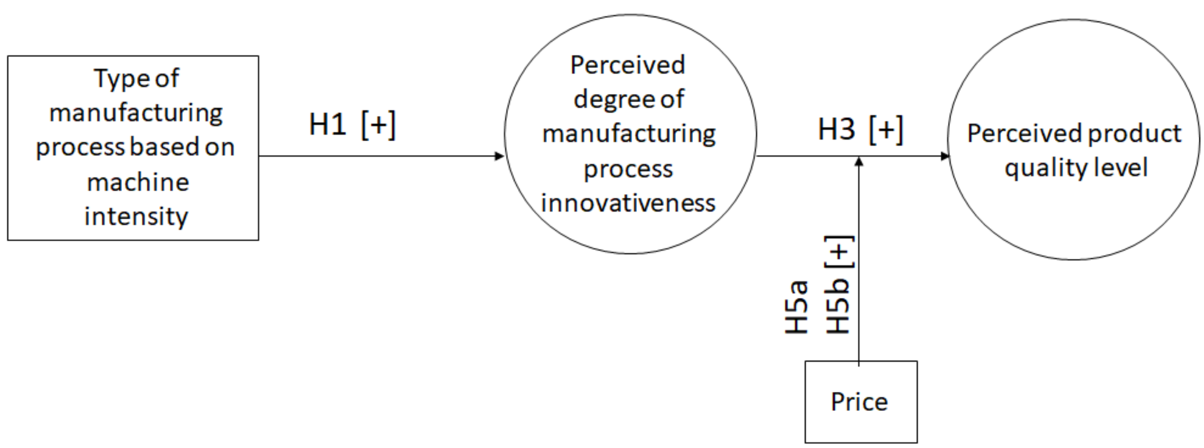

Fig. 3.2 Operational framework for technology-intensive industries

3.3.1 Industry Type

As Martin (1998)shows in his research, both automobiles and jewelry are considered high-involvement products. The Jewelry industry is used as a representative of the creative industries that are covering those sectors that originate in creativity, skill, and talent (Cunningham, 2002). In the jewelry industry's case, one of the significant factors influencing customers' view is tradition, talent, and creativity. As argued by Kennedy (2015), tradition is a significant factor in purchasing decisions in creative products, especially in the world of fashion and fine jewelry. What is more, the majority of people associate handmade jewelry with the designer's experience, skill, and knowledge (Siu & Dilnot, 2001). Due to that, we suspect that the handcraft production process may be perceived as of higher quality.

For the second industry category, we have chosen technology-intensive industries, which are represented by the automotive industry. In general, technology-intensive industries comprise industries that invest a lot in R&D and use more technologically advanced equipment (D'Auria, 2012). Technology-intensive industries are significantly different from the creative industries mentioned above, as its core values are safety and quality (Stylidis, Wickman & Söderberg, 2015). These two factors make us assume that the production innovativeness, as there is a high chance of errors in human work, may minimize the human error factor (Mital & Pennathur, 2004; Myszewski, 2010).

3.3.2 Process type based on mechanization and perceived process innovativeness

The process type variable can have two values: which are the hand manufacturing process and the machine manufacturing process. This division, as explained in section 2.4.2, differs based on how technologically advanced they are.

There are also no predefined degrees on the innovativeness of the manufacturing process. Therefore, we decided to measure it separately. Based on the elaboration in section 2.4.2, we are concluding that the degree of innovativeness of the manufacturing processes may be to a great extent, associated with technology, and respectively with the process mechanization.

Following this logic, we used the hand manufacturing process and machine manufacturing as a differentiator in the measurement of the perceived degree of innovativeness. We were assuming that the type of production process, with a higher degree of machine intensity, leads to a higher degree of the manufacturing process's perceived innovativeness. This relationship was tested in order to use the association of process type and perceived innovativeness for the main study.

3.3.3 Perceived quality

As shown in section 2.2.1, perceived quality is affected by two cues: intrinsic and extrinsic. The intrinsic cue refers to the perception that consumers have of the product. In our studies, we are aiming to detect how the intrinsic cue- perceived innovativeness of the manufacturing process- affects the product's perceived quality in the automotive and jewelry industry. Thus, perceived quality is the primary variable of interest of this study.

3.3.4 Price

As mentioned in Section 2.6, consumers perceive the price as both an indicator of sacrifice and as a quality sign (Baishya & Kakati, 2019; Erickson & Johansson, 1985; Shapiro, 1973). In fact, according to Shapiro (1973), on the one hand, a high price might have a negative effect on consumers, as it will mean a higher sacrifice. On the other hand, when considering it from a behavioral point of view, a high price can have a positive impact on the consumers, as the consumers tend to associate a high price with high quality. However, as mentioned in section 2.5, the relationship between price and perceived quality is not straightforward, since many factors influence this relationship (Jacoby, Olson & Haddock, 1971, 1971; Peterson, 1970; Peterson & Jolibert, 1976; Render & O'Connor, 1976).

Considering the aforementioned role of price, we introduce the following price division based on statistical data available on the average price of the two industries (Automotive and Jewelry) in Western and Center Europe (Average Price of Watches in Italy in 2007-2018, 2020; European Vehicle Market Statistics, Pocketbook 2019/20, 2019):

Industry	**Automotive**	**Jewelry**
Medium-Low Price Range [EURO]	10k - 30k	50 - 200
Medium-High Price Range [EURO]	>30k	>200

Table 3.1 Price Ranges

3.4 Measurement and scaling procedures

The semantic differential is a scale that is commonly used for assessing evaluative, potency, or activity factors (Burns & Burns, 2008). Therefore, also, attitude is often measured using this scaling method. The respondents are supposed to express the degree to which they feel the bipolar adjective scales best describe a given factor, using this scale in this particular case level of quality. The antagonistic adjectives for this research are low (quality) to high (quality), where the lowest score is 1, and the highest is 7. The scale used is of ordinal character; however, it may as well be treated (as it often is) as an interval one, since it provides numbers that guide respondent by setting visible intervals on the scale (Erickson, 2017).

The decision regarding the measurement was made based on previous pieces of researchers' attempts to measure the influence that various factors have on the perceived quality and analyzing possible alternatives (Jacoby, Olson & Haddock, 1971; Peterson & Jolibert, 1976; Render & O'Connor, 1976; Stone-Romero, Stone & Grewal, 1997; White & Cundiff, 1978). We have chosen to measure perceived quality similarly to what was done in the papers on this topic (Boulding & Kirmani, 1993; Peterson & Jolibert, 1976; Rao, Qu & Ruekert, 1999; Render & O'Connor, 1976). The way the studies were performed in the aforementioned papers is by measuring quality in three questions concerning overall perception and perception of two chosen attributes, using the scale 7 or 9 scores from *low* to *high* quality (Boulding & Kirmani, 1993; Peterson & Jolibert, 1976; Rao, Qu & Ruekert, 1999; Render & O'Connor, 1976). Additionally, we have chosen the product finishing (surface appearance/final touch) as an extra attribute to measure perceived quality since that is, to a great extent, influenced by the manufacturing process and can be applied in both exemplary industries (Weule, Timmermann & Eversheim, 1990). Similarly, we have chosen the probability of product defects as a second attribute to measure perceived quality, since it is a construct that is directly connected to any manufacturing industry (Sofiana, Rosyidi & Pujiyanto, 2019).

It can be argued, as done by Stone et al. (1997), that the approach is too simplistic since perceived quality is a multidimensional phenomenon. The authors also introduce dimensions such as Flawlessness, Durability, Appearance, and Distinctiveness. However, in the case of our research, it is not feasible to introduce such factors since the study is more abstract than the one done by Stone et al. (1997), and there are no tangible components on which the respondent can judge using such categories.

The perceived degree of innovativeness was measured in a similar manner. Several articles on innovation and innovativeness have developed different methods to measure these variables (Fort-Rioche & Ackermann, 2013; Hilmi et al., 2010; Knowles, Hansen & Dibrell, 2008; Lowe & Alpert, 2015; Salavou, 2004; Wang & Ahmed, 2004; Yamamoto & Bellgran, 2013). None of the studies measured exactly the perceived process innovativeness. Therefore, we needed to utilize studies that concern innovations instead. We have decided to use a consumer perceived innovation (CPI) measure developed by Lowe and Alpert (2015). Most of the studies mentioned above use a seven-point scale to measure the CPI, where 1 stands for *strongly disagree* and 7 for *strongly agree.* However, they take a different stand from previous research developing, a much simpler, two-item measure. In fact, this measure (differently from previous ones) cuts out from the survey questions regarding other dimensions of CPI: dimensions that usually require consumers to have in-depth knowledge regarding the brand, and that eventually would also require a significant learning effort from the respondents (Lowe & Alpert, 2015).

Concept	**Source**	**Question**	**Scale**	**Cronbach's Alpha**
Perceived manufacturing process (PMP) innovativeness	*Lowe & Alpert, 2015*	1) How innovative is <manufacturing process of interest>? 2) <manufacturing process of interest> is an innovative process?	scale from 1 to 7 where 7 is extremely innovative (strongly agree), and 1 is not at all innovative (strongly disagree)	0,883
Perceived quality	*Peterson & Jolibert, 1976; Render & O'Connor, 1976*	1) How would you assess the quality of this product? 2) How would you assess the finishing (surface appearance/final touch) quality of this product? 3) How would you assess the quality of this product considering your view on the probability of product defects?	scale from 1 to 7 where 7 is high quality, and 1 is low quality	0,862

Table 3.2 Concept measurement questions

For other variables, the nominal scale should be used, as presented in the table below (see Table 3.3).

<table>
<tr><th colspan="2">Nominal</th><th colspan="2">Nominal</th><th>Interval</th><th>Interval</th></tr>
<tr><td colspan="2">Price</td><td colspan="2">Manufacturing process type based on machine intensity</td><td rowspan="3">Degree of innovativeness of the manufacturing process</td><td rowspan="3">Perceived product quality</td></tr>
<tr><td>Medium-Low Price Range</td><td>Medium-High Price Range</td><td>Hand manufacturing process</td><td>Machine manufacturing process</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td></tr>
</table>

Table 3.3 Variables definition

3.5 Target group, sampling, and data collection

Target Population: Female and Male over eighteen, residents of Central and Western Europe with access to the internet in order to be able to participate in the research questionnaire since we used Google Forms for creating the survey, and we distributed the link throughout digital platforms such as WhatsApp, Facebook, and LinkedIn.

Based on the aim of our research, the definition of the target population is rather generic. However, few requirements had to be met, such as age, residency, and internet access. Since the research is not focusing on gender, we included in the target group, both male and female without distinction; however, all the respondents had to be over eighteen. The age requirement is fundamental for the purpose of the study, as we assume that the respondents can make decisions for themselves; therefore, they are responsible for their own purchases without depending on another individual. However, the evolution of postmodernism and postmodern customers is in different stages and may look different in various countries depending on the country's stage of development (political and economic), religion, or culture (Mehraramolan, 2016). Therefore, to minimize the effect of those differences, the respondents had to fulfill the residency requirement. We focused on the residents of Central and Western Europe since those are countries at similar development levels (United Nations, 2020), where differences in mentality, and culture, are not significant enough to affect the outcomes of the research radically. Therefore, to ensure that the requirements mentioned above were met, two control questions were asked at the beginning of the research questionnaire: if respondents are over 18, and if respondents are Center and Western Europe, residents.

We have chosen a web survey as it is a fast and inexpensive data collection method. Besides, the epidemiological situation at the time when the study was conducted restricted the possibility to have face-to-face interaction with respondents. The great advantage and the reason for the popularity of this tool is its extensive reach. In addition, it offers various questionnaire design possibilities, and it has a convenience connected to data documentation and gathering (Fielding, Lee & Blank, 2016).

The chosen data collection technique can cause a few methodological issues, which made us lean towards choosing convenience sampling. It is a nonprobability sampling technique, as there were members of the population who had zero chance of being selected (Easterby-Smith, Thorpe & Jackson, 2015). However, such a choice also raised several limitations, which are explained below. The reasoning behind choosing it despite the limitations is that for internet surveys the use of probability sampling is rarely possible, followed by challenges such as lack of improper sampling frame, or non-coverage problem; this is especially true when the general population is of interest as in our case (Fielding, Lee & Blank, 2016).

We aimed to collect data for a larger sample of 30 following the implication of the Central Limit Theorem. The theorem indicates that in order for the data to have approximately a normal distribution tendency, the sample size needs to have at least 30 observations (Burns & Burns, 2008). Considering that the research presents two levels of the independent variable, such as the degree of the innovativeness, we used the rule mentioned above adding a slight margin, using a sample of 100 participants, in order to have a higher probability of the sample being a better representative of the population. The research questionnaire received 115 responses; among those responses, 2 were not fully completed, and 8 respondents did not represent our target group as they were not Center and Western European residents. Thus, their responses were excluded from the results. Therefore, we managed to reach a predefined sample size of N=100, which considering the aforementioned theory it satisfies sample size for the purpose of this research.

3.6 Quality of the Study

3.6.1 Reliability

While assessing reliability, we used Cronbach alpha, which is the most common measure for checking if the items measure the same construct in the attitude scales (Burns & Burns, 2008). In this case, as presented in Table 3.2 in section 3.2, the values for both constructs are over 0,8 (nearly 0,9), which is a highly acceptable result assuring that there is reliability (Burns & Burns, 2008).

3.6.2 Validity

While considering validity, there are two main aspects that need to be acknowledged: internal and external validity (Burns & Burns, 2008). The internal one relates to the consistency of the observation and concepts used, and the external one focuses on outcomes generalizability (Burns & Burns, 2008; Easterby-Smith, Thorpe & Jackson, 2015).

As far as the internal validity is concerned, we shall judge the questionnaire's ability to measure what it is supposed to assess. This assessment can be done by using the scale developed and proved in the previous research, which is what was done in this case, as we elaborate in section 3.2. Another important aspect, which is a threat in experimental design, is the testing effect that may also, in this very case, lower the validity level of the results (Easterby-Smith, Thorpe & Jackson, 2015).

When it comes to external validity, the main factor lowering it, in this case, is the sampling procedure. Convenience sampling is a method that forecloses the generalization of obtained results (Burns & Burns, 2008; Easterby-Smith, Thorpe & Jackson, 2015).

3.7 Ethics

While considering the study's ethical aspects, we ensured that the research caused no harm to participants and respected their dignity. Moreover, we made sure that we obtained the fully informed consent of the participants and ensured their anonymity. We avoided any kind of deception concerning the study's aim and nature by providing an exhaustive explanation of the study's aims, reasons, conduct, and researchers as such. The number of ethical concerns was also limited due to the research's character, which is a master's thesis. Moreover, the research was not funded by any organization, and there was no cooperation with specific commercial organizations. All the aspects mentioned above provided solutions to the main ethical concerns connected with most business studies (Easterby-Smith, Thorpe & Jackson, 2015).

3.8 Data analysis

The data analysis is divided into two parts, the first is the analysis for reliability, and the second is the main analysis for proving the hypothesis.

SPSS software was used for all calculations and conducting of tests

3.8.1 Cronbach Alpha

As mentioned previously, Cronbach Alpha is one of the most popular measures for reliability and can be effortlessly performed using the software. This analysis was chosen to prove research reliability. The test was done based on the ratio of test item's variance (variety of answers for a given question) and scale variance (sum of item variance and covariance between test items) (Burns & Burns, 2008). In this particular case, since there are two variables measuring perceived manufacturing process innovativeness and perceived quality, the test was conducted once for each variable. In the case of the first one we considered two items, while for the second variable, three (see Table 3.2).

3.8.2 Analysis for hypothesis testing

For all the hypotheses presented, we used a Repeated measures ANOVA test, and additionally, we used dependent groups paired t-test as a post hoc for the two-way repeated-measures ANOVA. Repeated-measures ANOVA is an analysis of variance, which is based on the idea that each and every individual is measured multiple times (more than once), and the independent variables' levels are the different types or times of observations for the same people (Burns & Burns, 2008).

There are several benefits to using such a solution, and the main one is that only one group is analyzed. As required for other experimental designs and tests, providing equivalent groups would have been very challenging or even hardly possible considering the sampling technique and epidemiological situation. Therefore, the choice of repeated measures ANOVA allowed us to use one group and ensure that there were no individual differences (Burns & Burns, 2008). Moreover, this analysis allowed a smaller sample size, for example, repeated-measures ANOVA, where each group would have to be equivalent, but also independent, which requires a higher number of participants when summing up all the groups (Burns & Burns, 2008).

There are several conditions of the data set which need to be fulfilled in order to conduct the repeated measures ANOVA test. First, is the normality distribution of results; second, the homogeneity of variance of the occurrences, and the third is the absence of sphericity (Burns & Burns, 2008). In this example, we can omit the last condition since in the analysis, we are not using more than two groups at once, and there is no possibility of sphericity in such a case. The judgment of distribution shape proved the normality, and for the homogeneity of variance Hartley's Fmax is used (Burns & Burns, 2008).

The repeated ANOVA test was conducted 7 times, once for each of the hypotheses. For the analysis of the outcome in each case, the significance level of α=5% was used, which minimizes the probability of accepting the null hypothesis when it is false, thus minimizing the occurrence of a Type II error (Burns & Burns, 2008).

In the case of H_1 (There is a positive relationship between machine intensity and perceived innovativeness of the manufacturing process), the measurement was done twice, measuring the degree of PMP innovativeness, once for each process type. Therefore, the stimuli (or treatment) here is the change of the process type. The analysis was done based on (1st measure) the perceived hand manufacturing process innovativeness, and (2nd measure) perceived machine manufacturing process innovativeness.

The second test was done in order to test H_2 (There is a negative relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries), by checking the perceived quality scores when changing the degree of perceived innovativeness of the manufacturing process in the case of the creative industries. Therefore, the stimuli here is the change of the perceived innovativeness. The analysis was done based on (1st measure) the perceived quality for low process innovativeness, and (2nd measure) the perceived quality for high process innovativeness of the process.

In the case of the H_3 (There is a positive relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries), the analysis was done in the same way as for H_2. However, the data were for the technology industries instead.

For hypothesis H_{4a}, H_{4b}, H_{5a}, and H_{5b} different types of repeated-measures ANOVA were used - two-way repeated measures ANOVA, which allows testing for two factors simultaneously (Turner & Thayer, 2001). A post hoc test also follows this test, in the form of the usual repeated ANOVA test for the groups of interest. In the case of H_{4a} (The negative direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries remains unchanged regardless of the price range) and H_{4b} (The higher the price, the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the creative industries) there are considered four groups are portraying two factors, which are perceived process innovativeness and price. This analysis allowed us to observe whether the effect of factors is significant and if there is an interaction between the factors of interest. It allowed us to check for H_{4b} by judging the graph, which depicts the quality scores for mixes of different factors. For checking H_{4a}, we needed to run a post hoc, which is a paired t-test, in order to see whether the means for the innovativeness are different when the price is changed, to make sure whether the direction of the relationship changed or remained the same. The analysis for H_{5a} (The positive direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries remains unchanged regardless of the price range) and H_{5b} (The higher the price, the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the technology-intensive industries) was done appropriately, but using the data from technology-intensive industries.

4 Results

In this chapter are presented the outcomes of the analysis done on the data gathered. The outcomes are discussed in order to check for the pre-stated research hypothesis, so as to understand the meaning behind the numerical results.

4.1 Descriptive statistics and common tests

The table below (see Table 4.1) contains the descriptive statistics of all the data which are used for the statistical tests presented in chapter 4.

DESCRIPTIVE STATISTICS						
VARIABLE			**N**	**Mean**	**Std. deviation**	**Variance**
Type of production process innovativeness:		Hand process	100	3,205	1,36162	1,854
		Machine process	100	5,170	1,25774	1,582
Technology-Intensive Industries	High Innovativeness	Without Price	100	5,257	1,03133	1,064
		Medium-Low Price Range	100	4,933	1,07622	1,158
		Medium-High Price Range	100	5,720	1,07905	1,164
	Low Innovativenes	Without Price	100	4,480	1,71631	2,946
		Medium-Low Price Range	100	3,600	1,40306	1,969
		Medium-High Price Range	100	4,787	1,38334	1,914
Creative Industries	High Innovativeness	Without Price	100	4,370	1,08855	1,185
		Medium-Low Price Range	100	4,150	1,15604	1,336
		Medium-High Price Range	100	5,000	1,12017	1,255
	Low Innovativenes	Without Price	100	5,660	0,79276	0,628
		Medium-Low Price Range	100	4,500	1,21115	1,467
		Medium-High Price Range	100	5,783	1,01102	1,022

Table 4.1 Descriptive Statistics

As discussed in section 3.8.2, there are several conditions that have to be met to conduct a repeated ANOVA test; therefore, before running the tests, we checked for normality based on the histogram and calculated the Fmax test for each part tested to assess the homogeneity of variance. The sphericity, as discussed earlier, is not tested since, in the tests, only pairs were compared, so also the epsilon value is always 1 that is greater than 0,75 (Girden, 1992), which made us use

Huynh-Feldt for the within-subject analysis in each test. The condition of normality was also proved, as the histogram showed a bell-shape. Below the Fmax tests for variance homogeneity are calculated based on the data from the descriptive statistics table (Table 4):

Homogeneity of variance test for section 4.2

$$Fmax = \frac{Larger\ Variance}{Smaller\ Variance} = \frac{1{,}854}{1{,}582} \approx 1{,}17$$

Homogeneity of variance test for section 4.3.1

$$Fmax = \frac{Larger\ Variance}{Smaller\ Variance} = \frac{1{,}185}{0{,}628} \approx 1{,}89$$

Homogeneity test for section 4.3.2

$$Fmax = \frac{Larger\ Variance}{Smaller\ Variance} = \frac{2{,}946}{1{,}064} \approx 2{,}77$$

Homogeneity of variance tests for section 4.4.1

$$Fmax = \frac{Larger\ Variance}{Smaller\ Variance} = \frac{1{,}467}{1{,}022} \approx 1{,}44$$

Homogeneity of variance tests for section 4.4.2

$$Fmax = \frac{Larger\ Variance}{Smaller\ Variance} = \frac{1{,}969}{1{,}158} \approx 1{,}70$$

The F ratio in all cases is less than 3, which makes us believe that the variances are equivalent (Burns & Burns, 2008).

4.2 The manufacturing process type and perceived process innovativeness

Tests of Within-Subjects Effects							
Manufacturing process innovativeness	**Source**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**	**Observed Power**
	Huynh-Feldt	193,061	108,097	0,000	0,522	1,000

Table 4.2 Within-Subjects Effects for manufacturing process type and the degree of perceived manufacturing process innovativeness

The associated probability (Sig.= 0,000 for F = 108,097) is lower than the significance level (α = 5%) (see Table 4.2). Therefore, we conclude that there is a significant difference between scores on two occasions. This means that there is a significant improvement from the innovativeness of hand process to the innovativeness of machine process groups, with an effect size of 52,2%. Thus, we can say that 52,2% of the variation in the perceived innovativeness mean is caused by the treatment, which is changing the process type.

Presented in the table 4.2, observed power is computed at 1 that is a maximum value. Therefore, a probability of making Type II error is statistically null, which allows us to be confident with the results (Burns & Burns, 2008).

Based on the analysis above, we can see that the change from hand process to machine process leads to an increase of the perceived manufacturing process innovativeness mean; therefore, the test supports H_1.

H_1: There is a positive relationship between machine intensity and perceived innovativeness of the manufacturing process

4.3 The effect of degree of PMP innovativeness on perceived quality

4.3.1 Creative Industries

Tests of Within-Subjects Effects						
Creative industries without price	**Source**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**	**Observed Power**
	Huynh-Feldt	83,205	84,663	0,000	0,461	1,000

Table 4.3 Within-Subjects Effects for degree of the perceived manufacturing process innovativeness and perceived quality in creative industries

The associated probability (Sig.= 0,000 for F = 84,663) is lower than significance level (α = 5%) (see Table 4.3). Therefore, we can conclude that there is a significant difference between scores on the two occasions. Meaning that there is a significant improvement from perceived quality of the high innovative process to perceived quality of low innovative process in creative industries, with the effect size of 46,1%. Thus, 46,1% of the variation in the perceived quality mean is caused by the treatment, which is changing the perceived process innovativeness.

It is visible from the table above that the observed power is computed at 1 that is the maximum value. Therefore, a probability of making Type II error is statistically null, which allows us to be confident with the results (Burns & Burns, 2008).

Based on the analysis above, we can see that the change from high manufacturing process innovativeness to low manufacturing process innovativeness leads to an increase of the perceived quality mean, so the test supports H_2.

H_2: There is a negative relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries.

4.3.2 Technology-intensive Industries

Tests of Within-Subjects Effects						
Technology-Intensive industries without price	**Source**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**	**Observed Power**
	Huynh-Feldt	30,161	12,045	0,001	0,108	0,930

Table 4.4 Within-Subjects Effects for a degree of perceived manufacturing process innovativeness and perceived quality in technology-intensive industries

The associated probability (Sig.= 0,001 for F = 12,045) is lower than the significance level (α = 5%) (see Table 4.4). Therefore, we can assume that there is a significant difference between scores on the two occasions. This shows that there is a significant improvement in the perceived product quality from a low innovative manufacturing process to high innovative manufacturing process in technology-intensive industries, with an effect size of 10,8%. Meaning that the 10,8% of variation in the perceived product quality mean is caused by the treatment, which is the change in the perceived manufacturing process innovativeness.

From the table presented above, it is visible that observed power is equal to 0,93, which is close to 1 that is the maximum value. Therefore, a probability of making Type II error is statistically low, which allows us to be confident with the results (Burns & Burns, 2008).

Based on the analysis above, we can see that the change from low to high manufacturing process innovativeness leads to an increase of the perceived product quality mean, meaning that the test proves H_3.

$H_{3:}$ There is a positive relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries.

4.4 The Role of Price on the Main Effect

4.4.1 Creative industries

DESCRIPTIVE STATISTICS				
Variables			N	Mean
Perceived quality for: Creative Industries	Low Innovativeness	Medium-Low Price Range	100	4,500
		Medium-High Price Range	100	5,783
	High Innovativeness	Medium-Low Price Range	100	4,150
		Medium-High Price Range	100	5,000

Table 4.5 Descriptive Statistics for two-way repeated ANOVA for creative industries

The table above (see Table 4.5) presents the means for the groups taken for the analysis.

Tests of Within-Subjects Effects						
Variables	Source	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
Degree of perceived manufacturing process innovativeness	Huynh-Feldt	32,111	21,439	0,000	0,178	0,996
Price Range	Huynh-Feldt	113,778	108,25	0,000	0,522	1,000
Degree of perceived manufacturing process Innovativeness * Price	Huynh-Feldt	4,694	6,492	0,012	0,062	0,713

Table 4.6 Within-Subjects Effect Test for two-way repeated ANOVA for creative industries

The associated probability for the quality scores for both, price ranges and innovativeness groups, (Sig.= 0,000 for F = 108,25 and Sig. = 0,000 for F = 21,439) is lower than the significance level (α = 5%) (see Table 4.6). Therefore, there are significant effects from both the price and the degree of innovativeness. Moreover, there is a significant interaction between those factors (Sig. = 0,012 and F = 6,492), yet it explains only 6,2 % of the variation in quality scores.

From the table presented above, it is visible that the observed powers are rather high, and in the majority of cases with a value close to 1 that is the maximum value. Therefore, a probability of making Type II error is statistically low, which allows us to be confident with the results (Burns & Burns, 2008).

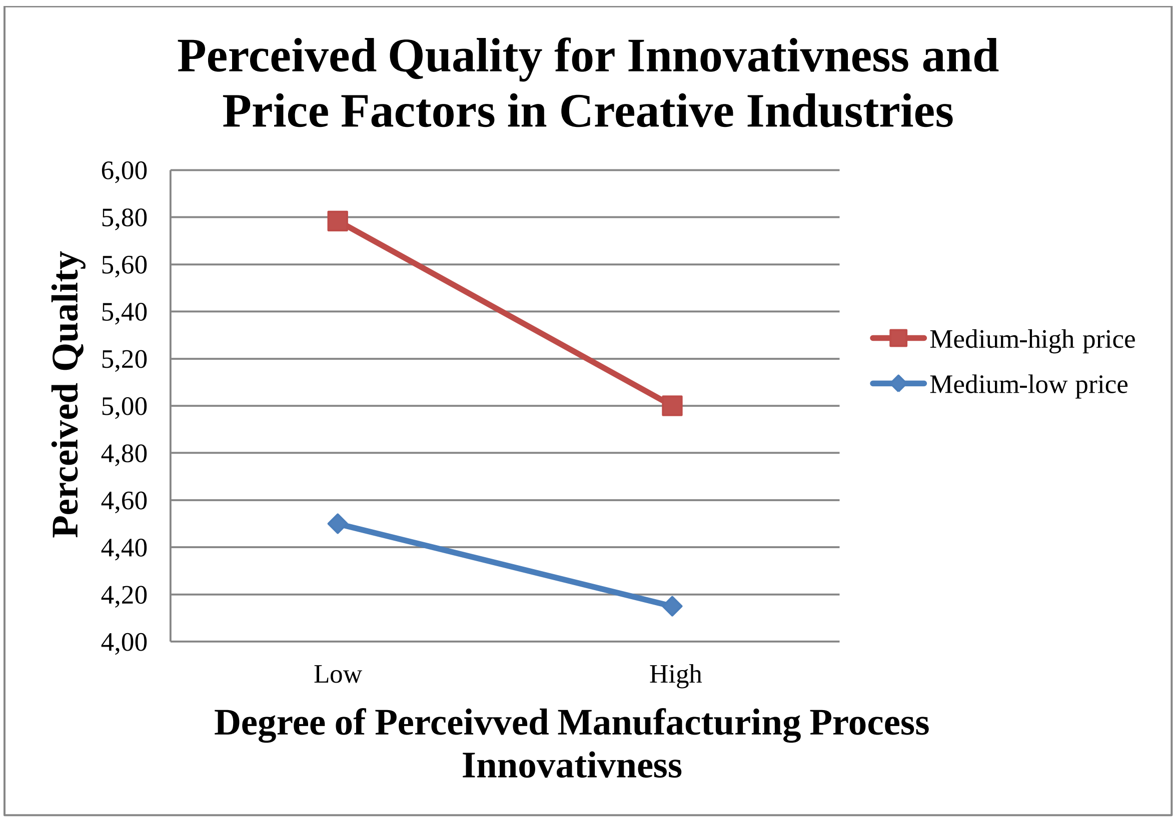

Fig. 4.1 Perceived Quality for Innovativeness and Price Factors in Creative Industries

The graph above (see Fig. 4.1) shows that the general tendency (the relationship between the innovativeness and perceived quality in creative industries) is still valid. This is further visible in the descriptive statistics table (see Table 4.5). In fact, we can see that as the price range increases, so does the mean for the perceived quality, in both low and high degree of manufacturing innovativeness. However, this needs to be further checked using a post hoc test (in this case, dependent groups t-test) for the pairs where each pair consists of the quality data for different price ranges, but the same degree of manufacturing process innovativeness.

Looking at the graph (see Fig. 4.1), we can observe that there is a change in the slope of the lines for the two different price ranges. Indeed, for the Medium-high price range, the slope is steeper than for the medium-low price range, where the slope is fairly flatter. The mean difference for the higher price range is higher than for the low price range (see Table 4.5). Therefore, we can say that both the graph and the means support H_{4b}.

H_{4b}: The higher the price, the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the creative industries

Post-hoc Paired T-Test:

Paired Samples Test							
			Mean	**95% Confidence Interval of the Difference**		**t**	**Sig. (2-tailed)**
				Lower	**Upper**		
Pair 1	Creative Indutries	Low degree of PMP innovat./low price range - Low degree of PMP innov. /high price range	-1,28333	-1,54222	-1,02445	-9,836	0,000
Pair 2		High degree of PMP innovat./low price range - High degree of PMP innov./ high price range	-0,85000	-1,11959	-0,58041	-6,256	0,000

Table 4.7 Post hoc paired t-test for creative industries

The T-test was done for two pairs (1) the perceived quality for low PMP innovativeness with a medium-low price, against the perceived quality for low PMP innovativeness with a medium-high price, and (2) the perceived quality for high PMP innovativeness with a medium-low price, against the perceived quality for high PMP innovativeness with a medium-high price. The outcomes (see Table 4.7) shows that both pairs are significantly different (Sig.= 0,000 and t = -

9,836; Sig. = 0,000 and t = -6,256), additionally, the confidence interval of difference further proves this mean difference between the pairs, as both intervals do not contain 0 in both cases.

Furthermore, considering the outcome of the two-way repeated ANOVA and the subsequent t-test, we can see that H_{4a} is supported.

H_{4a}: The negative direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries remains unchanged regardless of the price range.

4.4.2 Technology-intensive Industries

DESCRIPTIVE STATISTICS				
Variables			**N**	**Mean**
Perceived quality for: Technology-Intensive Industries	Low Innovativeness	Medium-Low Price Range	100	3,600
		Medium-High Price Range	100	4,787
	High Innovativeness	Medium-Low Price Range	100	4,933
		Medium-High Price Range	100	5,720

Table 4.8 Descriptive Statistics for two-way repeated ANOVA for technology-intensive industries

The table above (see Table 4.8) presents the means for the groups taken for the analysis.

Tests of Within-Subjects Effects						
Variables	**Source**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**	**Observed Power**
Degree of perceived manufacturing process innovativeness	Huynh-Feldt	128,444	48,897	0,000	0,331	1,000
Price Range	Huynh-Feldt	97,351	91,465	0,000	0,480	1,000
Degree of perceived manufacturing process Innovativeness * Price	Huynh-Feldt	4,000	9,997	0,002	0,092	0,879

Table 4.9 Within-Subject Effects Test for two-way repeated ANOVA for technology-intensive industries

The associated probability for the quality scores for both, price ranges and innovativeness groups, (Sig.= 0,000 for F = 91,465 and Sig. = 0,000 for F = 48,897) is lower than the significance level (α = 5%) (see Table 4.9). Therefore, there are significant effects from both the price and the degree of innovativeness. Moreover, there is a significant interaction between those factors (Sig. = 0,002 and F = 9,997), yet that explains only 9,2 % of the variation in quality scores.

From the table presented above, it is visible that the observed powers are rather high, and with a value close to 1 that is the maximum value. Therefore, a probability of making Type II error is statistically low, which allows us to be confident with the results (Burns & Burns, 2008).

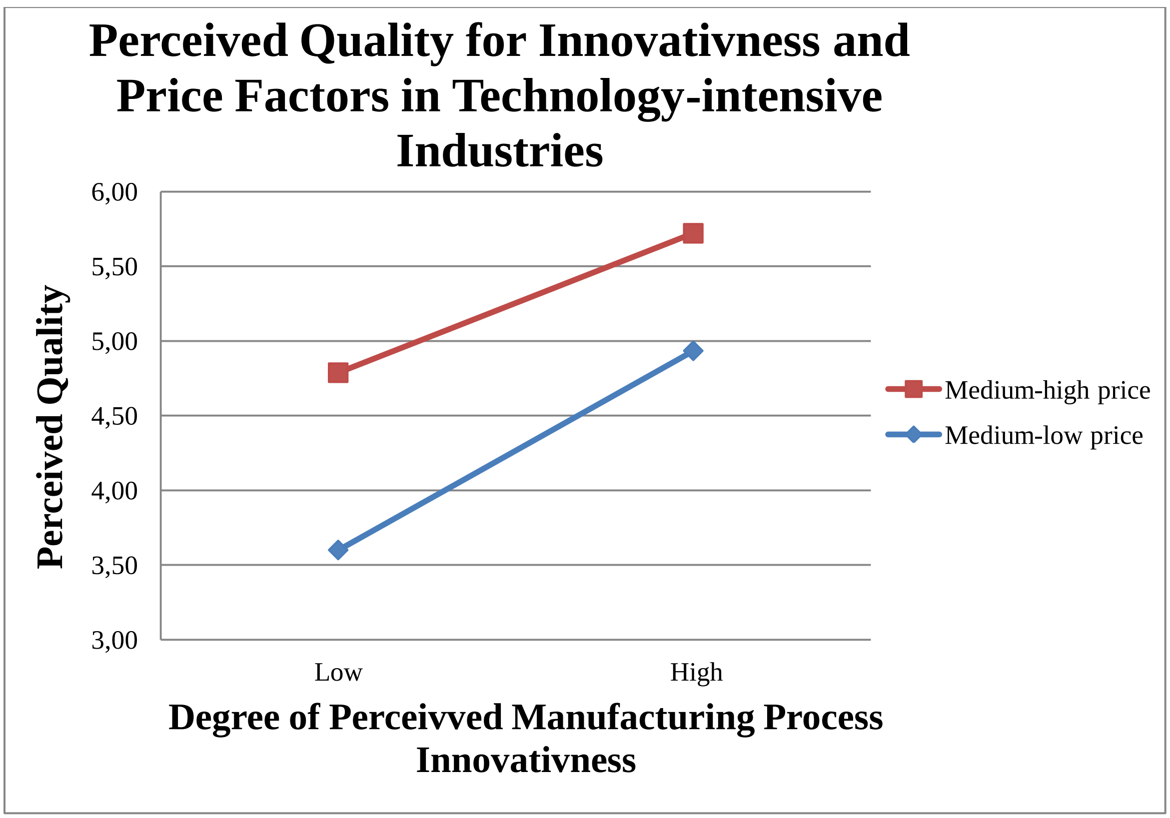

Fig. 4.2 Perceived Quality for Innovativeness and Price Factors in Technology-intensive Industries

The graph above (see Fig. 4.2) shows that the general tendency (the relationship between the innovativeness and perceived quality in technology-intensive industries) is still valid. This is further noticeable in the descriptive statistics table (see Table 4.8.). In fact, we can see that as the price range increases, the mean for the perceived quality decreases, in both low and high degree of manufacturing innovation. However, this needs to be further checked using a post hoc test (in this case dependent groups t-test) for the pairs where each pair consists of quality data for different price ranges, but the same degree of manufacturing process innovativeness.

Looking at the graph (see Fig. 4.2), we can observe that there is a change in the slope of the lines for the two different price ranges. Indeed, for the Medium-low price range, the slope is steeper than for the medium-high price range, where the slope is fairly flatter. The means difference for the lower price range is higher than for, the higher price range (see Table 4.8). Therefore, we can say that the graph and the means do not support H_{5b}.

H_{5b}: The higher the price the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the technology-intensive industries

Post-hoc Paired T-Test:

Paired Samples Test							
			Mean	**95% Confidence Interval of the Difference**		**t**	**Sig. (2-tailed)**
				Lower	**Upper**		
Pair1	Technology-Intensive Industries	Low degree of PMP innovat./low price range - Low degree of PMP innov. /high price range	-1,18667	-1,46999	-0,90334	-8,311	0,000
Pair2		High degree of PMP innovat./low price range - High degree of PMP innov./high price range	-0,78667	-0,97386	-0,59947	-8,338	0,000

Table 4.10 Post hoc paired t-test for two-way repeated ANOVA for technology-intensive industries

The T-test was done for two pairs (1) the perceived quality for low PMP innovativeness with a medium-low price, against the perceived quality for low PMP innovativeness with a medium-high price, and (2) the perceived quality for high PMP innovativeness with a medium-low price, against the perceived quality for high PMP innovativeness with a medium-high price. The outcomes (see Table 4.10) show that both pairs are significantly different (Sig.= 0,000 and t = -8,311; Sig. = 0,000 and t = -8,338), additionally, the confidence interval of difference further proves the mean difference between the pairs, as both intervals do not contain 0 in both cases.

Furthermore, considering the outcome of the two-way repeated ANOVA and the subsequent t-test, we can see that H_{5a} is supported.

H_{5a}: The positive direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries remains unchanged regardless of the price range

4.5 Hypotheses

The table below (see Table 4.11) summarizes the outcome of the data analysis (see section 4.1 - 4.4) in relation to the study hypotheses introduced in the second part of this research.

Hypothesis		Supported
H_1	There is a positive relationship between machine intensity and perceived innovativeness of the manufacturing process	YES
H_2	There is a negative relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries.	YES
H_3	There is a positive relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries.	YES
H_{4a}	The negative direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the creative industries remains unchanged regardless of the price range.	YES
H_{4b}	The higher the price, the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the creative industries	YES
H_{5a}	The positive direction of the relationship between the degree of perceived manufacturing process innovativeness and perceived quality in the technology-intensive industries remains unchanged regardless of the price range	YES
H_{5b}	The higher the price, the more distinct the difference in perceived quality between the degrees of perceived manufacturing process innovativeness in the technology-intensive industries	NO

Table 4.11 Hypothesis results

5 Discussion

This chapter aims to analyze the previously presented results and interpret them, taking into consideration the theoretical background. In this section, we also strive to answer the research questions based on our findings.

5.1 Perceived process innovativeness

As previously explained (see section 2.4), there are limited insights into the perception of the innovativeness in the manufacturing process. Therefore, for developing the main study, it was crucial to research this aspect. The assumption we started with was that the perception of process innovativeness depends on its mechanization (see section 2.5), and it was tested while analyzing H1. Indeed, the high innovativeness is associated with the machine, while low innovativeness is associated with manual labor. This phenomenon confirmed our beliefs and allowed us to use those associations to analyze the effect of perceived innovativeness on perceived quality. Therefore, this outcome depicts the answer for the Q2 (What is the relationship between manufacturing process types and perceived manufacturing process innovativeness?). The machine process is perceived as significantly more innovative than the hand process. In other words, the higher the mechanization of the process, the higher the perceived innovativeness is.

5.2 Creative industries

We indeed live in an era where technology moves fast; hence, factories are going beyond automatization, as they are starting to use advanced technologies like the Internet of Things and artificial intelligence. However, as reported in section 2.1.2, society is also experiencing fast changes moving from an industrial society to an informational society, where consumers appreciate diversity more and focus on the symbolic value that the product has rather than the functional one. Nevertheless, as section 2.5 explains, the product attributes that consumers value the most are based on consumers' beliefs, and these beliefs are different based on the industry category. Furthermore, as Cunningham (2002) reports, when it comes to the jewelry industry (representative for the creative industries), what consumers value the most are tradition, talent, and creativity, which are three fundamental aspects of the handmade manufacturing process (Niedderer & Townsend, 2014).

Therefore, as we previously assumed, when it comes to creative industries, consumers associate a high product quality to a low degree of PMP innovativeness, meaning a handmade process with a low machine intensity. In fact, this was proved when we tested for H_2 (see Section 4.3.1), as the results show that the lower the degree of PMP innovativeness, the higher is the consumers' perceived quality. Furthermore, when analyzing for this relationship adding the price ranges, hence testing for H_{4a} and H_{4b} (see Section 4.4.1), we discovered that as the price range increases does also the perceived quality, for both low and high PMP innovativeness, yet consumers still associate a lower degree of PMP innovativeness with higher quality. In addition, while testing for H_{4b}, we found that when considering the high-price range, the low degree of manufacturing process innovativeness matters even more. This phenomenon can be explained by the fact that there is a significant variation from the medium-low price range to the medium-high, and when this occurs, price tends to play even a more significant role in consumers' perception of quality (Völckner & Hofmann, 2007). This trend is also visible from the graph (see Figure 4.1), where the slope for the Medium-high price range is steeper than the one for the medium-low one. Indeed, this result is in line with the theory on price reported in section 2.6. In fact, a high price range is an indicator of higher quality and higher financial risk, and when the financial risk is higher, consumers also look for other product attributes: in this case, the production process.

5.3 Technology-intensive industries

In theoretical considerations, we stated that due to the belief formation process (Fishbein & Ajzen, 1975), stereotypes, the current industrial situation (Xu, David & Kim, 2018) and the postmodern customer mindset (Tonder, 2003), we believe that the product quality in technology-intensive industries is associated with the high degree of perceived innovativeness. The exact reasoning was that the main value creators for the customers in those industries are safety and quality (Stylidis, Wickman & Söderberg, 2015). Additionally, considering there is a high chance of errors in human work, which may affect those products attributes, the high innovativeness of manufacturing process may enhance the customer's crucial values by minimizing the error factor (Mital & Pennathur, 2004; Myszewski, 2010)

The empirical findings are much in line with the theoretical findings since it is visible that there is a tendency for the customers to judge the quality much higher in the case of high innovativeness than for low innovativeness of the manufacturing process. That was proved by testing for H3. While checking for H_{5a} and H_{5b} (see section 4.4.2), we found that no matter the price, the tendency remains the same, and higher innovativeness of manufacturing is still a preferred driver of perceived quality. However, what we did not foresee in the theoretical discussion is the fact that- surprisingly- it is lower price that makes the innovativeness matters more (see Fig. 4.2). We mistakenly assumed it would be an effect for the higher price due to the financial risk and urge to evaluate different alternatives (see section 2.6) greatly.

The possibility for such an outcome may be that in the case of higher price ranges, respondents associated cars and low innovativeness processes with luxury brands, which are well known for being handmade (Binder & Bell Rae, n.d.; Rovzar, 2016). Those exceptions may not have been strong enough to change the effect, but they make us believe that the manufacturing process type is less important in the high price range. That is, however, only one of the possible explanations of this deviation from the expected results and should be studied in more depth.

All in all, it seems that the immortal Audi's slogan *Vorsprung durch Technik* (Winterkorn, 2005) is valid and successful also from a manufacturing perspective.

5.4 General Discussion

In this study, the main focus is on the relationship between perceived innovativeness of manufacturing process and perceived quality for two industries. Concerning this central point of the study, which is captured in Q1: (What is the relationship between the perceived innovativeness of the process and the perceived product quality?) and Q3: (What are the differences in the relationship between the perceived manufacturing process innovativeness and the perceived product quality based on the type of industry/product?) we found an answer by analyzing the following hypothesis, H_2, and H_3.

The results not only show that there is a relationship between perceived innovativeness and perceived quality, but also that it is visible that there is a rather big difference depending on the type of industry, as it is also discussed in the previous sections (see section 5.2 and 5.3). The type of manufacturing process was overlooked as a perceived quality driver in previous studies. However, it bears an important role when the quality perception is evaluated—also considering the attributes necessary for various products and industries; the process's innovativeness may indirectly influence the perception of quality by changing the character of those attributes. This phenomenon, as it is elaborated in section 2.5 and 2.6, depends, to a great extent, on the associated values connected with the given industry. In line with the theoretical considerations, it was found (see section 5.3 and 5.2) that in the case of creative industries, the lower process's innovativeness is, in fact, perceived as providing the higher product quality. However, the relation was precisely the opposite for technology-intensive industries: the higher the perceived innovativeness of the manufacturing, the higher the quality perceived.

One of the most researched product attributes is price (see section 2.6), even though it is extensively researched, its importance and role vary greatly depending on the other product attributes studied. There are limited insights on what this relationship looks like when putting the price together with the manufacturing process innovativeness. Therefore, our study fills this gap and explores it. At this point, we strive to answer Q4: (What are the differences in the relationship between the perceived manufacturing process innovativeness and the perceived product quality based on the price range?).

We use price as a moderator, and as we can see from the analysis conducted for H_4 and H_5, the price indeed moderates the main effect between perceived quality and perceived process innovativeness. Interestingly, the outcomes are not entirely in line with what we expected from theoretical considerations. The moderation effect differs depending on the industry (see section 5.3 and 5.2), in the case of the creative industries, the price indeed enhances the importance of the process innovativeness while assessing quality. This effect of price shows that the high price intensifies the role of the perception of production innovativeness working as a product attribute for quality judgment, while the medium-low price range shows way lower importance (nearly indifference) when it comes to this product attribute. These findings are in line with the idea that the higher price and, therefore, the financial risk, urge the consumer to pay more attention to other product attributes (see section 2.6). As for the technology-intensive industries, the moderation effect of price is exactly the opposite of the creative industries, which, as explained above (see section 5.3), may be due to the luxury handmade car associated with the higher price range. All in all, there is no single effect of price on the perception of quality and not a singular relationship with perceived process innovativeness.

There is one more interesting finding that came from the data analysis. However, it was not directly studied by us. According to our data, the price's influence on the perceived quality is much more significant for low innovative processes in both industries. That seems to indicate that high price acts as proof of craftsmen's skills and, consequently, product value and quality.

6 Conclusions

This chapter summarizes the main research findings. In the first part, the main insights are reported regarding PMP innovativeness and perceived quality. Following the academic contribution is presented as well as the recommendations to practitioners.

With this research, we aimed at contributing to the studies concerning innovation and quality by understanding the role that the type of manufacturing process has on consumers' perceived quality, analyzing the relationship between the type of manufacturing process- handmade and machine-made- and the perceived degree of innovativeness. In order to achieve this, we conducted the study to understand how the degree of PMP innovativeness affects perceived product quality in two different industries, technology-intensive and creative, focusing on the Center and Western European market.

The findings show that there is a relationship between the PMP innovativeness and perceived quality. Moreover, this relationship differs greatly depending on the industries; for creative industries, the innovativeness negatively influences the perceived quality, while the relationship is positive in the case of technology-intensive industries. On top of that, it was found that price affects this relationship. However, price's effect differs since, in the creative industries' case, it is enhanced for the medium-high price; in the technology-intensive industries' case, it is enhanced for the medium-low price range. It illustrates that the PMP innovativeness should be treated as a product attribute and an argument in the decision-making process. Additionally, the study shows how the same value is attributed to different factors depending on the industry in question; the high quality is attributed to low innovativeness of PMP while in technology-intensive, it is attributed to high innovativeness of PMP.

6.1 Academic contribution

The study had been conducted in order to contribute to previous research on innovation and quality. There are several pieces of research concerning the relationship between innovation /innovativeness and quality (Antunes, Quirós & Justino, 2017; Cho & Pucik, 2005; Hanaysha, Hilman & Abdul-Ghani, 2014; Shi et al., 2018, Boisvert & Ashill, 2011; Lloréns Montes, Ruiz

Moreno & Miguel Molina, 2003; Lowe & Alpert, 2015; Salavou, 2004). However, our study takes a different stance and analyzes this relationship mainly from the consumer's perspective, introducing the concept of perceived innovativeness and perceived quality. The study also differs from previous research, as it emphasizes the manufacturing process by evaluating its perceived innovativeness. We are introducing the effect that price, as an additional product attribute and perceived quality driver, has on the relationship between the PMP innovativeness and the perceived quality. As far as we know, these two factors have never been studied together before; therefore, we aimed to fill several gaps through this study.

First of all, many pieces of research focus on process and product innovation, and not on innovativeness per se when analyzing the relationship with product quality (Antunes, Quirós & Justino, 2017; Cho & Pucik, 2005; Hanaysha, Hilman & Abdul-Ghani, 2014; Shi et al., 2018). For instance, Antunes et al. (2017) research aims at studying the relationship between innovation and quality by taking into consideration process innovation and total quality. They are doing that by defining quality as compliance with the requirements, which differs from the perceived quality, as the latter, mainly reflects the consumer's expectations on a certain product or service. Shi et al. (2018) research focuses on innovation as well, defining innovation as any kind of improvement of products or processes. This research, again, similarly to Antunes et. al. (2017) research, analyzes the impact that technology innovation, both product and process, has on product quality and not the perceived one. Here, we go beyond this by studying the relationship between perceived innovativeness (not innovation) and perceived quality, not actual. Also, through this research, we observe that such a relationship exists and is very significant.

Even though there have been pieces of research that have taken a similar stand as ours by introducing the consumer’s perception, they have done so by either considering perceived innovativeness and actual quality, or innovativeness and perceived quality, but as far as we know, they have never analyzed perceived innovativeness and perceived quality together (Boisvert & Ashill, 2011; Lloréns Montes, Ruiz Moreno & Miguel Molina, 2003; Lowe & Alpert, 2015; Salavou, 2004). In addition, most of these studies, when defining perceived innovativeness, understood it as the degree of newness, and mainly associated it with product or service innovativeness (Lowe & Alpert, 2015; Salavou, 2004), not taking into consideration the manufacturing process. We not only employ the perceived innovativeness of the manufacturing process as a driver of perceived quality, but we also combine two usually separated worlds of engineering and marketing to show their great but often overlooked, interdependence.

Furthermore, previous studies concerning perceived quality took into consideration price, in order to understand its relationship with perceived product quality (Gardner, 1971; Jacoby, Olson & Haddock, 1971; Peterson, 1970; Peterson & Jolibert, 1976; Rao & Monroe, 1989; Render & O'Connor, 1976; Völckner & Hofmann, 2007). These studies have shown the critical role that price plays when consumers are assessing the product quality, taking into consideration price in relationship to other product attributes, such as store and brand name, country of origin, and product category. However, none of the aforementioned studies have elaborated on price as a driver of perceived quality, combining it with the manufacturing process innovativeness.

Therefore, through our studies, we aimed at filling the gaps existing in the field of research regarding innovativeness and perceived quality by introducing the concept of perceived innovativeness and perceived quality. Furthermore, we propose the manufacturing process as an additional product attribute that influences consumers perceived quality. We did so by analyzing how the perceived innovativeness of the manufacturing process affects the perceived product quality in two different industries: creative and technology-intensive. As our analysis shows (see sections 4 and 5), the different types of manufacturing processes lead to a different perception of innovativeness. The perceived quality of the product does depend on the perceived innovativeness of the manufacturing process, and it behaves differently based on the industry. Thus, showing that the manufacturing process is, indeed, a factor that contributes to consumers' perception of quality that can also influence the effect that other product attributes have on perceived quality. In fact, we aimed at combining the manufacturing process with price in order to understand how the relationship between the P PMP innovativeness and perceived product quality changes when the price is introduced—showing that the role of price on the relationship changes based on the price level and industry. While our results show that a high price range strengthens the main effect for one industry (the creative industry), it is not true for the other.

This study is going slightly beyond filling the research gaps; in fact, this study in an unpopular way challenges the common belief of many researchers that engineering and marketing are too different to go together. As a matter of fact, we prove that their combination may be highly beneficial, and with it, we believe in giving to academia some food for thoughts, by showing that the study of a combination of these two areas can be surprisingly beneficial.

6.2 Recommendations for practitioners

This research can provide a new perspective on the interconnection of the manufacturing process and branding in the organization. From a managerial and marketing perspective, it shows that practitioners should start to recognize the type of manufacturing process as a factor that contributes to shaping consumers' beliefs regarding product quality. As a matter of fact, the study has shown that handmade and machine-made manufacturing processes are associated with two different degrees of PMP innovativeness. The former type, handmade, corresponds to a low degree of PMP innovativeness, while the latter, to a high degree. It further demonstrates that a high degree of PMP innovativeness does not always correspond to a high level of perceived quality. This finding is essential from a managerial standpoint since managers can have a better understanding of how to leverage the manufacturing process as a product attribute and a perceived quality driver to increase consumers' perception of quality based on the industry and strengthen brand equity. It is crucial to consider the industry type since it was proved that this relation is strictly dependent on it and varies significantly from one industry to another. Therefore, thanks to a better understanding of the manufacturing process's role, managers can improve perceived quality using the type of manufacturing process as a marketing asset and implement a campaign around it, which will, in return, lead to more substantial brand equity. Rarely does the whole process meets the vision and beliefs that people have in mind. In fact, it is not necessary to communicate the whole process but focus on the elements that are in line with consumers' expectations. For instance, when referring to the jewelry industry, the process may be automated, but if, for example, one of the process' steps is based mainly on human skills, it can be beneficial to market only this step since it is providing higher perceived quality.

7 Limitations and further research

This chapter deals with the circumstances and impediments which defined the final shape of this paper as well as the proposal for further research which may cover what we did not manage to in this study.

The primary limitations, which are, to a great extent, connected with this paper's character, are lack of resources and time constraints, which to a considerable extent, determined the final form of the study, such as the sampling.

There are also several limitations due to the chosen data collection, sampling method, as well as to the scaling technique.

One of the disadvantages of the scale used in the research is that the extremes are subjective, so high quality for one person is not always equivalent to those of the others (Burns & Burns, 2008). However, since we focused on the perception, which by nature bears this risk, the effect of this limitation is acceptable. Another disadvantage of the study is the assumption of equal intervals and the possibility of a *hola effect* (Burns & Burns, 2008). It is, however, a common critique towards the majority of attitude measuring scales. Despite all of that, the measurement scale provides a direct measurement of given factors, and it is very convenient, which makes it one of the most popular scales in the measurement of attitude.

The choice of the method, which was a web survey, also causes several limitations. First of all, it is commonly known that online surveys have low response rates, yet with the chosen sampling method, we can minimize this effect (Fielding, Lee & Blank, 2016). The choice of this tool leads to the exclusion of non-Internet users; however, it is connected with the sampling method limitation, which makes this point less significant (Burns & Burns, 2008; Easterby-Smith, Thorpe & Jackson, 2015).

Furthermore, continuing with sampling method limitations, it needs to be mentioned that outcomes cannot be generalized for the whole population; there is a high probability of researcher bias influencing the sample and high sampling error (Burns & Burns, 2008; Easterby-Smith, Thorpe & Jackson, 2015). These aspects might lead to the study's low credibility (Saunders, Lewis & Thornhill, 2019).

The aspects mentioned above pave the way for further research. Therefore we would recommend replicating the study but using probability sampling, which allows us to generalize the results. Nevertheless, the use of different data collection techniques is also preferable since the one used in this study is not very suitable for probability sampling. Moreover, the study's target was residents of central and western Europe, without a distinction of gender. Developing the study, considering the differences between the various cultures and genders, would also be an appealing idea, as it may provide valuable and more precise insight for both practitioners and customer culture theorists.

Another limitation is derived from the level of significance used for the analysis. In fact, by setting a significant level at 5%, the probability of having a Type II error minimizes. However, there is still a 5 % chance of rejecting a null hypothesis when it is true, hence a probability of making a Type I error (Burns & Burns, 2008).

Moreover, the point of time when the study was conducted was more than unfortunate. The epidemiological situation not only influenced the decision regarding the methodology, as mentioned before, but also the possibility that it may have distorted the results. This is so since the global crisis is an event of a great impact on societies and individuals, which may, especially in the time of its duration, lead to a change in consumers' priorities and values. Considering that, the products introduced in the questionnaire are not of highest priority; the choice which the respondents were to make might have seemed too abstract for them and too irrelevant in comparison to daily struggles and difficulties with purchasing the basic necessities.

Besides, considering the conditions mentioned above, it is especially fascinating to observe the customers' evolution, since the current global crisis may trigger unexpected changes in social beliefs. Those changes may affect their associations and beliefs. Therefore, what is true for current postmodern customers may drastically change in a few years, as well as, it may differ greatly from what would have been observed in the case of modern customers or even further back in time. Therefore we would recommend observing how the studied relationship behaves with time.

The topic of the research (PMP innovativeness/ perceived quality) is extensive and complex, and given that there were very tight resources and time constraints, it was only possible to cover a tiny piece of this area of study. Therefore, based on the findings and general reflections, we would like to propose the potentially interesting study ideas in the field we were researching in this paper.

Based on our findings, it seems crucial to explore a broader range of industries to check how they are affected since, in this very case, the differences between the creative and technology-intensive industries were tremendous. Additionally, we added price as a moderator; in the future, it would be beneficial to cover different product attributes and observe how they moderate the main relationship between perceived innovativeness of the process and perceived product quality.

One of these study outcomes differed from what we expected and predicted from the use of the theory. Therefore, it may be fascinating to explore the price effect on the relationship between perceived innovativeness and quality. It would be valuable to precisely explain the logic behind it, and study luxury car associations in further research.

Moreover, the additional finding regarding the importance of price moderation in the case of low innovativeness of the manufacturing processes should be separately studied to understand the phenomenon, which may significantly contribute to both practitioners and academia.

This study focuses on the manufacturing stage of product development. Therefore, we believe it would be enlightening to consider different product development steps since the processes there may similarly affect the perception of quality, as in the case of manufacturing.

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9 Appendices

9.1 Questionnaire design

Below there is a questionnaire in the printable form of Google forms, please note however that the design and layout is changed, to suit print conditions, in relation to the actual online questionnaire. The design and layout differs from what was accessed by the respondents however questions remain the same and are given in the same order.

MSc International Marketing and Brand Management - Research Survey

This is a survey for the master thesis in MSc International Marketing and Brand Management program at Lund University. This survey will focus on perceived product quality and process innovativeness, in the Automotive and Jewelry Industry. Please note that your answers will be kept anonymous. We kindly ask you to answer in an honest way and read the question carefully. The survey will take around 5 minutes.
Thank you for participating,
Federica Piccone and Joanna Pilawa
* Required

1. 1. Are you 18 or more years old? *

Mark only one oval.

- Yes
- No

2. 2. Are you a resident of a western or central European country? *

Mark only one oval.

- Yes
- No

Perceived process innovativeness

In questions 3 and 4: please specify how you perceive the innovativeness of manufacturing processes that are specified in the questions using a scale from 1 to 7, where 1 is not at all innovative, and 7 is extremely innovative.

In questions 5 and 6: please state your attitude to the statements below on a scale from 1 to 7, where 1 is strongly disagree, and 7 is strongly agree.

3. 3. Assuming that the product is manufactured in a process that is mainly performed by machines, robots and this kind of technology, how innovative is this (machine) manufacturing process?

Mark only one oval.

	1	2	3	4	5	6	7	
not at all innovative								extremely innovative

4. 4. Assuming that the product is manufactured in a process which is mainly performed by humans, how innovative is this (hand) manufacturing process?

Mark only one oval.

	1	2	3	4	5	6	7	
not at all innovative								extremely innovative

5. 5. Machine manufacturing (when the product is manufactured in a process which is mainly performed by machines, robots and this kind of technology) is an innovative process?

Mark only one oval.

	1	2	3	4	5	6	7	
strongly disagree								strongly agree

6. 6. Hand manufacturing (when the product is manufactured in a process that is mainly performed by humans) is an innovative process?

Mark only one oval.

	1	2	3	4	5	6	7	
strongly disagree								strongly agree

Jewelry Industry	Please specify how you perceive the product quality on a scale from 1 to 7, where 1 is low quality, and 7 is high quality. Keep in mind that the used manufacturing process does not influence the design, quantity produced and the material used (e.g: gold, silver, etc.).

7. 7. Assuming that you are planning to buy a watch and you are provided with the information that it is handmade, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

8. 8. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q7)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

9. 9. How would you assess the quality of this product (Product described in Q7), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

10. 10. Assuming that you are planning to buy a watch with a medium-low price range (50-200 EUR), and you are provided with the information that it is handmade, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

11. 11. How would you assess the finishing (surface appearance/final touch) quality of this product (described in Q10)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

12. 12. How would you assess the quality of this product (described in Q10), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

13. 13. Assuming that you are planning to buy a watch with a medium-high price range (>200 EUR), and you are provided with the information that it is handmade, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

14. 14. How would you assess the finishing (surface appearance/final touch) quality of this product (described in Q13)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

15. 15. How would you assess the quality of this product (described in Q13), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

16. 16. Assuming that you are planning to buy a watch, and you are provided with the information that it is machine-made, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

17. 17. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q16)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

18. 18. How would you assess the quality of this product (Product described in Q16), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

19. 19. Assuming that you are planning to buy a watch with a medium-low price range (50-200 EUR) and you are provided with the information that it is machine-made, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

20. 20. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q19)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

21. 21. How would you assess the quality of this product (Product described in Q19), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

22. 22. Assuming that you are planning to buy a watch with a medium-high price range (>200 EUR), and you are provided with the information that it is machine-made, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

23. 23. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q22)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

24. 24. How would you assess the quality of this product (Product described in Q22), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

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Please specify how you perceive the product quality on a scale from 1 to 7, where 1 is low quality, and 7 is high quality. Keep in mind that the used manufacturing process does not influence the design, quantity produced, the material used, and the brand.

25. 25. Assuming that you are planning to buy a car, and you are provided with the information that it is handmade, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

26. 26. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described Q25)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

27. 27. How would you assess the quality of this product (Product described Q25), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

28. 28. Assuming that you are planning to buy a car with a medium-low price range (10,000-30,000 EUR), and you are provided with the information that it is handmade, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

29. 29. How would you assess the finishing (surface appearance/final touch) quality of this product (Product describes in Q28)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

30. 30. How would you assess the quality of this product (Product described in Q28), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

31. 31. Assuming that you are planning to buy a car with a medium-high price range (>30,000 EUR), and you are provided with the information that it is handmade, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

32. 32. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q31)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

33. 33. How would you assess the quality of this product (Product described in Q31), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

34. 34. Assuming that you are planning to buy a car, and you are provided with the information that it is a machine and robot made, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

35. 35. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q34)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

36. 36. How would you assess the quality of this product (Product described in Q34), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	◯	◯	◯	◯	◯	◯	◯	High

37. 37. Assuming that you are planning to buy a car with a medium-low price range (10,000–30,000 EUR), and you are provided with the information it is machine and robot made, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	⬭	⬭	⬭	⬭	⬭	⬭	⬭	High

38. 38. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q37)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	⬭	⬭	⬭	⬭	⬭	⬭	⬭	High

39. 39. How would you assess the quality of this product (Product described in Q37), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	⬭	⬭	⬭	⬭	⬭	⬭	⬭	High

40. 40. Assuming that you are planning to buy a car with a medium-high price range (>30,000 EUR), and you are provided with the information that it is machine and robot made, how would you assess the quality of this product?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	⬭	⬭	⬭	⬭	⬭	⬭	⬭	High

41. 41. How would you assess the finishing (surface appearance/final touch) quality of this product (Product described in Q40)?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	⬭	⬭	⬭	⬭	⬭	⬭	⬭	High

42. 42. How would you assess the quality of this product (Product described in Q40), considering your view on the probability of product defects?

Mark only one oval.

	1	2	3	4	5	6	7	
Low	⬭	⬭	⬭	⬭	⬭	⬭	⬭	High