Creative, entrepreneurial, and branding strategy for a novel jewellery line

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SCHOOL OF ECONOMICS, BUSINESS ADMINISTRATION & LEGAL STUDIES

A thesis submitted for the degree of
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Thessaloniki – Greece
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INTERNATIONAL HELLENIC UNIVERSITY

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This dissertation was written as part of the MSc in Strategic Product Design at the International Hellenic University.

I hereby declare that the work submitted is mine and that where I have made use of another’s work, I have attributed the sources according to the Regulations set in the Student’s Handbook.

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Abstract

Jewellery is considered to be the epitome of beauty and luster. Thousands of years ago, man was creating unique jewel pieces, on the basis of ornamentation of the body, demonstration of social status and expression of socio-economic and cultural aspects of their life. Forms depicting nature, scarce or everyday materials, processing methods and fabrication techniques of the past, are still in practice today, and if combined with contemporary jewellery practices, the results present opportunities for design innovation. Technology-enhanced jewellery is entering the market, gaining market share and positioning themselves next to widely-known branded enterprises. The Millennials seem to respond positively to this technological call, showing interest towards augmented jewellery pieces that offer enhanced features when compared to mere adornments. This new era encourages innovative concepts and searches for the features and the ways that will become a game-changer within the jewellery industry. This research is looking for innovation in all sectors involved in the creation of jewellery, from its history and the trends, to the designing process and the technology that affects parts of the design. Smart jewellery is a wearable with a more aesthetic and quality taste, pairing with technological tools, to please the discerning and demanding user of today.

Keywords: innovation, smart jewellery, aesthetics, technology, design

Aikaterini-Despoina Mavromoustakaki

09/03/2018
Preface

This dissertation is investigating the challenges and opportunities in the market, by introducing innovative and creative concepts in contemporary jewellery design. It has been written as part of the MSc in Strategic Product Design at the International Hellenic University (IHU). It includes a literature review, which informs the reader about the manufacture of jewellery, contains observations and interviews with experts to complement the bibliography, and is completed with the generation of three concepts that explore innovation through original design. Following my studies in Architecture and MSc in Strategic Product Design, I am willing to combine the knowledge gained and give new “flair” to the family business.

Lastly, I would like to express my appreciation to the people who supported me and helped me complete this dissertation. I would especially like to thank Mrs Symeonidou Ioanna, who supported me throughout this dissertation. Demanding as she should- a sample of her high expectations- she managed to elicit my most creative self. Special mention should be made to my parents, Mano and Voula, for their encouragement, the motivation and the information they provided, as well as for their support over the years of my studies and life. Furthermore, I would like to thank Dimitri for his encouragement and assistance, and all my colleagues, yet friends, who responded willingly whenever I needed them.
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1. INTRODUCTION

1.1 Research motivation

General

The aim of this thesis is the search for innovation in the jewellery sector. Particularly, addresses the fundamental aspects of goldsmithery, explores the multiple roles of innovation in jewellery making and design, and analyses the different scopes that meet this subject.

The initial motivation for this thesis, derives from the strong interest for this sector. It is undeniable that women have always had a special bond with jewellery and desired to own plenty of jewels. There are many historical reasons for this behaviour, which will be analysed in the following chapters, however anyone can interpret it, superficially leastwise, if they bring to mind the famous 50’s Marilyn Monroe song “Diamonds are a girl’s best friend”. It is therefore quite interesting to explore this sector from the eyes of the designer, with the particular twist of searching for innovation, rather than discovering the reasons for this intense enthusiasm or the value of it.

Personal

The personal incentive for me to be engaged in the writing of this thesis, is the family jewellery shop. The small-sized business, run currently by my father and previously by my grandfather, is awaiting to change hands and welcome new ideas, in order to be developed. The motivation stems from the interest in history, the need to create and the appetite to continue this work, with skills that our ancestors did not have. These are found in the industry of marketing, a formidable ally, which the era demands. Thus, it is strongly believed that innovation will highly benefit the family business. The shop has already a clientele of older people, which has decreased due to the socioeconomic crisis that has affected all the small and medium-sized enterprises. So, in order to improve its
position in the industry, has to redefine its target group and its already existing products, or enrich them with modern creations to meet new customer needs. Younger people are the main target group, and those clients’ desires are the ones that need to be satisfied. This highlights the need for a higher adaptability to change and fashion, and also underlines the necessity of insertion of technology into new creations, as it is now an integral part of today people’s lives. All the results of these research will be used accordingly, in order to bring new customers to the Jewellery shop, and at the same time expand the business through a new brand. This will hopefully lead, some years later, to exports in Europe, and why not internationally.

1.2 Scope

One of the most challenging, yet interesting, intentions of this thesis is to analyze the subject from many perspectives. The interdisciplinary approach is supported by the need of a comprehensive view on the subject of study, drawing information from different fields, thus avoiding information gaps.

Figure 1 Exploring innovation through different scopes.
Consequently, innovation is going to be explored through a mix of different scopes, as seen in Figure 1. The design of a jewellery line and its aesthetics are going to be tested, in order for innovative features to be found, the ones that upgrade the everyday jewellery piece into an indispensable product. The manufacturing methods will also be analyzed, distinguishing the techniques used for both the creation of the original designs and the construction of the final product, as well as the materials used. Last but not least, the market will be examined, as it offers great opportunities, which if combined with the consumer behavior and their needs, innovative ideas can be born.

1.3 Research questions and objectives

Although the thesis is treated as a single subject, with continuity and flow, it contains distinct chapters that answer clear questions. These research questions, which are crucial to be easily recognized as they are related to the essence of this research, are the following:

- What makes jewellery innovative, which are the features that make it possible and how is this carried out?
- Which are the necessary steps in order to design a jewellery line?
- How can technology affect current practices of the design and the fabrication of jewellery?

This research addresses these questions, as the pre-understanding of the subject formulates the methodology of the research and allows it to evolve and be built. Moreover, research objectives are pursued, which assist in organizing the structure of the thesis and remaining specific throughout the research. Some of them are:

- How the evolution of jewellery has been perceived through the centuries and how it relates to nowadays?
- How techniques affect form and shape?
- Technology for creation, or technology in creation?
- Is the market ready to welcome an innovative smart jewellery line?
- How is the market interpreted by the wholesalers and the suppliers?
All these questions aim in exploring and studying various topics and sectors, in order to complete this research.

1.4 Methodology

This thesis employs different methods of material collection. The initial bibliographic research gathers information on the subject matter. Certain gaps left by the literature, qualitative research methods are followed, which shed light on aspects of the market that bibliography cannot clarify, and concerns both the suppliers and the consumers’ behaviour. Furthermore, a research by design is implemented, investigating possibilities through design practice. Summarily, these are:

- Literature
- Qualitative research methods
- Design

These methods are used to collect information, thereby gaining a deeper understanding of the topic and drawing conclusions that can both be used for direct application and future research.
2. LITERATURE REVIEW

An introduction to the history of jewellery is deemed necessary, as the readers will be able to introduce themselves to this industry, whether they are familiar with the subject or not, and have a better understanding of the intentions and the point of view of the writer. The initial motivation of the current study will also be formulated, since it is important that a driving force be present, in order for someone to succeed.

2.1 Brief history of Jewellery

Jewellery has always been part of people’s lives. It existed at the very dawn of our species, more or less two million years ago. Prehistoric, 130,000 years old white-tailed eagle talons, conjectured to be forming a pendant, were discovered in Croatia (Figure 4). Findings, dating to 75,000 years ago testify that prehistoric people processed everyday materials to create pieces of art. Ornaments, such as shell beads, represent some of the earliest objects of this kind (Bouzouggar, Barton, & Marian Vanhaeren, 2007). Examples of red ochre coloured and perforated Nassarius gibbosulus shell beads from Grotte des Pigeons, Taforalt\textsuperscript{1}, Morocco in North Africa, confirm the assertion that these were used as ornamentation. These pierced shells are believed to be a sign of evolution of the human being and social development, as the fact of the production of jewellery and art in general, indicates that those people were capable of making analogies and thinking symbolically (Ravilious, 2007). It is possible that the ornaments showed the individual’s place in society and where they belonged. “Beads are tangible evidence of a concept of self,” John Bower said, an archaeologist-paleoanthropologist at the University of California, Davis, and added, "You're not going to decorate yourself if you have no concept of self” (Mayell, 2004). These exact words are taking us to the

\textsuperscript{1} It is the oldest known cemetery in the world. There were found human skeletons dated to the Epipaleolithic years, there was also evidence for Iberomaurusian occupation almost 15,000 years ago and Aterian occupation as old as 85,000 years.
present, where people are realized socially through the act of sprucing up, loading their bodies with Jewellery and creating a “golden” self to look up to. They wear bracelets, earrings, they pierce themselves, they tattoo their bodies and they care about their external appearance. There’s a message being put out. This may be one of the reasons why people, regardless of gender, age, colour or belief, tend to beautify themselves one way or another, so that they discover how their self is completed within society.

Jewellery has been identified in all periods of human existence. Chlorite bracelet, around 40,000 years old, considered to be the oldest stone bracelet in the world, was discovered in Siberia (Figure 3) (GemSelect.com, 2015). An obsidian necklace, around 7,000 years old, was excavated at Arpachiyah, today’s Iraq (Figure 2) (Carol, et al., 1986). These findings show that, from Paleolithic history to modern times, our ancestors were not as simple as was previously thought and that jewellery was part of their social lives.

However, this type of art did not flourish equally across the world. Even though the exact regions cannot be fully defined, it can be said that Western Asia, the Mediterranean and North Africa played the most important role in the evolution of Jewellery making and the spreading of it. It is clear that jewellery had both decorative and amuletic (Carol, et al., 1986). This means that it was used in order to beautify the human, make amulets, as well as define social status. The latter purpose can be justified from the value the jewellery can get, as scarce materials used for the construction, could be obtained by wealthy people or people of power. But this was not always the case.

![Figure 3](image3.png) 40,000-year-old stone bracelet was unearthed in the Altai region, Siberia in 2008. Photo: Vera Sainitskaya

![Figure 2](image2.png) Obsidian necklace with cowrie shells from the Red Sea or Persian Gulf with traces of red pigment on them and one label shaped slate pendant.
Jewellery was also transformed into an element of differentiation. Pirates wore jewellery to show power, rulers to make an impression, rich merchants to get closer to both pirates and rulers. Gold jewellery was also worn by the poor so that they mock their poverty (Chourmouziadis, 2003).

This can be transferred into today’s beliefs and habits. Energy stones and lucky brooches protect their owner, diamond rings and expensive watches offer a great fit in high society and its privileges while sparkling earrings and golden necklaces accompany the woman’s “well-treated” face before a night out. Although nowadays, people with a low income, tend to show interest in possessing jewellery and especially gold, because of its value over time and its potential use in case of financial need. “During and after the financial crisis, people bought gold out of fear,” says the Chief Executive of Pro Aurum Robert Hartmann (Hartmann, 2017).

Furthermore, thousand years ago, people used minerals and materials, like obsidian\(^2\) and cowrie shells, to create the ornaments. Once metalworking techniques had been

\(^2\) It is a naturally occurring volcanic glass formed as an extrusive igneous rock.
discovered, gold became a much-desired element. This indicates that according to each era (Stone Age, Bronze Age, Iron Age, Historical periods), people constructed objects for both utilitarian and decorative reasons, like Sumerians, who built weapons, utensils and ornaments, and also made great progress in settling a social order (Carol, et al., 1986). This is very interesting, as it is observed that since Palaeolithic times, there was the concept of structure, in many fields, which allowed its expressers to create culture. Various cultures that were developed, such as Badarian culture in Egypt, Minoan culture in Crete, Greece, and one of the most stable cultures of the ancient history in Mesopotamia, established the Jewellery trade and at the same time influenced neighbouring peoples.

Jewellery history is observed alongside history of art, war, architecture and essentially has marked entire historical periods, not only in Prehistory and Ancient history as mentioned above, but also in Post-classical and Modern history. In early modern era, jewellery had superstitious aspects. Magic was part of people’s lives and jewellery was thought to attract supernatural events and have magical properties. Gemstones and metals had magical and therapeutic context, especially when attached to the human body, and were added in a framework of astrology and alchemy (Auble, 2001). Medieval jewellery showed the social status and the wealth of the wearer, depicting themes of religion, love and magic, whilst embellishing and lavishing cloaks, coats and other types of garment (Campbell, 2009). During the Renaissance, jewellery took a more artistic dimension, creating jewels with forms of mythical creatures and ships. The evolution of fine art and the rapid growth of technology brought along new gemstones, and these periods were considered as beautiful, elegant and mysterious. It is important that it be mentioned that jewels were categorized into creative and traditional, based on social structure and culture (Evans, 1989). In the Victorian Era, affected by Industrial Revolution, mass production flourished, changing, of course, the construction techniques and the materials used. Art Nouveau, Art Deco and Modernist jewellery introduced organic forms, more delicate pieces and geometric shapes, respectively, leading to Modernist and Contemporary creations, which show a particular interest in history (Skinner, 2013). The latter era includes all the expertise and the materials used
over thousands of years, which are incorporated into modern techniques, discussed later on.

2.2 Design process

History can definitely teach the aspiring goldsmiths and provide them with the skills needed in this industry. Examples of prehistoric, medieval and contemporary pieces can be an inspiration to them, generate ideas and have an overall impact on somebody’s work. Nevertheless, history is not enough. In order for someone to be a great goldsmith, they have to know about the materials, the existing and new techniques, how to handle the tools available, and so on. Yet, if someone wants to be a great jeweller, they should know all the above, and also be aware of the design process and the market. A jewellery piece passes multiple levels until it reaches the final result. Thus, it is important that they set a plan and have an established process (Aspelund, 2010). This does not mean that the process is linear as seen in Figure 5, as most stages are repeated along the way. Inspiration usually comes first, by stimuli in the field or any other form of art. It is about building a relationship between the personality of a person and an idea. When these two combined, a concept is conceived. This starts to grow, while the person is identifying the design problems they want to resolve.
Then, the designers observe, examine and question the basic principles they have set, in order to be led to the final decisions, be able to define the anatomy of the concept and create the prototype. This model is under processing, as all the previous stages will be repeated and a lot of the prototypes will be either rejected or revised. The communication of the final product exists in both stages before and after production, and it depends on the nature of the product and the business.

This is the case for a jewellery piece or a line. A jeweller has to be familiar with the materials used in this sector, the jewellery functions and forms, and the designing and manufacturing methods. They also have to search the market, know their competitors and position their products in such way as to achieve maximum sales.

2.3 Searching for innovation

In a world dominated by the pessimism of habit, is there a more revolutionary act than that of innovation-vision? These are the driving forces which motivate people’s minds and urge them to think in new ways, breaking the stereotypes. Innovation is an act of vitality, a way of life. The International bibliography has shown that innovation-based enterprises have succeeded. This is also the case in the jewellery sector. However, in order for a business or a person to innovate and at the same time achieve their goals and be sustainable, they must first analyze the market and be aware of the existing materials, patterns, techniques and fundamental principles of the profession, before attempting the next step. The following chapters aim precisely at this analysis, creating the base for this project.

2.3.1 Functions and Forms

Functions

There is almost no surface of the human body that man did not want to adorn, by adding pieces of art, which shows each time the aesthetic point of view of the user. In Table 1, it is all the information gathered, which shows concisely what is explained descriptively below.
Particular emphasis is given to the face, where the most communicative human centres are located (Figure 6). Earrings and necklaces are observed to beautify the aspect of a woman, while nose, eyebrow and even mouth piercings are probably the first elements that one will notice on their interlocutor (Figure 7). Kayan women, wearing neck rings, are a great example of people wearing jewellery for a totally different reason than the ones mentioned above. They strongly believe that the rings are meant to connect them to “the memory of their Dragon Mother”, as Mu Ree Khoo Thwe says, an educated Padaung woman, and not protect them from tigers or slave traders (Theurer, December 2014).

Similarly, hand area is also adorned, which is located in comparison to the legs, closer to the face (Figure 8). Therefore, it is not surprising that since the beginning of human existence, the use of bracelets and rings is widespread. A simple handshake, a hand-wave, the motion of hands while people are walking or talking, awkward movements of people touching their face or hair when feeling uncomfortable in public, even when

---

3 Kayan people, a sub-group of Karenni people, is an indigenous tribe, Tibeto-Burman ethnic, minority of Myanmar.
someone is smoking a cigarette or signing a document, are acts that can be accompanied by jewellery and may demonstrate pageantry.

It is commonplace to adorn the area of nipples, belly and external genital organs (Figure 9), a practice also used in ancient civilizations. Australian aboriginal men used to insert small stones into incisions of their genital organs (Brown, 2001).

Furthermore, jewellery like bracelets and rings are also worn on ankles and toe fingers respectively. This is highly practised in India, as the latter ones are used for the revitalization of the productivity organs, or as a marriage symbol, or even for balance and health, which are promoted through the pressure of the rings on certain nerves running up the body (Subbarao, 2007).

Except for the body, people showed interest in the decoration of their clothes, by making pins and cufflinks. They even designed golden buttons or other details that demonstrated the level of social welfare. The watch is also considered to be a piece of jewellery. The first watches made its appearance around the mid-1500s, a period that in the horological industry was one of great advancement and innovation (Thompson, 2008). People used to engrave personal details of the owner on it and such techniques are still commonplace. There are three types of watches, the wristwatch, the pendant and the pocket watch. Moreover, jewellery can be associated with small pieces of art,
placed on furniture as decoration of the surrounding space, which will match the aesthetic tastes of each owner.

Furthermore, it has to be mentioned that jewellery is still used in order to honour someone. In the ancient times, served as an offering to the gods and the dead (Chourmouziadis, 2003) (Oliver, 1966), a custom that has not changed as much today. Still in the 21st century, people tend to offer golden figurines of babies to the church, so that a woman can become pregnant, or golden plates engraved with human limbs so that the people offering them overcome an illness or a problem associated with the special design.

Moreover, gold medals have always been used to honour human abilities, something that can remind the reader the case of the Olympic Games.

<table>
<thead>
<tr>
<th>Functions</th>
<th>Fragmentation into sub-operations</th>
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<tbody>
<tr>
<td>1. Adornment of the Body</td>
<td>face (earrings, eyebrow, nose and mouth piercings, necklaces)</td>
</tr>
<tr>
<td></td>
<td>core (nipple, belly button and genital organ piercing)</td>
</tr>
<tr>
<td></td>
<td>limbs (hand and leg bracelets and rings)</td>
</tr>
<tr>
<td>2. Provide the time</td>
<td>watch (wristwatch, pendant, pocket watch)</td>
</tr>
<tr>
<td>3. Decoration of the clothes</td>
<td>pins and cufflinks</td>
</tr>
<tr>
<td>4. Decoration of the Space</td>
<td>pieces of art</td>
</tr>
<tr>
<td>5. For amuletic purposes</td>
<td>amulets for fortune and relief from problems and illnesses</td>
</tr>
<tr>
<td>6. For Commendation</td>
<td>medals</td>
</tr>
</tbody>
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Table 1  The main functions and uses of jewellery.

Forms

Jewellery can have practically infinite depictions. The imprinting of nature is quite typical and the use of patterns of flowers, fruits, trees and leaves, is frequently observed, or even celestial representations, such as the sun, the moon, clusters of stars and so on. Greek jewellery consists mostly of representations of gods, animals and plants, as it is
highly naturalistic (Pinckernelle, 2005). Animal depictions, such as bees, lions and snakes, are also a significant part of jewellery design. All these had a special symbolic weight and were not just decorative objects. Jewellery was transported as an element of differentiation, of worship of the gods and the dead, and discern authority (Chourmouziadis, 2003). Except for all the aforementioned purposes of jewellery, like adornment and showing power, it began to refer to arcane matters and became precious and expensive symbols. These are still recognizable and widespread, as the depictions of linear shapes and symbols, as the cross, the meander, triangles, circles, double axes, the swastika, etc. (Chourmouziadis, 2003).

2.3.2 Materials

There are a plethora of materials used in jewellery making. As it is already mentioned, obsidian, sea-shells and river-shells were some of the first ones used since Paleolithic times, while the use of materials like bone, stone, glass and clay, flourished later on (Chourmouziadis, 2003). Much later, minerals like copper and silver were distinguished for their durability, but they were even more demanding in their processing. They kept their shine and did not interact with the oxygen of the atmosphere, as did the iron (iron oxidation). They were also used metal alloys, which had different characteristics than the original metals, in terms of colour, hardness, etc.

Gold is another material used broadly in jewellery making, which is of particular interest for study. It is a notably soft metal (ductile and malleable) so its use in pure form is not a common practice. Thus, mixing it with bronze, provided the goldsmiths with the desired hardness, whilst mixing it with copper, except for its hardness, it is observed a reddish appearance because of the red colour of the latter (Drandaki & Drandakis, 2009). Also mixing it with palladium gave gold a white tint. These proportions could also vary, depending on the desired result, which is reflected in the carats or grades of the gold in the alloy. Gold had and continues to have a lot of uses; artistic, cultural, economic and industrial. In the past, it was used as a medium of exchange and was traded all over the world (Merah, 2016), and it still does in a broader sense. Nowadays, gold has many applications, is unsurpassed for jewellery, is a high-tech conductor of electricity, and has
medical applications in dentistry and in treating diseases from arthritis to cancer (Kosares, 2004).

Nonetheless, it is not just the noble metals used in jewellery. Steel, titanium, and the much more expensive platinum, play an important role in the business. It is worth mentioning that platinum is a distinct metal from white gold, since the first one is a metal itself, in opposition to white gold, which is an alloy of other metals.

As far as the materials used in jewellery making are concerned, special mention should be done for the stones. First of all, the mineral stones are the most valuable ones. Their commercial value is the result of many factors, such as their rarity in nature, their rarity at a certain moment in the market, their fashion, their special characteristics and so much more (Karamalis, 1999). At the top of the preciousness scale the diamond (adamas = indomitable) is classified, a rare stone with a superior hardness\(^4\) (10) among the materials found in nature (it even carves the steel), with a wonderful glow after its proper processing. On the precious stones, are classified the ruby, and the sapphire, a stone with great hardness (9) and enough rarity, one of the most beloved ones, diachronically. Furthermore, the emerald, with its warm green shading, is preferred by buyers, while the aquamarine stone competes against it on price. The tsavorite is also an exceptional green gemstone, which took its name from the Lake Tsavo in Kenya.

Moreover, there is a number of gemstones that the inexperienced audience is not so familiar with, like the kunzite and the morganite, in shades of pink, and also on the verge of precious and semi-precious stones, there is the tourmaline, in a variety of colours (Codina, 2002).

\(^4\) The Mohs' scale of mineral hardness is a qualitative ordinal scale characterizing scratch resistance of various minerals through the ability of harder material to scratch softer material. The hardest on the scale is the diamond (hardness 10) and, in practice, it is engraved only by another diamond.
The semi-precious stones follow, with their most popular representatives being the amethyst, the topaz, the citrine, the heliodorus, the agate, the malachite, the jasper, the turkuaz, the coral stone and so many more. The amber (electron) is also very popular, as it is known for its magnetic and healing properties. In general, there was no material that had a non-crumbling behaviour that was not used in the jewellery business. A great example is a seal that since ancient times its use has been widespread. In fact, characteristic designs were featured on them to certify the identity of the owner. In contrast with the precious stones, the pearls are derived from organisms formed in molluscs and are used extensively in jewellery making (Codina, 2002).

Lastly, there are a lot of materials, like the concrete, which have not been used in the art of goldsmithing until today. The use of cement and materials like that, which seemingly do not match the preciousness of fine jewellery and do not share the same excellence and glossiness, is showing growth in the last years, having remarkable results.

2.3.3 Material Processing

There are as many forms of processing, as the materials are. This means that each material needs its own treatment. However, due to the nature of the work, this chapter needs to be simplified and divided into categories.

The precious and semi-precious stones used in jewellery, when mined, are not in the form that people are accustomed to seeing them. They are usually minerals, dull and opaque, which in no way resemble the final result. This process is undertaken by specialized craftsmen, who cut and grind the stones according to precise specifications, which result in different types of cutting. An example of this is the diamond, which according to the type of cutting is divided in: brilliant cut, emerald, pear, baguette, etc. (Drandaki & Drandakis, 2009). Then follows polishing that optimizes the result. There are also stones, such as sapphires and rubies, which, by baking in special ovens that develop high temperature, improve their colour that becomes deeper and fuller. Pearls and other soft stones, like corals, turquoise, etc. are also processed, but in a much more mild way. Brushes only are used to polish the pearl, as it is ranked 2.5-4.5 in Mosh scale
and is sensitive and easily scratched (Karamalis, 1999). Mineral stones are cut, either by hand, using a wheel with a diamond tip, or with modern technologies (laser cutter).

<table>
<thead>
<tr>
<th>Categories</th>
<th>Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Precious &amp; Semi-precious stones</td>
<td>cutting, grinding, baking, polishing</td>
</tr>
<tr>
<td>2. Mineral stones</td>
<td>grinding, laser cutting</td>
</tr>
<tr>
<td>3. Pearls</td>
<td>polishing</td>
</tr>
<tr>
<td>4. Metals</td>
<td>centrifugation, mixing, welding, annealing, melting, separation, cutting, piercing, shaping, finishing, etc.</td>
</tr>
</tbody>
</table>

Table 2 Categories of materials and the material processing

Regarding the metals, and as seen in Table 2, there are a lot of procedures used in metal processing. The first processing is performed with the use of chemicals or other methods (e.g., centrifugation), which achieves the removal of other substances, leaving the metal in its original form. The goldsmiths, once they receive it pure, mix it with other metals that either increase its hardness or provide it with the desired colour. Depending on the composition of the mixture, the carats of the alloy is calculated. Among others, the finishing is the final process, whose result is what the customer is going to receive.

2.3.4 Design

In the last years, there has been an increase in Greek jewellery designers and most importantly, it is possible for them, to promote their work and communicate their creations to the customers. The "A Jewel Made in Greece" exhibition⁵, which was launched as an idea and was implemented in 2014, is an example of a set of intentions of Greek designers to promote Greek jewellery in Greece and abroad. This team of partners, better said, were hosted in November 2017 by the Museum of Arts and Design (MAD) in New York, an act that shows particular interest in Greek jewellery

⁵ http://www.ajewelmadeingreece.gr
internationally, and at the same time, cooperation and collectivity on the part of Greek designers.

Nowadays, jewelers have started using technology for their benefit, even though they never reject the traditional way of drawing by hand. So, there are two ways to approach the designing phase, the analog and the digital, but most of the times, a combination of the two is preferred.

**Analog**

Drawing by hand is the most common practice, as it is direct and both mind and hands are working. Requires concentration, knowledge of drawing techniques, and the designer must have a perception of scale and perspective. International brands, like Van Clefs and Arpels, Dior and Graffs, present their work in high-quality drawings.

**Digital**

Three-dimensional software and computer rendering, on the other hand, facilitate and serve the designers, as automated methods save them time. There are commands with predefined actions that create realistic models of products. Programs like RhinoGold, which is actually a plug-in in Rhino⁶, Matrix, 3Design, Zbrush, Blender, etc. allow the seller to present to the customer the final product. The 3D model is open to many changes and the result is more understandable to both the creator and the consumer.

**2.3.5 Manufacturing Methods**

Pro rata, the aforementioned separation also exists at the construction phase. There are efficient craftsmen, who undertake the creation of jewellery pieces, using different kinds of methods, and there is also a trend towards the three-dimensional printing.

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⁶ Rhinoceros is a 3D computer graphics and computer-aided design (CAD) application software, used in architecture, product design, industrial design, jewellery design and so on.
Analog

a. Handmade

The first and most interesting work is that of handmade. The jeweller uses a cylinder machine, which converts the piece of metal into sheets and wires (the metal passes through successive holes of an iron plate) until the desired thickness is achieved. These wires may have a circular cross-section (achieved by passing the metal through the holes) or square (with a successive passage of the wire through the cylinder rails). Then, it is up to the creator’s talent and skills. The wires or sheets are heated slightly to soften, and the craftsman bends, stretches, cuts and welds the metals, according to the plan (Drandaki & Drandakis, 2009). This process results in small imperfections or small strokes that distinguish this handmade piece from another one manufactured, with the fidelity of a photocopy. This encompasses the moment and the particularity of the construction.

b. Lost waxing casting

Casting is the most common technique, and because of the low cost of production, and low cost of equipment (machinery) offers great flexibility. By this procedure, from a prototype are produced copies in wax or other resin, and practically thousands of copies of an item can be made (Sias, 2005).

Digital

Nowadays, it is a fact that both analog techniques can provide the jeweller with great results. Notwithstanding the foregoing, 3d printers have invaded people's lives and are the most modern way to build the desired product. There are 3D printers that print directly in gold, silver and platinum, using DMLS\textsuperscript{7} \ SLM additive manufacturing\textsuperscript{8}. A very

\textsuperscript{7} Direct metal laser sintering technology (DMLS) (Salmi, et al., 2012)

\textsuperscript{8} Sophisticated rapid manufacturing that can create parts directly without the use of tooling (Herderick, 2011).
fine metal alloy powder is melted with a laser, to produce a design layer by layer, which method nevertheless, is overwhelmingly more expensive.

**Combination of the two**

To create a 3D printed object in gold, as cost-efficient as possible, the preferable method is the lost wax method. When traditional jewellery making meets 3D printing, the result can be distinguished by superior detail, precision and a smooth surface (EnvisionTEC, n.d.). The prototypes are 3D printed and either the wax or resin models, are used to make a plaster mold for casting (Goodship, Middleton, & Cherrington, 2016). Then, the process is analog and does not differ from the lost waxing casting technique mentioned above.

**2.3.6 Contemporary jewellery design practices**

On the verge of a digital era that demands an ever-increasing use of computer capabilities, the man adjusts, redefines oneself and innovates. Pervasive computing meets this exact trend, embedding microprocessors into everyday objects, so that they communicate with the user and perform various tasks, minimizing the need for computer interaction. These objects can be portable devices. However, ubiquitous computing as otherwise called, dictates something more. Thus, a turn is observed towards wearable devices, which is reinforced over the years. Wearables⁹ are accessories with a dual role, satisfy both aesthetics and functional technology (Silina & Haddadi, 2015). Practically, a wearable can be a piece of jewellery or a gadget, which serves the user by giving a solution to a problem-need and, alongside, offering pleasure and happiness while wearing it. This means that jewellery is in the process of undergoing a profound and rapid digital change. So, design exploration meets digital jewellery and the importance of materiality, sensorial perception and cultural context is now being discussed (Versteeg & Kint, 2017).

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⁹ Wearables, or else wearable devices, are warned on or around the body (Silina & Haddadi, 2015).
2.3.7 Smart Jewellery

Consequently, this implies that smart jewellery is the next generation of wearables, combining both technology and aesthetics. Pieces of jewellery, using, or not, luxurious materials, deceive the eye of the viewer, who does not expect them to hide operations and concepts that ease their life. Some of them may have an interface and some may not.

This means that the latter ones have to be connected, through Bluetooth, with an application and, hence, with a smartphone. Even though the smart jewellery sector has not yet flourished, is a lot promising and one can encounter some remarkable examples, like the Misfit Ray (Figure 10) from Misfit, which is a fitness “friend” and a sleep tracker and looks like a conventional golden bracelet, the Swarovski Activity Crystal (Figure 11), again from Misfit, that counts steps, the calories burned and the distanced travelled, tracks daily activities, analyzes sleep patterns and looks like a regular watch or bracelet, and also the Bluetooth wireless Necklace Earphones from GemPhones (Figure 12), which are Bluetooth Necklace Earphones for Women and are currently on a crowdfunding phase.
3. MARKET RESEARCH

A jeweller, in order to sustain oneself and establish viable growth for their business, except for the acquired knowledge of the jewellery sector and the secrets of the profession, they should be technologically literate and know the market. Marketing is a domain that offers the necessary tools to the user, in order for them to be competitive.

3.1 Examples of successful people and businesses

There are people who have succeeded in the jewellery sector, not only because of the valuable product they offer, but also on account of their brand and their marketing plans. In other words, they have adopted marketing techniques that promote their work and communicate it to the customer, building a relationship between the brand and the consumer.

It is important to realize that the people behind these brands did not become successful overnight. However, it does not mean that all businesses are going to become that successful with the passage of time. The point that is often overlooked is that these people had a vision and an innovative idea, which happened at the right time, in the right market. That is to say that they discovered what was missing from the market, or what they could do better, and they went for it.

Examples of such businesses are Dior, Mikimoto, Bulgari, Faberge, Chanel, Buccellati, Van Cleef & Arpels, Tiffany, Cartier, Iris van Herpen and so many more (Table 3). Nevertheless, special mention should also be made to Greek companies, which, even though they do not have the magnitude of the aforementioned businesses, they claim a large share of the Greek market. But, what is exactly that distinguishes these successful businesses from others?

There are numerous jewellery designers, both Greek and foreign, who have presented wonderful work samples, but there are not that famous or their brand is not that strong. Therefore, the first question which arises is if marketing plays a leading role in this field,
as, of course, in any other. In other words, how much one should invest in building a strong brand and promoting their products?

<table>
<thead>
<tr>
<th>People/Businesses</th>
<th>Differentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dior</td>
<td>Fine and elegant designs with diamonds, pearls and gemstones, strong and glamorous style, feminine design of this line also gives a nod to versatility</td>
</tr>
<tr>
<td>2. Mikimoto</td>
<td>Simple and elegant designs of unique pearls, popular for the creation of luxury pearl jewellery pieces</td>
</tr>
<tr>
<td>3. Bulgari</td>
<td>Luxury jewelry brand, use of diamonds and colourful gemstones, the brand itself is very recognizable</td>
</tr>
<tr>
<td>4. Fabergé</td>
<td>Fabergé eggs trademark using exquisite jewels, gems, precious metals and enamel</td>
</tr>
<tr>
<td>5. Chanel</td>
<td>Costume jewellery, multi-strand pearls on sautoir necklaces, fancy brooches with ornate bracelets, chunky earrings</td>
</tr>
<tr>
<td>6. Buccellati</td>
<td>Expertise on gemstone jewellery, animals and insects made out of gemstones</td>
</tr>
<tr>
<td>7. Van Cleef &amp; Arpels</td>
<td>Virtuosity designs, gem work, most recognizable feature is the quatrefoil motif</td>
</tr>
<tr>
<td>8. Tiffany &amp; Co</td>
<td>Trademark jewelry: the diamond solitaire and platinum engagement rings</td>
</tr>
<tr>
<td>9. Cartier</td>
<td>Exclusive jewellery for the royalty and celebrities, luxurious creations that involve precious metals and gems, Louis Cartier was the first jeweller to successfully make Platinum jewellery, was the first designer to popularize wristwatch for men</td>
</tr>
<tr>
<td>10. Iris van Herpen</td>
<td>3D printed jewellery, treated more like accessories that complement the clothing</td>
</tr>
<tr>
<td>11. Swarovski</td>
<td>Precision cut crystals, rare that a brand name is so synonymous with its product, affordable diamond</td>
</tr>
<tr>
<td>12. Folli Follie</td>
<td>Full fashion concept, accessories and watches</td>
</tr>
<tr>
<td>13. Zolotas</td>
<td>Ancient Greek inspired jewellery, granulation and filigree technique trademark</td>
</tr>
<tr>
<td>14. Lalaounis</td>
<td>Ancient Greek inspired jewellery, nature, history and mythology inspirations, Zolotas was Lalaouni’s uncle</td>
</tr>
<tr>
<td>15. Oxette</td>
<td>Uses mainly silver-based material, natural, semi-precious and synthetic stones, Swarovski Crystals</td>
</tr>
</tbody>
</table>

Table 3: Examples of successful people/businesses and their differentiation points. Brands from 1 to 11 are companies based abroad, whereas from 12 to 15 are Greek businesses.
As Figure 13\textsuperscript{10} shows, the answer is evident. Only from 2003 to 2007, branded jewellery has almost doubled its share, and the 20\% of the year 2011 is estimated to be twofold increased in 2020 (Dauriz, Remy, & Tochtermann, 2014).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Branded_vs_Unbranded_Jewellery.png}
\caption{Branded and unbranded jewellery}
\end{figure}

This is happening, because:

- of the tendency of youngsters to express themselves through brands,
- the nouveau riche want to demonstrate wealth, and
- branded products have prestige and are trusted more easily.

Moreover, there could be a second list of people exploring the jewellery sector, in a more liberating and artistic way, followed by the use of technology. These people use computer programs to express their imagination and their social concerns.

\textsuperscript{10} A figure from McKinsey analysis (Dauriz, Remy, & Tochtermann, 2014).
Niccolo Casas is one of them and his work aims to highlight the symphony of architecture, technology and fashion design. He has collaborated with Iris van Herpen and he uses 3D printing technology to create his artworks. Mima Pejoska is another versatile artist, who combines both older techniques and technology to create jewellery collections and conceptual projects. Nervous system creates foldable forms that consist of articulated elements. The team applies new technologies in design and they even release online design applications that enable customers to co-create products in an effort to make a design more accessible.

This means that the sector is in a transitional period, where conventional jewellery gives its place to technologically sophisticated ones. Both 3D and 4D design are observed, as well as jewellery with mounted chips, microphones, camera and even stranger functions.

Lastly, there could be a third list, involving pioneering groups of people, which aim high and have created a lot of smart jewellery pieces, being the ones to have started the trend of high-tech fashion. So, this begins with Wisewear, which is a corporation engaged in product design, prototyping, development and low-rate manufacturing. It has undertaken a lot of smart jewellery projects, relating to health and fitness issues. Another one is Misfit, which has numerous products, mainly watches and bracelets that host a lot of functions, while having normal prices and giving the opportunity of customization at the same time. Moreover, Monster Company is prestigiously awarded and recognized in the music industry for its smart jewellery, as well as Motiv and The Touch, whose products compete in intelligence. Furthermore, Totwoo is a smart jewellery brand that focuses more on the look of the product, namely focuses more on looking like a jewel, featuring concepts of love and luck.

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11 Three-dimensional shapes turn into flexible moving structures (4D) using 3D printing.
3.2 Value proposition

According to the above, this tendency towards technology applications should be taken into consideration when designing a new line, as the millennials have witnessed a world different to their ancestors’. There is no doubt that jewellery will keep its present form for many years to come, and conversely, it is obvious that smart jewellery is taking over the market. As mentioned before, wearables appeal to young audiences and rapidly are gaining a large market share. “If you have something with you all the time, you might as well be able to wear it”, says Cameron Miner, the lead scientist on the IBM Digital Jewellery project (Schwartz, 2000). Thus, it is essential that the line be based on technological foundations, serve modern needs and not follow, but lead. The line will be principally autonomous and it will be hosted by jewellery shops, museums, exhibitions and, of course, the internet.

It is crucial that a concept or multiple decisions within the concept be decided, before decomposing the marketing strategy that certainly plays an important role in communicating the products. The goal is to create a smart jewellery line that will allow interaction between people and bring them indeed closer. A brand that anyone will be able to relate to, express themselves through it and feel comfortable and secure while wearing it. Functions, materials, general appearance and comfort.

3.3 Strategy tools

Prior to designing the line, it is important that a marketing strategy be formulated, so that the basic aspects of the market are examined. STP process in marketing is one of the tools and it will be developed below. Segmentation, Targeting and Positioning (STP) is a strategic approach in Modern Marketing, which implies that, in order for a product to be successful and competitive, a Focusing Marketing strategy should be developed (Figure 14). Firstly, there is the need for identifying and profiling distinct groups of buyers, then selecting one or more market segments and, lastly, communicating the key distinct benefits.
3.4 Market Segmentation

Narrowing down to target markets will facilitate the segregation of the potential consumers and finding the common characteristics among the subgroups (Figure 15). The line will be worn by different subgroups; by couples, who want to share their love in a more technological way, by siblings, best friends and family members. Gadget enthusiasts will appreciate these products, as single pieces of jewellery can also have functionality. High risk groups, like the elderly or pregnant women, will also find it useful, as the products will provide them with safety features.
It is difficult to determine whether a product is practical for a member of a subgroup or not. People’s needs and wants, even though can generally be grouped, are becoming nowadays progressively diverse (Dibb, 1988). Thus, consumers can also be divided by:

**Demographic segmentation**

- **Age**
  Ages mostly from 14 years of age and above

- **Gender**
  Both men and women, as the jewellery line is going to be unisex

- **Income**
  They are of medium and high income, as jewellery is not on the base of someone’s needs. According to Maslow’s Hierarchy of Needs theory, jewellery satisfy Esteem needs (Maslow, 1943).

- **Education**
  Technologically literate, as these pieces of jewellery, in order to be used as smart devices, require specific familiarity with the subject. However, they can be worn as plain jewels, without minding their function.

**Psychographic segmentation**

![Personas of people choosing the smart jewellery.](image)

- **Chloe the gadget lover**
  - Age: 25-55
  - Gender: F
  - Marital status: Single
  - Education: Bachelors
  - Readability: Grade 13-15
  - Career Type: Freelancer
  - Career Stage: C-level or higher
  - Income Range: 15k-20k €

  Chloe is a graphic designer and a fashion blogger. She surf the internet several hours a day, posts pictures and personal thoughts and raps about fitness, well-being and technology.

  *Quote: “Technology has alienated us and at the same time brought us together more than ever. We cannot go back, so we need something that overcomes the current way of communication and promotes modern human interaction. Smart jewellery will complete any look, while connecting people.”*

- **Barbara the energetic**
  - Age: 25-45
  - Gender: F
  - Marital status: Married
  - Education: Master
  - Readability: Grade 18+
  - Career Type: School Teacher
  - Career Stage: Currently unemployed
  - Income Range: 11k-13k €

  Barbara is expecting her first child, so she isn’t working at the moment. She is very active and never misses her yoga class. Sometimes leaves the yoga studio late and returns home on foot.

  *Quote: “I feel a little worried when I come back from yoga class. I cross these dark alleys anxiously, having the feeling that someone is following me. I am worried about my child. What if someone attacks me? With my smart jewellery, I notify both my husband and sister that something is wrong.”*

- **Jimmy the sentimental**
  - Age: 18-27
  - Gender: M
  - Marital status: Single
  - Education: College
  - Readability: Grade 16-18
  - Career Type: Steadily employed
  - Career Stage: Entry level
  - Income Range: 9k-10k €

  Jimmy is a psychologist and a horror movie enthusiast. He enjoys watching his favorite series with his girlfriend at home and cycling with her near the beach.

  *Quote: “My girlfriend is out of town right now, so I am hitting the gym and going to the movies with my friends. I miss her, but she will come back soon. I wish I had that smart jewellery piece, when out with the boys, just to feel her heartbeat or her thoughts. She always calms me down.”*
Psychographic segmentation is very important, as the buying patterns of the customers can be identified. The personas in Figure 16 are some examples of the expected consumers of smart jewellery, located in Greece. The line is not hosted by a specific shop or an exhibition, and it can also be sold via the internet, so the Greek culture, as a whole, is taken into account.

3.5 Targeting

It is evident that all these submarkets cannot be treated the same way, as each group has its own particularities. The submarkets 1 to 5, as seen in Figure 15, are the main target groups, which are certainly followed by so many more.

Submarket 1 includes mainly couples. As mentioned before, either romantic couples, or best friends, or siblings, or family members. To reduce the range of users, teenagers and youngsters should be accepted as the key customers, as the process of pairing smart devices with each other is mostly used by this group of people. They are technologically educated and more flexible in exploring this type of devices. They are enchanted by creating “technological bonds” with friends and partners, and eager to test any unconventional idea.

Submarket 2 includes people, who are intrigued by smart devices and are willing to try new inventions, which combine the elements of fashion and digital.

Submarket 3 is the group of people that spend a lot of their everyday life on Facebook, Instagram, Twitter and Snapchat. They are great influencers and have thousands of followers. These people can not only embrace a new branded luxurious product or a smart device, but they can effectively promote it.

All the above submarkets can easily be approached through the internet, and more specifically through social media.

Submarket 4 is very likely to buy a smart jewel, whether the product is actually necessary or offers more, compared to a conventional jewel. As Figure 16 shows, a pregnant woman, or an elderly person may be found in a state of emergency. A smart jewel can
alert the family of the person that something is wrong. This submarket can be reached by newspaper and television advertising.

Submarket 5 includes people, who are willing to buy a smart jewellery piece, whether the product facilitates their everyday life at work and reduces their anxiety. They need no other stress factors. To approach this submarket, a great technique is using AdWords and other advertising tricks, which relate to business sites, news sites and informative content pages.

3.6 Product Positioning

In the final analysis, many different segments of the market can be interested in the smart jewellery line. The two most prominent are the submarket 1 and 4. These two are likely to buy pieces of the line, for both lifestyle and safety reasons.

<table>
<thead>
<tr>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT: Smart Jewellery line (jewellery and technology)</td>
</tr>
<tr>
<td>WHY: Innovative technological products that have an opportunity in the market</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT: Reasonable pricing</td>
</tr>
<tr>
<td>WHY: Competitive price compared to conventional jewellery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT: Physical shops, E-shop</td>
</tr>
<tr>
<td>HOW: Medium stock, By order, Courier</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT: Beautiful and useful</td>
</tr>
<tr>
<td>HOW: Newsletters, Social Media, Newspapers, Advertisements, Word-of-mouth</td>
</tr>
</tbody>
</table>

Figure 17  The Marketing mix (4Ps).
An important tool of Marketing is the 4Ps, which define Marketing mix (McCarthy, 1960). This helps the business understand where exactly its product is placed and make the corrections needed. Above, in Figure 17, there is a clarification of the smart jewellery line and its price, the distribution channels and the ways of promotion.
4. RESEARCH METHODS AND ANALYSIS

The aim of this dissertation is finding innovation in the jewellery sector. As seen in the previous chapters, innovation can be found in the use of materials, forms, patterns and manufacturing methods. It can also be explored through the way a jeweller promotes a product in the market and how they take advantage of the opportunities presented. Nevertheless, in order to reach a better understanding of how the market behaves, in what point the customer is involved and influences the circulation of money, and in what depth an innovative smart jewellery line is going to be accepted by the consumers, it is crucial that certain methods be followed, so that the results be accurate and the designing process more targeted.

4.1 Qualitative research method

In this thesis, two primary data collection methods are followed, direct structured and direct unstructured (Stathakopoulos, 1997). Interviews were held in both methods, provided that, when the researcher is not directly involved in the subject of research, their specific questions may solve their doubts, but the free annotation of people, with experience in the field, may raise more important questions for analysis and create food for thought. Therefore, they are equally important. Furthermore, observation was also used as a means of data collection, providing, this way, the researcher with valuable information about consumer decisions, and giving an insight into the bigger picture.

4.1.1 Observations

Observation is another method of qualitative research, with which one can collect valuable data and have a better understanding on a specific topic. Thorough research is being done, since the quality of the results is great. Consumers are being observed, which implies veritable evidence of their purchasing habits, without them being able to
alter the facts. Although this is time consuming, it is a great way to withdraw information, which otherwise the researcher could not have access to.

The limitation of this method is that there is a possibility to misinterpret consumers’ needs and wants. Unless the right questions are asked and the correct goals are set. This means that if the observer is specific of what they are looking for, they are able to target to the right market research and have the corresponding profitable results (Beall, 2010).

In this thesis, a sample of 120 people was observed, in November of 2017, at the family jewellery shop, and below, observations are made, about their consumer behaviour.

**Observations Analysis**

After entering the 21st century, the jewellery market has shown signs of shrinking and decline. It can be said that it rather passes the maturation phase of the crisis, which leads to targeted buying that only concerns necessary purchases. This can roughly be translated into an engagement diamond ring, a pair of wedding rings and a cross for a Christening. Moreover, as far as the materials are concerned, it is observed that, nowadays, there is a clear superiority of platinum in terms of choice, in relation to the yellow gold, which held a dominant position in previous generations.

So, if we consider, for instance, November as a typical month for the retail of jewellery, consumer behaviour can be interpreted in these ways:

1. From 120 consumers, only 10% of them actually proceeded to purchase, of which percentage arises,
   a. 35% of these purchases are related to engagement and wedding rings,
   b. 20% concerns the Christening crosses,
c. 20% concern jewellery gifts, such as evil-eye charms, baby tag-bracelets and Constantine coins\textsuperscript{12},

d. 25% of these purchases are related to rings, earrings, bracelets and other pieces of jewellery, which are addressed to adults and gift-exchange. Noteworthy, this category, once accounted for 75% of total sales.

2. From 120 consumers, 70% of them are of an older age, 40+, which age group is the old customers of the shop. As already mentioned, younger people, even if they can afford paying for this luxury, prefer other types of purchases, like smartphones, electronics, computers, etc.

3. There is also a shift of youthful interest in faux\textsuperscript{13} jewellery, as well as silver jewellery. Silver has also met the trend of the dominance of white jewellery as mentioned above, and faux jewellery was most favourably, mainly because of their affordable price, in relation to gold jewellery. If the use of stones is included, the difference in price between precious and artificial stones, with the latter ones being, of course, a lot cheaper, would further justify this tendency. The fashion of faux became popular among youngsters, for the extra reason of providing them, with inexpensive materials, and letting them express themselves, through manufacturing jewellery of their own.

4.1.2 Interviews

The first question was whether the interviews should be addressed to clients or businesses, and if chosen the latter, there is a dilemma, regarding the right choice,

\textsuperscript{12} Gold coins of Byzantine, Venetian and Cypriot culture.

\textsuperscript{13} The term faux jewellery was originally used to describe jewellery that complemented a particular outfit (Baker, 1986). Nowadays, the term describes “precious looking” jewellery, made with not so “precious materials”, like silver. The main difference between fine jewellery and faux is the quality of the metal, or the use of non-precious stones.
between retailers and suppliers. In this thesis, interviewing suppliers was considered the most appropriate technique, as targeting the people, who provide the market with raw materials, is critical. They have an overall view of how the market is acting, what the consumer is looking for and what is more purchased. They are able to answer questions about human behaviour, economy, competitiveness and communication. Furthermore, consumers are not knowledgeable of the market, and given that they are not familiar with the evolution of the jewellery sector, cannot provide the researcher with comprehensive answers. In addition to that, design, and aesthetics cannot be solved in words and plain questionnaires, which is why interviewing people and having a discussion around a specific topic can yield maximum benefits. This method can answer the Hows and the Whys, and has greater flexibility in understanding and interpretation of concepts. An in-depth interview is considered to be the most appropriate technique for collecting information when it is necessary to clarify the attitudes, desires, attitudes, opinions, dispositions and needs of consumers (Stathakopoulos, 1997).

It is obvious that interviewing an enormous number of suppliers is not feasible, as is the case with the questionnaires. The latter method can provide the researcher with a great number of questionnaire replies, however, the sample may not be always sufficient, nor are the answers highly reliable, since some respondents may not understand a question, nor answer completely and accurately. Interviewing, however, can provide with a lot of information needed for the thesis as there is little room for non-answering questions, although is time-consuming for both the interviewer and the interviewee.

The sample is 17 suppliers, as these were the ones among 22 that agreed to participate, found in 32nd International Fair of Jewellery, Watches, Precious Stones, Machinery and Equipment, at Thessaloniki, 21-23 of October 2017. The other 5 did not accept the request for a conversation, either because of lack of time and work overload, or unwillingness.

To recapitulate, in order to create a smart jewellery line, apart from analyzing bibliographic sources and the theories of marketing, it is crucial that experts, in this case, suppliers, be interviewed, whose knowledge, expertise, experience in the field and especially deep understanding of the market and the choices of the consumers, will shed
light on the subject being analyzed. So, interviewing, for about 45 minutes, each of the 17 respondents, there was a freedom of asking predefined questions, creating questions according to the interlocutor, asking for clarifications and trying to collect the best possible responses. Three question techniques were used, and these are the laddering, the hidden-issue and the symbolic questioning (Stathakopoulos, 1997).

As there are no suppliers currently in Greece, who are trading smart jewellery, and are not so familiar with the subject, the questions formed for the interviews were not as much of a technological nature. However, their answers led to useful conclusions.

**Interviews Analysis**

It is important to note that the 17 suppliers have been active in the field for over 30 years, as 90% of them inherited the business from their parents, which means that they are second-generation goldsmiths-sellers. Moreover, most of them preferred to remain anonymous. However, words of merchants will be quoted, who had no problem their name to be displayed. Below is concentrated and summarized the material collected.

1. The majority of the respondents pinpointed that there is an increase in sales, in the last three years. Even though there is no comparison with 10 years ago and further back, an improvement is observed in the time of crisis. They believe that if one desires to start these days a business related to jewellery, or design their own pieces and enter the market, it is easier than 3 years ago, but tedious.

2. There are many ways to enter the market, either one wants to begin from scratch, or they have a background related to jewellery making. Although the needs of a jeweller are, in general, the capital, the design and manufacturing techniques, there are also four categories that can give some direction to already existing or future entrepreneurs.

   a. Goldsmith workshops: This is a typical way to start a business, since someone already has the expertise and the acquaintances. In other words, they know the job, they just do not have the right physical place, to welcome the final customer, and a brand name.
b. Import jewellery: One way to start a jewellery business is to own a place, trade jewellery from abroad and sell it to the local market. Import jewellery according to fashion trends and customize the merchandise to local market.

c. Design: There are people, who have no previous experience with constructing jewellery or owning a jewellery shop, however, they are great designers. These individuals, or designing teams, can sell their designs to goldsmiths or enterprises, and do not involve in any way with the production or sale to the final customer. Nevertheless, there is a need for knowledge on the construction, so that they are confident that what they have created is implementable.

d. E-shop: This is considered to be a contemporary way to sell jewellery pieces or entire lines. It is addressed to people, who already have a shop, or beginners, who are trying to sell their creations through the internet.

3. Furthermore, through these interviews, it was understood that the brand and a trustworthy name play a vital role in the market. The key lies in creating a strong image that exudes assurance, confidence, luxury, innovation, timeliness and, at the same time, timelessness.

4. Differentiation is the key to success, either the design is concerned, or the materials, or an innovative concept, or the way of production. Many of the respondents felt that their design was characteristic, others said they have great quality and variety, others confessed they believe that their jewels are more chic and elegant than other colleagues’ products, when others expressed that what sets them apart is the use of colour and their unbeatable prices. Each one felt that their business was distinct in some way, and they could easily pinpoint its strong point.

5. The most challenging part is to communicate this diversity. The struggle is almost the same for both the merchants and sellers. The only thing that changes is the vocabulary and the body language. When a seller approaches a merchant, they know what they want and they ask for it. The sellers are not the ones to easily mislead or change their mind about a purchase. Unlike the consumer, who does not speak
technical terms, nor has the experience. Nevertheless, the customer has opinion and specific aesthetics, which the seller can direct, but not control. Furthermore, for a merchant or a seller to be communicated to the customer, there are many different ways.

a. Physical presence

b. Participation in jewellery fairs and exhibitions

c. Social media

d. Radio and commercials

6. Once the seller is active and people recognize their brand, both the name and their work, it is easier to promote the product itself. Out of the 17 respondents, the 80% replied affirmatively that owns a web page and uses social media in order to communicate with their customers or approach new ones. Mr. Aleksopoulos, from Silver Union & Co G.P., stressed the importance of Facebook in their business and how social media promote customer communication, market expansion and the products themselves. Most of them insisted that the internet and technology are great tools, which should be used to the greatest extent.

7. What is actually an underlying fact throughout this thesis, is that technology has invaded people’s lives, in every possible aspect. Smartphones are taking over the role of one’s companion, friend and consultant. Smartphones are considered, by all respondents, to be the biggest competitor of jewellery. This was not that much of expected, but all sellers assured that this is the case. Thus, these interviews essentially complement the bibliographic research, and show that there is no equal battle between jewellery and technology, unless the latter is integrated in jewellery pieces. “The new generation does not buy jewellery, like their parents did, they prefer smart devices”, said Mr. Korifidis, the CFO of Korifidis Bros & Co L.P., and he added “This is the new customer and you have to combine smart choices with the new generation”.

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8. Consequently, it is essential that jewellery be treated in other ways, which is not only the fact of beautifying the aspect of a person, but also meeting its modern needs. Somewhere exists the intersection of aesthetics and functionality and needs to be explored.

**4.2 Additional remarks**

It is really interesting trying to find innovation through observation and personal conversations. Each and every one has to offer something, as all are involved in the buying process. Observing customers at the time of selection and discussing with people in the know, as far as the market is concerned, are acts that, after proper processing and evaluation, can contribute a lot to the researcher’s work.
5. DESIGN AND DEVELOPMENT

In order to validate the method and test the findings, a design brief is developed. Dealing with lines, concepts and finally, the construction of an object, can lead to more answers and tangible results. So, innovation will be attempted to be found in jewellery, through a series of design experiments. There are no significant examples of smart jewellery lines, thus, this chapter will investigate possibilities through design.

5.1 Aesthetics and Technology

Aesthetics in its primary sense means the way people perceive the world through their senses. Largely, it is one of the most important factors consumers choose a specific product, as it creates value (Wessell, 1972). Thus, aesthetics to this effect define the interaction between the user and the product, and the experience being developed. On the other hand, technology means the set of selected methods of production, based on apt development ideas, focusing on solutions. Today, aesthetics is an integral part of modern industrial production, at least the one addressed to the customer. In other words, engine parts, computer chips and other functional parts of machines, which are not meant to be used directly by consumers, aesthetics has no reason to be present.

In products produced in the small scale of craft industry, technology and aesthetics rarely co-exist satisfactorily. This is due to the limited financial resources of micro-production, which in turn entail the absence of specialized staff capable of covering a wide range of specialties. The production, for instance, of mobile phones by giant industrial enterprises, is supported by financial and industrial design departments, people skilled in electronic computers, networks, market research, research of innovative materials and so many more. Conversely, a small industry, in this case a jewellery production unit, is unable to maintain, especially in times of crisis, the necessary employees for the production of its products. The result is due to the inspiration and intuition of few people, the owners or the employees, rather than a complex study of market conditions. In this perspective, a jewellery piece is basically something more personal and bears the identity of the creator to a much greater extent
than an industrial product. This, under certain conditions, constitutes at the same time a serious advantage, since an original idea can be translated into a product a lot faster. Technology, in this case, can take the form of an original concept (which goes beyond the traditional frames) and produce a perfect aesthetic result, whilst allowing the coupling between a piece of jewellery and a specific application.

Technology is evolving, therefore the ability for someone to imagine concepts like jewellery phones, jewellery transmitters and mood detectors, etc., is enormous. Nowadays, one can design and produce whatever they want, as long as they have the inspiration, the passion and the capital needed.

*Below follows a series of designs, thoughts and proposals of smart jewellery products, which aim to explore the relationship between technology and aesthetics, in an effort of recognizing and identifying innovation, paving the way for further research.*

### 5.2 Concepts

In this part of the thesis, three concepts are generated and all the findings of this research will be implemented in the design of this innovative jewellery line. Smart jewellery is the result of the combination of technology and aesthetics, and aims to look beautiful, yet practical.

As technology has isolated people, is blamed for alienation and has caused feelings of depression and loneliness, all the three concepts generated, are based on human interaction and connection. It is a fact that technology is present in every aspect of human life and it cannot be avoided. Instead, it can be used in a positive manner, trying to bridge the communication gap that has been created. Thus, the smart line has this exact purpose, providing the users with smart features.

#### 5.2.1 Equality earrings

**Design motivation**

The first concept explores several aspects of female and male adornment. It is a fact that female jewellery and accessories claim the largest market share, whereas male
ornaments are still under development and experimentation. For instance, when someone is thinking about earrings, their mind goes directly to female products. Thus, innovation can be explored through a male and female centered design that open doors for further research in this market. This concept discusses: adaptability, social conscience, equality, connectivity. There are men, who would wear for instance, a more glamorous earring, but there are possibilities of them being criticized for this action. However, expression is a fundamental principle of human existence. Therefore, to become more specific, if a man chooses to wear an earring, there should be a product that allows this act. KPMG research has shown that more than 65% of Millennials do not believe that gender defines a person anymore and are not willing to adapt with the traditional definitions of femininity and masculinity (Kurian, 2017). Maia Adams, co-founder of Adorn Insight, also says that “Men, in general, have become more image-conscious” and she adds that “jewellery has become part of that self-expression box of tricks” (Gomelsky, 2014). Furthermore, there is a significant number of influencers, like actors, singers and bloggers, who have given new directions in fashion industry and communication of the trends. This means that visual perception plays an important role, especially when the lives of this generation pass through social media and visual platforms, like Instagram.

Figure 18  Inspiration of the first concept.

14 Adorn Insight is a firm that focuses on jewellery trade.
Will.i.am, is an example of an influencer, who has created his own headphones, which actually look like jewellery pieces, combined with technology Figure 18. This implies that earrings for men can be a reality and the male jewellery industry can be enriched with a new series of accessories.

**Evolution**

The Millennials are “native speakers” of the digital language, the “always connected” generation (Prensky, 2007) (Kurian, 2017). So, an always worn smart jewellery will keep its users always connected with each other. The first attempts were a combination of a variety of hands-free headphones, as it would be easier for a man to adapt to an already existing electronic device, something they have already experienced, like in Figure 19.

![Figure 19](image19.png) Hands-free headphones existing products leading to the new concept.

![Figure 20](image20.png) Attempts for the one type of jewellery.
Since the earring will have smart features, there is a need of a surface for data input. So, the attempts below show some early decisions that had to be made. As seen in Figure 20 it is important that the earring be steady, closer to manly face features and still adorn the face area. In the case of a woman’s earring, in Figure 20, attempt A is a great base, but with slight differences to meet balance needs and steadiness, like in Figure 21. Aesthetics always play the most important role and that is why smooth curves are used, flow lines and circular shapes, which symbolizes continuity and life. Both earrings generated follow the same designing alphabet.

Figure 21  Evolving woman’s earring.
Concept 1

These pieces of jewellery have Bluetooth connectivity and their goal is to beautify the person wearing them and fulfill their practical needs. It is addressed to both women and men, with slight differences to meet the expectations of each sex, as seen in Figure 22, feminine pendant-like earring for women and headphones-like earring for men. This is intended to be used by friends, couples, siblings, family members and practically anyone that wants to be constantly connected with another person. The jewellery pieces form a unit, but they consist of two parts, the earpiece that is a speaker ball and the touchpad that allows data input. There is also an application which connects the two devices and encodes all functions. In particular, as seen in Figure 23, the touchpad area allows the user to form shapes with their index finger, creating combinations-codes which correspond to unique commands. This means that, by someone drawing, metaphorically, a circle with their finger on the touchpad of the earring, the application translates this shape into a default command, which is, for example, the audio message “I will call you later”. This message will be transferred via the application to the second user’s device. The second user will be notified by a subdued vibration of the earring that they have a message. If they choose to hear the audio file, by tapping the touchpad of their earring, the ball speaker will transmit the message.
There is the option of recording personalized messages, changing the defaults and creating new shapes and messages. It also enables answering phone calls, as it has an integrated microphone, and it also sends notifications and reminds special events and important dates.

Figure 23 Examples of shapes and their translation in the application. This figure shows that the translation can be an audio file, like the first two hypothesis, or linked to commands like play music or remind the user of important dates and so on.

Figure 24 Earrings’ concept modelled as input-throughput-output system.
All these can be achieved, if these procedures are understood as an input-throughput-output system (Figure 24), where the earrings play the role of the host. This way, shapes are translated into audio messages, and quick moves of the index finger into meaningful words towards each pair.

The encoding is of no immediate interest in this dissertation, as innovation is explored through design, although it is certainly a very important part in completing this project. Nevertheless, Figure 25 explains some details about the technology of the touchpad used.

It is essential that it be noted that all the technology used, can be fitted in a jewellery piece. As technology progresses, it can fit itself in ever-decreasing spatial portions. Although, this thesis is not dealing with the mechanical part and the construction details, it is worth noting that research has been done regarding the weight and the dimensions of the parts (hardware) fitting the smart earring, so that the design follows existing data and realistic hypothesis for the concepts. For example, the battery is one of the biggest parts in electronic devices, and today has reduced its size tremendously. There are also customizable small-capacity batteries. The earring also uses a hollow tube to fit all the wiring, and it also retains its weight around the ear, so that the earlobe does not lift the whole structure.
All things considered, if the technology and the capabilities it offers are overlooked, it will be noticed that the devices themselves can stand as jewels, without noticing they are actually wearables. *This is the dividing line between wearables and smart jewellery, where aesthetics play the most important role and the appearance of the object is promoted more than what it offers as a technological device.* Although it is a fact that, nowadays, the appearance of a product is seriously taken into account, it is indeed more evident in smart jewellery.

Both earrings in Figure 26 are not actual final products, as there are a lot of factors that should be taken into account, like the ergonomics of the pieces. Though, the aim of this exploration is to search for innovation and the opportunities hidden. *Through this concept, it is evident that men jewellery and the limits between men and women adornments have not been explored enough, thus triggers the interest for further research.*
5.2.2 Safeness pendant and cufflink

Design motivation

The second concept explores subjects such as communication and safety. It is a fact that, all over the world, there are extremely high crime rates, and statistics show that America is ranked first among the continents, with a crime rate reaching 82.5% in 2018 (Numbeo, 2018). Although Europe has the lowest crime rate, compared to the other continents, still, 49.4% as shown in Figure 27 is a fairly high percentage. More specifically, Greece is 15th among European countries in 2018, with a rate of 39.1%. Thus, being safe is a great incentive to start creating a designing project.

![Figure 27 Crime rate in Europe for the year 2018.](image)

The first designing attempts were using the concept of the center and the surrounding environment, dealing with human existence and its entity. The idea included firstly the core, which symbolizes the man, their self-centered approach to things and the way they perceive the world, and secondly their surroundings, which embodies their interpersonal relationships. Initially, the design imprinted two concentric circles, with rays connecting those circles, showing the different aspects of a man’s character. The idea derived from Wassily Kandinsky’s painting “Circles in a Circle”, in which his belief of the harmony of the cosmos is expressed through certain shapes and lines. The man is a
being full of emotions and logic. Their personality, behaviour and reactions are affected by the specific environment they grow up, hence they are complex and multidimensional.

**Evolution**

“Safeness” is a concept which is intended to become a necklace, a cufflink, or any other form of jewellery, pendant or not. However, in this thesis, it will be presented as the first two mentioned above.

Figure 28  Evolution of "Safeness".

Figure 28 shows the evolution of “Safeness”. The core denotes man as the centre of attention, since human’s nature is egocentric. The circle is gradually shifting and shrinking though, an action that shows the prevalence of nature. The off-centre circle symbolizes the inwardness of man, the place hiding all their feelings. All the pieces created by the partition of the circle, represent different emotions and feelings, like happiness, anger, anxiety, fear and love. All of them lead to the same point, the man. This concept gives people the opportunity to show their anxiety and fear, and be heard. The dimensions vary, as the cufflink should be smaller, in order to fit the buttonhole and
serve its purpose. The diameter of the pendant is 35 mm and has a truncated conical shape, which protrudes (Figure 29). In contrast, the cufflink sinks inwards, as shown in Figure 30.

Figure 29  Pendant views and dimensions.

Figure 30  Cufflink views and dimensions.
Concept 2

The “Safeness” is addressed to both sexes and it can be worn as a pedant necklace or a cufflink as shown in Figure 31. Both versions have the same capabilities and characteristics, except for the minor differences in appearance. These pieces are as well connected to a smartphone application. Through this app, the user can make alterations and manage the functions of the smart devices. The most special feature of these pieces is that they serve as a protection zone for the user. If one is at risk, they press the central button of either the pendant or the cufflink, and the jewellery pieces immediately send their exact location to three people that the user has selected. It has an integrated GPS system, which will remain active for about 20 minutes, providing a live location data transmission for the user at the given time. Then it switches off, for battery saving, unless the person in danger turns it on again.

The pattern of the activation mode can be changed at any time, which means that if one, for example, has to press the button three consecutive times to activate the safe-mode, they can alter it to two times and one prolonged one. This naturally resembles the Morse code\textsuperscript{15} system, which will be used for this type of communication. The user

![Figure 31 Safeness worn by woman and man, as necklace pendant and cufflink, respectively.](image)

\textsuperscript{15} The Morse code is a method of transmitting text information as an on-off signals.
will be able to create their own helping messages, or use the default code to conduct live messages, with dots and dashes, if they are unable to call someone for help, as shown in Figure 33. This feature is quite interesting, as 19th century technology is combined with 21st century technological advances to create something unique. The Safeness uses technology for both its construction and its function. Yellow gold, white gold or silver are used for the main core of the jewel, and carbon for the rest of the parts. The convergent part of the design represents the emotional stress and the feeling of fear and anxiety that a tense moment like the aforementioned can cause to a person (Figure 32). Moreover, the Safeness has other features. It is a north indicator, it can provide the user with flickering points used for navigation, with the assistance of the GPS system, and it also tells time, operating like a watch. These functions are interchangeable, by using the central button. On the perimeter there will be 12 zircons, or transparent agates or rutiles, which will let the light pass through them, indicating the hours and the minutes in the case of the watch, by using different colours (Figure 34). It will show the north and the user’s directions, whilst the lights will change if the user turns circularly the jewel. Furthermore, if the one uses their smartphone maps in order to get directions towards a specific address and their jewel is paired with this phone,
then having the advantage of 12 points, it can indicate whether you are heading the right direction or not, without looking at the phone map.

Figure 33  A case of an older man asking for help (S.O.S.), notifying three family of his members.
All these functions can be of course deactivated, by pressing and holding the central button. Figure 35 shows a three-dimensional representation of the cufflinks.

Figure 34 The 3 extra functions of the pendant-cufflink.

Figure 35 3D representation of the cufflinks.
Figure 36 shows three-dimensional representations of the pendant, both as a separate entity and worn.

![Figure 36 3D representation of the pendant.](image)

**5.2.3 Connectivity bracelet**

**Design motivation**

Human interaction and connection are definitely present in all concepts. People are social beings and they need to communicate with each other. The original motivation for this piece of jewellery is the sound wave (Figure 37). However, a large part of the population has disable hearing loss\textsuperscript{16}, which amounts to 466 million people worldwide (WorldHealthOrganization, 2018), which means that a sound may not be heard by someone, but vibration can be felt. *Waves*, a rope installation, by Daniel Palacios, was the initial incentive for this concept. This is why buzzes and vibrating tones replace sound waves.

\textsuperscript{16} This refers to more than 40dB hearing loss in adults and more than 30dB in children.
Evolution

Initially, the concept began with the partition of the basic core into separate segments, since the intention was to correlate the latter ones with the relationships that are being developed among people, the ties that are created and, actually, the more than one connections, at the same time, of the same person. Figure 38 shows some primary sketches of this idea, while the x points show where the lights were going to be placed.
The wavy effect of Figure 39, on the area for data input, reminds of the continuity and curvature of the human body, and a touch on this area bears a resemblance to a touch on the skin. The 5 x points of the 5th phase, on Figure 39, show the lights that are going to be used, in combination with the vibration, to indicate basic functions of the bracelet. The basic form of the design has definitely influences from architecture, flowing volumes and clean lines (Figure 40).

**Figure 39  Sketches of the bracelet.**

**Concept 3**

The “Connectivity” bracelet is mostly addressed to women, but it can be worn by men too (Figure 41). It stands for friendship and the special bond between friends. It has an integrated GPS system and a Bluetooth connection. Its basic aim is to collect data of
each person and share it with team members, bringing them this way closer. It has 5 main spots for one’s best friends, however, the last spot can be shared with more people if it is something they want. It has 5 led lights, which will be turned on if someone is located near the user. In other words, if a group of 5 friends connect and pair their jewellery, this means that in one’s bracelet, four out of five spots will be occupied. Then if they are inside their house, or having a walk, or even shopping, and another friend is located, for instance, within a radius of one kilometre, then both bracelets will buzz and one of the led lights will turn on (Figure 42). The light that will light up each time is defined by the user, through the application that determines which friend is linked with which position. Once they are close, the bracelet notifies the user, and the rest is on
each other’s willingness, time and mood. Furthermore, this smart jewellery can share more than just raw data. It monitors heart rate, temperature of the body and changes in the skin, which can indicate different kinds of emotions and stress. All this information is saved for each person using it. If one wants to connect with another member of the group, they just touch the touchpad and swipe right and then left, as shown in Figure 43. The lights are turned on, flickering, and the user chooses one of them, by double tapping on the area of the pad that corresponds to their option. The friend x is notified by a double buzz that another friend asks for them to share their data-emotions. Thereafter, it is up to the human initiative.

Figure 43 Examples of hand movements. Shows the interaction between the human and the smart jewellery piece.

All default commands can as well be changed through the application. Another interesting feature of these jewellery pieces is that they all have a touchpad area, but none of them has a screen. They are all using touching, vibrancy and combinations of flickering lights or buzzes. This is because its goal is to improve the users’ memory and
sharpness, without focusing all their attention on a screen, as well as facilitate communication between people, even those with disable hearing loss.

Figure 44 shows a three-dimensional representation of the bracelet, from both the front and the back.

![3D representation of the connectivity bracelet.](image)
6. CONCLUSIONS

6.1 Originality of research

The present research is a short journey into the jewellery sector, explored through a mix of different scopes. From analyzing the data gathered by using qualitative research methods, to designing innovative jewellery pieces that embody the beauty of a jewel combined with technological breakthroughs, this dissertation is a unique result of its kind. It aims at finding out where innovation in goldsmithery lies, concerning the design, the fabrication of jewellery and the market, addressing unanswered questions. Except for the original research, which is observing customers and interviewing suppliers, collecting this way valuable raw data, bibliographic research was also done, leading to useful conclusions.

Thus, the originality of this dissertation is that it is an interdisciplinary research, whose objective is to provide the reader with new knowledge about the innovative existence of jewellery and the current practices of its design and fabrication, in the modern world.

6.2 Concluding Remarks

The dissertation led to numerous conclusions. The literature review casts light on the early stages of creating a jewel, which are the design process, the material processing and the manufacturing methods. All these are extremely helpful, since they are the basis for every design effort. This chapter clarifies key concepts and concludes that most of the methods and techniques that were used in the past, are still largely used. Modern technology has definitely invaded their professional routine, however, in Greece, using extensively 3D printers for parts of the jewellery or its construction in total is not widespread. Although this technique is applied, the cost is not conducive. Unlike other European countries, or America, Greece still has few resources, the majority of Greek jewellers cannot afford such machines and will not take the risk. As history has proven, the sector has great creators and laudable samples to show, but due to the crisis, it is
difficult for goldsmiths to give prominence to their strengths. Therefore, it is important that they evolve, manoeuvre and adapt to the new data. Smart jewellery is a smart choice, since technology, hence wearables are constantly developing, as also already shown in this dissertation, and innovation is ready to cover whatever space aesthetics leaves.

Furthermore, the market is awaiting for technologically literate professionals to lead. This opportunity, given that Millennials have already entered the market and are also the ones to define it, has to be taken seriously into account, since jewellery was, is and will be at the center of interest, but only by changing forms. It is essential that it be made clear that no new need arises here. This smart line aims at pulchritude and utility, two concepts with which man has been dealing for thousands of years.

Moreover, the observations and interviews done for this research, provided the researcher with interesting results, which gave a little twist to the dissertation. Originally, the research was targeting more towards conventional jewellery and the innovative communication to the consumer. However, both methods led to finding where innovation lies, either the fabrication is being discussed, or the design itself. One of the most valuable knowledge gained, is that the biggest competitor of jewellery is the smartphone. Therefore, from observing people choosing and buying jewellery pieces for an entire month, the conclusion that emerges is that it may have been more practical to observe people in a gadget store. This means that the real customer is not the one that enters a jewellery shop, in order to buy a wedding ring or a christening cross, however the woman or the man that expect something more from their jewellery, than adornment. Jewellery shops do not have these types of products and the customers will not search for them in such places. Nevertheless, observing people in the jewellery shop confirmed that consumer intentions to buy a piece of jewel are not purely aesthetic, but there are underlying economic factors. According to the respondents, their sales have declined, since 2006, and only the last three years they have noticed a slight increase.

Furthermore, through these interviews, it was made clear that differentiation and the successful communication of this diversity are the keys to success. In addition to that,
there are traditional ways of presenting one’s products, such as participation in exhibitions and jewellery fairs, but it became obvious that the internet and social media are the ones mostly used.

The designing process provided with valuable knowledge. Innovation can be found in the intersection of aesthetics and technology. The one affects the other, as the limits are not so defined. How much is technology willing to sacrifice for the sake of beauty? Can aesthetics be seen in a different way, more technologically imprinted?

6.3 Future Research

This dissertation may provide the basis for further research. Firstly, it could concern the placing of the product on the market via the internet and social media, including promotion techniques and questions related to internet security and consumer confidence in buying jewellery without the physical presence. How would a branded innovative line behave in the market? Do “smart” features affect the price of the jewel and are people willing to buy it, if there was no technology behind it?

A future research could also regard the ergonomics combined with aesthetics. Could the latter affect ergonomics, or the other way round? Aesthetics could be explored a little further, using bibliography about beauty, fashion and art, giving technology another hue. Innovation could be explored through an experiential way that consumers would be able to use the products and test them.

Lastly, according to my point of view, there is an ambiguity about femininity and masculinity of jewellery. Some find that it is too extreme for a man to wear a shiny earring or wear an elegant pendant. How far is too far? Is there aesthetic equality between the two sexes? These are questions that still need to be investigated.

Figure 45 shows a composition of all the jewellery pieces.
Figure 45  3D representation. A composition of all the jewellery pieces.
Bibliography


Appendix

INTERVIEW QUESTIONS

The following questions were answered, whilst a free conversation on the sector was conducted. The results obtained in the chapter of Research Methods and Analysis are the result of further discussion and analysis, not only based on these questions.

Question 1:  *Is the market ready for an innovative line? Will consumers respond positively to this?*

Question 2:  *Is branding important for such a line?*

Question 3:  *If the branded line is created, in what ways does it enter the market?*

Question 4:  *Which could be the major differentiation points of a line that could efficiently promote the products? In your case, what do you think distinct your products from others’?*

Question 5:  *From where did your existing clients learn about you? Do you approach new ones in the same way? If not, in what ways? Are there other ways, which you do not choose, and why?*

Question 6:  *In what ways you promote your products?*

Question 7:  *What is the major competence of jewellery?*

Question 8:  *Has technology affected jewellery sales?*

Question 9:  *Do you fight or embrace technology in your sector?*
Question 10:  How would you describe the new customer, the customer of 2018?