

# Italian Craft Firms Between Digital Manufacturing, Open Innovation, and Servitization

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**Abstract** This paper focuses on craft firms that have contributed to the creation of a strong image of Italy in the world and encouraged the development of industrial districts and small firms in the country over the past decades. However, ongoing economic, technological, social, and cultural changes in recent years have made it difficult for these firms to survive: since the beginning of the economic crisis in 2008 until 2015, almost 94,400 craft workshops have closed, which amounts to a 7.26 % rate of decrease. In order to face these challenges, craft entrepreneurs must be innovative and review the ways in which they provide value to customers. By means of a qualitative explorative analysis, this study aims to analyze recent strategic directions undertaken by some Italian craft firms and identify the opportunities derived from them. It highlights three directions in particular: (1) to embrace the use of digital technologies, rather than viewing them as a threat to the firm's future, (2) to involve customers in the design and production processes and expand the firm's network, and (3) to offer a wide range of services in relation to their products. Following all three of these strategic paths will help craft firms to survive and increase their competitive advantage by capturing opportunities offered by new technologies and new ways to produce. This paper concludes that mixing ancient and digital knowledge in an open context of collaboration will allow craft entrepreneurs to positively look to the future.

**Keywords** Craftsmanship · Entrepreneurship · Competitiveness · Digital technologies · 3D printing · Foot and body scanner

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## Introduction

In today's competitive environment, all companies are subject to continuous changes that force them to undertake new directions in order to survive and develop. This paper focuses on craft firms because they have contributed to the creation of a strong image of Italy in the world and encouraged the development of industrial districts and small firms in the country over the past decades (Schillaci et al. 2013). Currently, they are facing difficulties triggered by the persistence of the economic-financial crisis, which has caused ongoing, uncertain, dynamic, and hard-to-interpret scenarios since 2008. Further complications include the gradual shifting of the economy toward service industries, technological progress, information and communication technologies (ICT), and expanded global competition, as well as customers aimed at looking for customization, higher quality products, value creation, and living experiences (Pine and Gilmore 1999).

This situation became particularly critical for small- and medium-sized enterprises (SMEs) such as craft firms because of their typical traits that make them vulnerable or, in some cases, even resistant to face these changes more than large companies that hold most entrepreneurial, managerial, and financial skills. Generally, SMEs are constrained by factors (Cioppi et al. 2014) such as (a) reduced availability of financial resources and, during the moments of crisis, even difficulty in obtaining credit (Pal et al. 2014), (b) reduced economies of scale, (c) limited marketplaces, (d) concentrated demand (Papaoikonomou et al. 2012), and (e) low levels of professionalism, especially in critical areas such as marketing (Hin et al. 2013; Palacios-Marqués et al. 2015). In addition, some craft firms are still attached to the characteristics of the traditional handicraft model (Brusco 1989), which includes the following aspects: (a) to propose products to a local market, (b) to use simple and multipurpose machinery, (c) to rely on low levels of school education and specialization, (d) to acquire professionalism through years of apprenticeship with another artisan, (e) to develop relationships between firms by means of imperfect competition, and (f) to develop relationships with customers through mutual trust and knowledge.

In order to overcome these difficulties connected to economic, technological, social, and cultural changes, craft entrepreneurs should modernize themselves by offering technologically innovative and highly customized products in national and international marketplaces (Micelli 2011). In other words, they have to review the ways in which they provide value to customers in the knowledge economy era (Rullani 2004).

On the basis of these considerations, the following research question is posed: How can craft firms face these ongoing changes in order to remain competitive in the future? Digital manufacturing research has only responded to this question from an engineering and design perspective, whereas management scholars have neglected this topic, though it has been discussed by the national trade press. Therefore, by means of a qualitative explorative study, this paper aims to analyze the strategic directions undertaken by some Italian craft firms in facing these changes in their environment.

The paper proceeds as follows. We outline the relationship between SMEs, especially craft firms, and digital manufacturing, open innovation, and servitization and propose some significant contributions from these research streams. After explaining the research method used, we describe the development of craft firms in Italy and outline their importance for national growth. Next, we highlight how some Italian craft

firms have integrated digital technologies in their design and production processes and adopted open innovation and servitization logic. These results are analyzed and discussed from the perspective of management. Finally, we conclude with the limitations of the study and directions for future research.

## Theoretical Background

Identifying papers for significant insights on this topic was a laborious task for two reasons. On the one hand, a few books and papers deal with this issue at an international level from a management perspective; on the other hand, several research streams can be taken into account to examine it. For the purpose of this study, we considered the following research streams: digital manufacturing, open innovation, and servitization.

### Digital Manufacturing

Digital manufacturing is regarded as the integration between digital technologies and manufacturing production (Foresight 2013). It includes an integrated suite of technological tools that offer a competitive advantage by reducing product development times and costs, as well as meeting customers' needs such as customization, increased product quality, and faster response to the market.

Although these synthetic considerations highlight the importance of examining this topic from the competitiveness perspective, there is much research on this topic in terms of computer-aided design (CAD), engineering (computer-aided process planning (CAPP) and computer-aided production engineering (CAPE)), virtual reality, automation, and process control. Many engineering and industrial design scholars are also focusing on management themes such as decision-making, manufacturing resource planning, logistics, supply chain management, and e-commerce systems. At an international level, the management literature lacks research on digital manufacturing and the opportunities they present for future development of handicrafts.

As noted widely in national magazines and periodicals in Italy, digital manufacturing can be a way to merge innovation and technology (Apanasovich 2014) with craftsmanship and tradition. Therefore, one way for craft entrepreneurs to compete in the future is to become digital artisans. However, the competition is increasingly strong also because of the emerging phenomenon of makers who emphasize the combination of design and artisanship (Anderson 2012; Hatch 2013). In this convergence era (Yoffie 1996), the development of digital technologies and decreasing costs of three-dimensional (3D) printers enable makers (individuals) to produce in easier and more affordable ways (Bettiol and Micelli 2014). Accordingly, and considering that the past is the past and the future is now (Normann 2001), craft firms should face this manufacturing transition phase (Rullani 2014), overcome this disorientation state (Baccarani 2007), and invest in digital manufacturing.

### Open Innovation

In the last decade, a number of strategic management scholars have focused on a new phenomenon that has developed as a result of increasing outsourcing, vertical

disintegration, reduction of the life cycle of the products, intensification of global competition, rising costs of research and development, and diffusion of ICT instruments (e.g., Jonsson et al. 2015; Verbano et al. 2015). This phenomenon is called open innovation, a new business model for industrial innovation that was defined by Chesbrough as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation, respectively” (Chesbrough 2003 p. 1).

Open innovation requires companies to open corporate boundaries to suppliers, partners, customers, third parties, and the community (Chesbrough et al. 2006) in their innovation processes. In this regard, the Berto Salotti company has proposed an interesting new manufacturing model called crowdcrafting, which includes the principles of the knowledge economy and experience economy, and the logic of crowdsourcing (Bonfanti and Brunetti 2015).

Developing products quickly and effectively, incorporating technologies and new knowledge in products (Del Giudice et al. 2013), improving the innovation process, meeting customers’ needs, and remaining competitive (Van de Vrande et al. 2009) are the main motivations that induce SMEs to undertake an open innovation strategy. The choice to collaborate with external sources depends on both the availability of internal skills and the desire to individually control the development and use of innovation (Schilling 2005). Some scholars also highlight the positive relationship between a network of different external partners and innovation performance (Gay 2014; Gronum et al. 2012; Maggioni and Del Giudice 2011; Meroño-Cerdan and Soto-Acosta 2005; Nieto and Santamaria 2010; Parida et al. 2012; Soto-Acosta et al. 2010, 2015; Trequattrini et al. 2015).

## Servitization

Studies about the innovation paths of industrial companies (Bifulco 2004; Silvestrelli 2004) show how production processes are progressively dematerializing. In this context, the interaction between manufacturing and services has rapidly increased in the last decade (Bryson and Daniels 2010; Falk and Peng 2013; Francois and Woerz 2008).

In this regard, Vandermerwe and Rada (1988, p. 314) coined the servitization concept with which they identify corporations that “are increasingly offering fuller market packages or ‘bundles’ of customer-focused combinations of goods, services, support, self-service, and knowledge.” Although various definitions are provided in the service and industrial management literature (e.g., Alvizos and Angelis 2010; Baines et al. 2009), there is agreement among scholars that manufacturing companies have to be customer focused (i.e. able to identify and meet customers’ needs and expectations) and innovate and expand their offering by integrating goods and services.

These services include all benefits and intangible assets that can generate customer satisfaction and create value. Mathieu (2001) classifies them into two categories: (a) service specificity that include customer services (e.g., online services), product services (e.g., after-sales, assistance, and distribution), and services as a product (consulting services) and (b) organizational intensity in tactical, strategic, and cultural terms. In addition, Mathieu (2001) proposes another classification by distinguishing business services that support a provider’s product (product services) from those that support the customer’s actions in relation to the provider’s product (customer services).

Manufacturing companies adopting servitization realize a differentiation strategy because expanding their service offering provides them with a competitive advantage (Baines et al. 2009; Brax 2005; Gebauer et al. 2008, 2012; Mathieu 2001; Vandermerwe and Rada 1988).

## Method

This paper outlines the relationship between digital manufacturing, open innovation, and servitization. After describing the development of craft firms in Italy by outlining their importance for national growth, we highlight how some best practices of Italian craft firms integrate digital technologies in design and production processes and adopt, at the same time, open innovation and servitization logic.

First, we undertake a descriptive analysis of secondary and primary sources, using surveys and data published on the institutional websites of important associations to which Italian craft firms belong. In particular, we consulted Confartigianato Imprese, an independent and non-party confederation open to all geographical, sectoral, and cultural sections of Italian handicrafts, and Movimprese, a quarterly statistical analysis of the entrance and cessation of enterprises undertaken by InfoCamere on behalf of Unioncamere, based on all the archives of the Italian Chamber of Commerce. Some of the national data collected are provided by Global Entrepreneurship Monitor Italy, the world's foremost study of entrepreneurship.

Next, we analyze relevant online articles in national magazines and periodicals (*Corriere della Sera* and *IlSole24Ore*). The keywords used for the search were “craft firms/enterprises/companies,” “craftsmanship,” “craft entrepreneurs,” and “digital manufacturing.” We considered four selection criteria: (a) Italian craft firms (excluding makers) that have invested in digital manufacturing, (b) firms with a business core based on personal luxury craftsmanship (jewelry, footwear, leather products, and clothing), (c) firms that specialize in technological innovations, and (d) the wealth and relevance of the information available in relation to our research objectives. Qualitative Solutions and Research (QSR) NVivo 10 software was used for the qualitative data analysis in order to search for keywords and to assist in coding the themes. The themes were inductively codified (Saldana 2009) in relation to the research purpose. With reference to servitization, we adopted Mathieu's (2001) model discussed in “Theoretical Background.”

## Craft Firms in Italy

There were 6,045,771 Italian companies registered with the Chamber of Commerce in 2015 (June 30) (Movimprese). While more than 50 % of these companies are employed in the service industries, manufacturing holds about 30 % of the Italian entrepreneurial fabric, and agricultural businesses about 13 %. This is also reflected in the results of a survey undertaken by Global Entrepreneurship Monitor (GEM) in relation to new entrepreneurship in Italy. In 2014, new business activities were mainly concentrated in the service industries (48.2 %), businesses services employed 24.1 % of these

activities, manufacturing employed 18.1 %, and the primary sector returned to lower levels (9.6 %).

Focusing on manufacturing, the situation has been particularly difficult for craft firms, which have decreased over the last decade by 7.26 %. Since the crisis began in 2008 until the beginning of 2015, almost 94,400 craft workshops have closed in Italy. From 1,470,942 active craft firms in 2010, the numbers have dropped to about 1,368,904 in 2015 (June 30). At the end of 2014, the Italian regions that have lost the greatest number of craft firms have been Lombardy (−11,939), Emilia Romagna (−10,126), Piedmont (−10,071), and Veneto (−9934). By percentage, the areas most affected were Sardinia (−12.2 %), Molise (−9.7 %), and Abruzzo (−9.4 %). Although all craft firms have been affected by the economic crisis, manufacturing craft firms have been severely affected, with the ending of 10,633 ironworking workshops, 6757 carpenters, and 5409 activities in the textiles, clothing, and footwear industries.

The impact of craft firms on business activities is important in the Italian economy. The craftsmanship includes a number of industries such as design and fashion, machine tool manufacturing, hi-tech, and personal luxury items (leather, footwear, clothing, and jewelry). Confartigianato Imprese, an Italian association created to serve artisans and small businesses, provided in 2013 a forecast (albeit paradoxical) in relation to the unexpected death of craft entrepreneurs. The effects on the population may seem small (−2.4 %), but the impact on the economy would be huge. In this regard, the added value may decrease by 11.9 % (equal to 4.5 billion euro), the unemployed may increase by 47.3 % (with the unemployment rate rising from 12 to 18.8 %), and the Made in Italy brand may decrease by 9.1 %.

### Integrating Digital Technologies in the Open Innovation and Servitization Logic

In this section, we examine how some best practices of Italian craft firms (Table 1) are integrating digital technologies in their design and production processes and following, at the same time, the open innovation and servitization logic. Focusing on craft firms

**Table 1** Some Italian craft firms operating in the personal luxury industry

Digital innovation	Industry	Italian craft firm	Location
3D printing	Jewelry	Ardovari	Caldogno (Vicenza)
		ArtDesignPN	Fiume Veneto (Pordenone)
		Cécile	Monte San Savino (Arezzo)
		.enough and .bijouets	Trento
		Mauro Chiarillo 8	Tricase (Lecce)
Foot scanner	Footwear	Italian Cobblers	Veneto and Lombardia Regions
		Vittorio Spemanzoni	Morrovalle Scalo (MC)
Body scanner	Tailoring	Dell’Orto Alta Sartoria	Verona
		Enrico Monti Perfectum	Bergamo, Mogliano Veneto (Treviso), Verona

whose business core is based on personal luxury craftsmanship, we study the strategic choices of jewelers, shoemakers, and tailors.

### **Jewelers and 3D Printing (or Additive Manufacturing)**

Given that Italy was the sixth largest exporter of jewelry worldwide in 2014 (Osservatorio Economico), the jewelry industry is particularly relevant to a study of national manufacturing. Some craftsmen are using additive manufacturing, colloquially known as 3D printing, in their design and production processes. 3D printing is a revolutionary process (Kurfess and Cass 2014) able to produce a 3D product by using different materials such as resins, metals, and polymers; jewelry is among the its major industrial application areas (Petrovic et al. 2011; Venekamp and Le Fever 2015),

Starting from a drawing or a handmade sketch, the designer creates a 3D design that perfectly represents the jewel in actual scale through CAD programs. Subsequently, the digital drawing is printed in three dimensions into a model of resin or wax by means of 3D printing. These high-definition printers are able to print for up to 24 h autonomously, without supervision. In this way, the designer can implement product testing to verify that the characteristics meet all requirements and customer expectations. This can be done once the customer arrives in the laboratory in a fast and inexpensive way. In addition, the designer does not have to call customers many times to ensure the products are in line with their expectations. All processes are managed online, with significant saving time and costs.

Creating a jewel is a painstaking process that requires expensive materials to create quality products. Thanks to this technology jewelers can develop projects with originality and personality by creating products in forms not otherwise achievable with traditional techniques. In particular, they can also produce jewelry with very complex, extremely thin shapes and exceptional surface quality, almost impossible to be realized with the techniques so far in use. Although it uses the same CAD model, the process still exhibits craftsmanship in the fact that the jewels are never perfectly identical; they differ in small details just as unique handmade pieces do.

### **Shoemakers and Foot Scanners**

According to a survey conducted in 2012 by Openjobmetis, an Agency for Labor, the recent economic crisis has led to a growing demand for ancient craft professions handed down from father to son. Despite having been neglected in recent years, they have always been a point of excellence in Italy. One of these important professions is that of shoemakers who repair, cut, sew, pack, finish, and garnish tailored shoes for customers in their craft workshops.

A new frontier for shoemakers is the foot scanner: it is a 3D scanner consisting of a closed box with eight rooms internal to the laser. It is able to provide in a few minutes a virtual 3D copy of a foot introduced in its interior (Witana et al. 2006). The geometry data gathered are immediately sent to the builders who can create unique footwear according to the specifications required by the customer. In addition to its simplicity of use, it enables the shoemaker to create highly customized products and, at the same time, offer many services. For example, a customer goes into a shoe store in Shanghai to buy a handmade, high-quality, Made in Italy product. He/she sticks his foot in the

foot scanner, which photographs it. The customer can view the various models, colors, and materials and then choose the desired shoe. The order comes into the craft shop and the shoemaker can begin to create the shoe by modeling it in 3D on the basis of the customer's foot image. Once ready, the shoe will be sent to the destination. In this way, craft entrepreneurs have the possibility to realize a customized shoe at distance. Such a pair of custom-made shoes can cost more than 5000 €.

The foot scanner enables artisan shoemakers to fill a need that is not satisfied today: the opportunity to access a unique, exclusive, and refined product, even from far away, through a network of small businesses that use exclusively Italian materials carefully chosen and crafted by the best artisans in Italy. In addition, assistance during the entire life of the shoe can be offered by providing for their cleaning, installation, or repair in response to customers' requests. In addition, craft firms can produce a quantity of footwear that a master shoemaker would fail to achieve individually, while maintaining excellent product quality enforced in accordance with the dictates of the oldest traditions.

Particularly interesting is the collaboration between eight shoemakers of Confartigianato Imprese, six of whom are from Veneto and two of whom are from Lombardia, aided by the Regional Centre for Artisan Cooperation, which has fostered Italian cobblers. It is a craft firm network that aggregates the best Italian artisan masters able to provide excellent products to customers, shops, and companies. In support of these craft firms, an association of 200 artisans was formed in Veneto called "Calzolai 2.0," which aims to innovate this industry by introducing new technological devices and giving useful suggestions for improvement and development.

### **Tailors and Body Scanners**

The fashion industry is not only great brands but it is also an extensive network of small-scale artisans who create from the drawing stage to cutting unique pieces. Despite the economic crisis, the handcrafted fashion workshop is still an attractive industry (Confartigianato). Exports have actually increased as never before, showing how the Made in Italy quality and innovative capacity maintain Italy's competitiveness.

From the digital manufacturing viewpoint, quite a few tailors are using the body scanner, that is, a dressing room with 3D infrared scanners that enable the customer's anatomical measures to be recreated in a few seconds in a simple and non-invasive way. In practice, the customer enters the dressing room only wearing underwear, and in 5 s, the system is able to collect thousands of points of information by means of infrared light that strikes the surface of the customer's body. Subsequently, the software processes these points and extrapolates the measures point to point. In other words, the body scanner detects and reproduces the customer's anatomical measures in a 3D model in a few seconds and saves them directly in the online profile so that the measurements can be reused for future purchases. The tailor can still enter the customer's measurements on the site without using the scanner. The buyer can then choose, always using the digital system, the style and fabric of the garment, which will then be finished in about 2 weeks without further testing.

This technological innovation offers many advantages. The tailor can avoid opening a direct headquarters but follow many consumers worldwide by offering them a highly detailed and customized service. The shopkeeper supports lower costs, given the non-



necessity of the tailor. Consequently, the price of the tailored garment (dress or shirt) approximates to that of the factory. Customers generally react with curiosity rather than embarrassment. They enjoy the time saving and the assurance that the product is a truly tailored, Made in Italy garment from the fabric to processing. This adds value to the product quality.

While some craft firms exclusively live online, others are opening temporary showrooms to bring themselves to the customer. Some firms are considering the possibility of expanding the target market, addressing themselves not only to entrepreneurs and professionals but also to hotels: guest will be received by appointment by company personnel who will guide him/her in choosing and buying a highly customized garment.

## Discussion and Implications

The craft firms examined for this study are Italian best practices because they are forward looking in terms of their strategic choices, which reflect the relationships between digital manufacturing, open innovation, and servitization. They have understood that the digital technology, openness of business boundaries to network, and service offerings are vital for meeting customers' needs and providing them with value.

In light of the entrepreneurial experiences collected, it is possible to identify the opportunities derived from the integrating digital manufacturing in an open innovation and servitization logic (Table 2).

In particular, adopting the digital technological innovation allows craft firms to enjoy the following advantages: (a) opportunity to address many customers also simultaneously, (b) international presence without geographic limitation, (c) reduced working times, (d) limited waiting time for product prototyping, (e) attention to detail and precision in the product design and creation, and (f) ability to create original and complex products not obtainable with traditional design and production techniques.

**Table 2** Opportunities to Italian craft firms

Digital manufacturing	Open innovation	Servitization
To address many customers also simultaneously	To creatively involve customer in the design and production processes	Customer services: opportunity to choose desired materials from all over the world online, to enjoy a curious shopping experience, to reduce waiting times during the purchasing process, and to reduce purchase costs for the craft product
To be present at an international level without geographic limitation	To collaborate with more craft firms in network, located in various parts of the world	Product services: home delivery worldwide, reduced waiting times for product delivery, and assistance for the entire life cycle of the product
To obtain reduced working times	To meet customers' needs also simultaneously thanks to firm networks	Service as a product: consulting services
To achieve limited waiting time for product prototyping		
To enjoy more attention to details and precision in the product design and creation		
To create original and complex products not obtainable with traditional design and production techniques		

In terms of open innovation logic, the Italian craft firms considered for this research creatively involve the customer in the product design and production processes. In this way, customers participate in the creation of a customized product and their involvement contributes to making this product unique and original. In addition, customers can choose precious and specific materials (e.g., fabric, leather, stones) from different providers located in various parts of the world thanks to the network of firms created by the artisans. This network is crucial to allow craft firms to address many customers also simultaneously.

From the servitization perspective, we examined the innovation into service offerings carried out by craft firms considered by means of the “service specificity” dimension offered by the Mathieu’s model (2001). In particular, craft firms provide some “customer services” such as the opportunity to choose desired materials (e.g., fabric, leather, stones) from all over the world online and to enjoy a curious shopping experience, reducing waiting times during the purchasing process, and reducing purchase costs for the craft product. In terms of “product services,” customers can enjoy home delivery worldwide, reduced waiting times for product delivery, and assistance for the entire life cycle of the product. “Service as a product” essentially includes consulting services. All these services are aimed at meeting customers’ needs such as (a) assurance of customization, purchase of a tailored Made in Italy product; (b) authenticity, exclusivity, sophistication, and uniqueness; and (c) fun and involvement.

All these strategies are not only customer focused but also aimed at providing services that meet and build customer loyalty. According to Mathieu (2001), a service offering must be able to add value to the product in order to differentiate it. In the case of craftsmanship, these services can be provided if craft firms choose to open themselves to digital technologies, collaborate with other firms, and expand further services.

However, only using technology is not sufficient to remain competitive. Every technological innovation can be imitated by competitors (especially makers) at any time. The artisan’s knowledge and craftsmanship skills along with the possibility of offering services by means of a network represent original elements of competitiveness. In other words, the digital technologies (e.g., 3D printing and scans) do not replace the old methods of design and production, but rather represent a tool to be added to the artisan’s toolbox. After all, every artisan is, and remains, a traditional artist whose work is moved by passion and love of detail. According to Sennett (2008), being an artisan means having “the desire to do a job well for its own sake.” Thus, digital technology only modifies the way in which it is possible to realize the artisan’s ideas.

Given that involving customers in the business innovation processes is important, craft firms can make their participation wider and more active. Craftsmen can invest in Internet and social media (Bonfanti and Brunetti 2015) with at least a twofold purpose. On the one hand, they can attract new customers by using, for example, digital manufacturing as a marketing tool to promote their products and Made in Italy brands all over the world. This opportunity is currently very neglected by craft firms, at least in Italy. On the other hand, they can raise awareness about the value offered by craft work. According to Micelli (2011), artisans should become storytellers, communicating the history, tradition, and culture of their works to customers with their experiences and feelings rather than jealously guarding their knowledge. Moreover, e-commerce can be an interesting tool to develop craft activities. Choosing these online paths, however, should not lead artisans to neglect the relational dimension of the service quality

(Baccarani et al. 2010; Grönroos 2007) offered to customers because it is in itself an invaluable added value.

Craft entrepreneurs can also open business boundaries to other stakeholders by enlarging their networks to partnerships with other craftsmen to expand mutual skills and better meet, if not anticipate, customers' needs. In addition to customers and suppliers, craft firms can open their knowledge to other stakeholders such as designers, architects, engineering, students, universities, and research centers to create networks that further develop creativity and knowledge. In this regard, Berto Salotti's experience (Bonfanti and Brunetti 2015) as an Italian craft firm is significant, as its core business is producing handmade, Made in Italy sofas through the direct involvement of multiple stakeholders.

In addition to these practical implications, this study provides some social implications. Telling experiences of best craft firms' practices in not only high school but also university courses can induce young people to undertake this work. Generally, they do not know the peculiarities of the crafts and today again associate mentally craftsmanship with production processes particularly related to manual processing. Most of them ignore how craft activities are changed in the time: the same digital technologies are transforming manufacturing processes. Culturally, people imagine and evaluate craft professions as less qualified and not rewarding. However, crafts are often an interesting employment opportunity in terms of pay and contracts and allow levels of satisfaction and empowerment most often ignored or underestimated. This study suggests to craft firms to promote their activities among young people to help them discover the beauty of their work (Crawford 2010). Young people could also help senior artisans to access the social media world.

## Conclusions, Limitations, and Direction for Future Research

This study highlighted the importance for craft firms to open themselves to ongoing changes by undertaking the following three strategic directions: (1) to embrace the use of digital technologies rather than regarding technology as a threat to the firm's future, (2) to involve customers in the design and production processes and expand the firm's network, and (3) to offer craft products by providing a wide service offering. Following all three of these strategic paths will help craft firms to survive, renew themselves, and increase their competitive advantage, by capturing opportunities offered by new technologies and new ways to produce. Mixing ancient and digital knowledge (Rullani 2004) in an open context of collaboration will allow craft entrepreneurs to positively look to the future.

This research is not exhaustive and presents some limitations. This explorative analysis is necessarily incomplete. As the selection of the craft firms explored here was subjective, the conclusions of this research cannot absolutely be generalized. The usefulness of this study lies in focusing on a few Italian best practices, representing a point of departure, not arrival, to improve themselves and serve as an example for other craft firms to continue to compete in the future. The analysis is an attempt to identify (and collect) the most significant craft realities at a national level according to the research objectives and thus provide an incentive for further research.

This study thus opens up a number of potential research avenues. It should be interesting to investigate the impact on business performance in terms of economic results generated by the firm, business image in international markets, and young people's attraction to artisan professions. In addition, it would be significant to study craft firms similar to those considered for this research in order to understand how they are integrating digital manufacturing with an open innovation and servitization logic. From the methodological point of view, a qualitative analysis by means of interviews of craft entrepreneurs will obtain further information about strategic directions and opportunities.

Another promising area for further research is the analysis of the craft firm network. By means of a social network analysis (e.g., Scott and Carrington 2011; Knoke and Yang 2008; Anzera 1999), it will be possible to conduct an ego-network-centered study to identify key craft firms that are strategically fundamental for developing the Italian craftsmanship at national and international levels. By means of this analysis, it would also be possible to identify isolated craft firms (i.e., their participation in the network is irrelevant), pendant (i.e., the firm is “hooked to the network” by a single relationship), bridge (i.e., the firm connects two subgroups), and gatekeeper (i.e., the firm creates relationships between a subset and the outside of group within the network). Finally, it could be significant to calculate the indicators of (local and global) centrality to assess the craft firms that have further connections with other stakeholders, and network density to understand the general level of relationships.

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