RICHES

RENEWAL, INNOVATION AND CHANGE:
HERITAGE AND EUROPEAN SOCIETY

This project has received funding from the European Union's Seventh Framework programme for research, technological development and demonstration under grant agreement no. 612789

D5.1 The Use of Craft Skills in New Contexts

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- Subject to final approval -

May 2015

Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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1. Executive Summary

This report outlines the results of a qualitative study that examined how craft skills can generate value and competitive advantage for the European creative economy, particularly with respect to employment and the creation of new jobs. Two pathways for value generation have been prefigured and investigated: through the integration of new technologies to configure new ways of using craft skills; and through the transfer of craft-related skills to other economic sectors, with a focus on the sectors of design and fashion. In relation to this, the report outlines the role of digital technologies in the transmission and transformation of craft skills, especially through informal education venues and experimental approaches. Methodologically, the study was informed by desk research and empirical research carried out through interviews, an online survey and case studies in the UK, the Netherlands and Romania.

Key findings

Factors driving a European craft revival

Social, cultural, and technological factors contribute jointly to **a craft revival** manifested as:

- A resurgence of interest in craft skills and a Do It Yourself (DIY) culture and ethic;
- The emergence of digital fabrication and hybrid forms of making, spearheaded by online and offline maker communities;
- A rising consumer demand in unique craft products;
- The reinvention and repositioning of craft skills, techniques, patterns and materials, and their augmentation through integration of digital technology; and
- The promotion of ethical approaches advocating sustainability, ecologic use and local production and development.

The craft revival is championed by **the maker movement,** which started as a wave against mass production and consumerism, putting forth values of simplicity, sustainable living, and individual creation and design. Powered by the capacity of the Internet to connect online communities, buyers and sellers, the maker movement changed into a worldwide phenomenon claimed to be at the forefront of a new industrial revolution, the makers' era. The following impacts on the craft economy are connected with the maker movement:

- Recalibrating retail by enabling direct relations between makers and a global consumers market, faster routes to market, faster and easier marketing and transactions, driving market demands for unique objects through the communication of intangible assets and values associated to the products commercialised
- Strengthening the position of the maker in the economy by opening up new digital business models, raising the prestige and desirability of crafts objects for global consumer markets, and linking makers to global audiences
- Opening up new opportunities for learning, skills development and transmission by providing new (online) spaces for connection, communication, collaboration, learning and exchange for amateur and professional makers and craft consumers
- Contributing to the democratisation of design, with patterns, techniques, tools and resources being freely exchanged, and consumers often involved in co-creation of products and services.

Cultural institutions and crafts have a historical relationship that is gaining momentum and is becoming increasingly important, albeit insufficiently exploited, in the context of a craft revival.

This report focuses on **museums**, which preserve craft and design knowledge under the form of artefacts and contextual documentation. Museums perform three key roles: 1) An educational role - Through their collections, exhibitions, learning programmes or multimedia artefacts, museums are essential actors in the transmission of craft and design knowledge and skills, and open spaces for critical reflection on the socio-cultural value and current status of craft; 2) A creative and inspirational role - They encourage contemporary creativity and innovation which can draw inspiration from or build upon traditional knowledges, artefacts and ways of making; and 3) An economic role - They support the craft economy by offering a retail venue for craft objects and, through association with museums brands, contribute to their selective positioning and contemporary relevance. It is to be considered, however, that museums remain faithful to their primary mission of preserving, curating and transmitting cultural artefacts and knowledge, and – except a limited number of museums – generally they do not claim a role in fostering the revival of crafts, or opposing the disappearance of craft professions and skills. To capitalize upon the potential of museums for supporting crafts along the three axes identified, it is necessary to set in place collaborations (especially with educational institutions) by which the knowledge and artefacts preserved are analysed, interpreted and used in contemporary creative expressions.

Intellectual property (IP) frameworks are essential tools for protecting and promoting the fruits of creative endeavour in the cultural and creative industries, and for converting creativity into economic value. IP frameworks can be used strategically in the sectors of craft, design and fashion to promote innovation and creativity and support functioning business models. For fashion, all forms of Intellectual Property Rights (IPR) protection are relevant, from design rights to copyright. Craft works are protected by copyright and design rights. IPR issues are raised by the integration of digital technologies in arts and crafts production and some of the principles of the maker movement, for instance the ethos of free sharing. However, an analysis of craft practice around online communities reveals that what is shared covers resources, knowledge, techniques, and tools, while original designs are generally protected by copyright or design rights, especially when makers use IPR as a form of revenue generation. IPR play a role also in the creative re-use of content. The re-use of cultural heritage material can spur innovation and creativity, however it is limited to public domain works. A more open strategy to IP is advisable for content owners, if this is not necessary as a contribution to their financial self-sustainability.

In this context, crafts are ideally positioned to contribute to value generation and innovation, which can be analysed at two levels: 1) technology-driven innovation and 2) innovation through the transfer of craft-related skills to other sectors of the economy.

Technology-driven innovation

Integration of new technologies in design and making processes (e.g. additive manufacturing, laser cutting, etc.) can contribute to enhanced efficiency, creativity, interactivity, and customisation of products. They also improve production processes by: speeding up production and increasing volumes while retaining aesthetic characteristics and unique craft qualities through hybrid manufactured and handmade production; enhancing digital creativity through the exploration and visualisation of concepts and ideas; facilitating experimentation through rapid translation of design concepts into prototypes and/or final pieces; and enabling the production of new objects and unique designs affordable only through new technologies. At the same time, issues are raised by unequal access to specialised skills, devices and tools. Moreover, the integration of technology in design and making needs to consider how it affects the value of craft products (often relying on the handmade) and the makers' practice beyond financial and productivity considerations. From the makers' perspective, the integration of technology

appears to be regulated by a craft ethos, which can be manifested differently by contemporary and heritage makers.

Innovation in product marketing and distribution is afforded by web-based technologies, in particular social media, which offers makers: new venues and means for communicating value and brand image building; new routes to (global) markets; new opportunities to engage with customers; and possibilities for growing professional networks. To translate these opportunities into business growth, there is a need for: entrepreneurship and strategic business skills; knowing the market, customers and competitors, along with a clear understanding of products positioning; knowing how to communicate the *value* of products, which can stand in product attributes, the process of making or maker's skills; skills to enable a seamless use of a variety of web-based tools for displaying products for sale, communicating attributes, and engaging with customers.

New business models and organisational forms are afforded by the integration of digital technology, for instance: models based on emerging technologies such as digital manufacturing; models thriving on e-commerce; collectives and partnerships between makers and creative entrepreneurs and other forms of association. Taking hold of these opportunities requires business acumen and entrepreneurial skills, which are less accessible to makers in some contexts, especially in rural and more isolated environments.

Innovation through skills transfer to other economic sectors

The territories open to craft intervention range from luxury goods manufacturing to fashion, architecture, tourism and furniture industries, where crafts can bring added value and competitive advantage in the form of new materials, new ways of making, skilful integration of new technology; unique, distinctive products, and brand distinction. Some European economies are more receptive than others to the added value that craft skills can bring to the creative economy. Barriers to skills transfer are associated with a lack of awareness of the value that craftspeople can bring beyond sector-specific activities, lack of cross-sector linkages and collaborations, and (from the perspective of makers) the perceived lower status of craftspeople working outside the craft sector.

Summing up on craft and innovation, the pathways to innovation outlined present an unprecedented potential for strengthening the socio-economic standing of makers. However, best practices and innovative directions are in many instances only prefigured, some spearheaded by bold and creative young makers and entrepreneurs that were not afraid to experiment and take risks to cultivate innovation. There is the need to ensure that these initiatives scale up and spread, noting that these successful ventures co-exist in Europe with a continuous decline of crafts and an eroding position of highly skilled craftspeople. To widen the scope, a series of **recommendations** are provided. A first key issue to address regards the ambiguous position and status of the craft sector. The proposal is to both:

1. Establish the place of the craft sector and craftspeople as distinctive from other skilled trades; and
2. Operate a paradigm shift, to position craft beyond the maker and workshop-based paradigm, thus acknowledging its distinctive contribution to manifold domains, from fashion and design to tourism and architecture.

In relation to this, makers need better access to information about the possibilities opened to them beyond sector-specific activities; they also need to become more flexible and develop cross-disciplinary competences, if they are to become skilled in maintaining portfolio careers.

Second, it is important to document experimental initiatives and new ventures and create a growing body of evidence which can fasten the adoption of craft-related innovation across European countries. Third, attention should be motioned towards craft professionals that are cut off from information access and the promises of globalised markets. Heritage makers, often working in rural areas are in a disadvantaged position, with lack of access to information and skills – digital and entrepreneurial. Apart from facilitating access to information and training, this study found that collaborations between makers and entrepreneurs and other forms of association hold great promises and present a still untapped business potential, which should be better communicated.

The impacts on employment and careers can be summed up in six broad trends:

1. Self-employment and (home-based) micro-businesses on the rise
2. Portfolio working is embraced by more and more professionals
3. Increases in career change and career return
4. Blurring boundaries between amateur and professional craftspeople
5. Emergence of novel professional profiles, encompassing digital fabrication skills as well as mixed profiles blending old and new making skills
6. Requirements for complex skills sets bridging craft, technology, and entrepreneurship

The shifts in the job market ask for changes in the **means and approaches for the transmission of craft-related old and new craft skills**, to educate new generations of professionals with interdisciplinary skills sets and broad cross-disciplinary thinking patterns and approaches. At present new professional profiles, such as digital fabricators, acquire their skills in informal maker spaces. Skills are themselves transformed, bridging old and new notions of (digital) craftmanship. Some of these maker spaces slowly start to become systematised (e.g. Fab Labs), and steps are taken to devise new models that link to formal education, through initiatives such as Fab Schools. Moreover, maker education proves to be a rewarding approach not only for dedicated (future) makers, but also as a way to impart essential competences for 21st century students and professionals. It is proposed that maker education, rooted in a learning by making paradigm (analogous to the constructivist 'learning by doing' educational theory) should find its place in European classrooms, to drive the acquisition of key skills sets for the 21st century.

2. Introduction

The strategic socio-economic importance of the European Cultural and Creative Industries (CCIs) has received increasing attention in recent years, driven by the recognition of the role that culture and creativity have not only in promoting balanced social orders, but also as sources of economic value. The role of the CCIs becomes even more important in a new economic order sustained by digital infrastructures and technology-powered communication, networking and exchange systems, where communication, relationship building and the capacity to offer experiences rather than merely products and services (EC 2010b) become crucial points of competitive advantage. For some, economic growth and technological innovation may come at the expense of values, practices, knowledge and skills that have been inherited from the past and are considered nowadays facets of our heritage, to be conserved and safeguarded rather than employed in revenue-generating activities. New technologies and innovation have revolutionised social and economic orders in the past, making practices, tools and professions obsolete, and offering the possibilities to forge new, more effective ones. However, the stakes are higher today than ever before, as machines become more powerful, intelligent and sophisticated, offering increased possibilities to replace humans in intellectual, design, and hands-on creative activities.

This report examines how craft-related knowledge and skills can be used strategically to stimulate creativity, spearhead innovation and generate economic value and new employment opportunities. It builds on the assumption that socio-economic innovation and growth can be pursued effectively by leveraging, rather than disposing of knowledge, skills, techniques and professions that have thrived in our societies until now, and are now endangered. Adopting an inclusive approach to conceiving innovation as an alternative to deterministic views of uncontrollable technological growth, the report demonstrates that culture, creativity, and economic and employment growth can be effectively reconciled. The study specifically addresses craft-related knowledge, skills and techniques, and seeks to shed light on how they can be revived not as cultural instances to be safeguarded but as important sources of competitive advantage, particularly when employed in conjunction with digital technology. This study is therefore as much about recognizing the value of culture and creativity, as it is about repositioning intangible cultural assets such as craft knowledge and skills as parts of our current lives, sources of economic value and pillars of cultural continuity and cohesive societies.

Current European and worldwide trends, such as the Maker Movement, demonstrate the revival of crafts and a resurgence of interest in its underlying body of knowledge and skills, as well as the qualities of uniqueness and aesthetics that distinguish craft objects among mass produced ones. Best practices and country-based economic performance reports also indicate their global economic contribution, and that digital technologies can be used to augment and enhance rather than replace craft-related production practices. This report argues, moreover, that if these trends are sustained the economic value of crafts will grow, in addition to the role they play in connecting contemporary societies to values, traditions and knowledge that are deeply embedded in craft practice and serve as a link of cultural and historical continuity. In addition to the Maker Movement, the role of cultural institutions in sustaining crafts is investigated, shedding light on their educational function in the transmission of craft-related knowledge, in inspiring contemporary craft and design practice, as well as their economic role, as a retail venue for craft products.

The central piece of the report examines how craft skills can generate economic value and be used to direct innovation through employment in new contexts - either new economic contexts distinct from the craft sector, or novel contexts configured through the integration of digital technologies in craft practice. The impacts in terms of economic performance are therefore

mapped in relation to the creation of new jobs, employment, and strengthening the position of the maker in the creative economy. The transfer of craft skills in other economic sectors, from architecture to fashion design is shown to generate economic value and be a source of competitive advantage drawing on makers' intimate knowledge of materials and spaces, and their ability to produce unique, distinctive designs. The use of new technologies at all stages in craft products lifecycle contributes to enhancing designs, maximizing work efficiency and opening up new marketing and distribution channels, which can result in the creation of new jobs in existing production companies and expanding opportunities for self-employed makers.

Alongside technology-driven innovation and the use of craft skills in productive contexts, the study is equally focussed on understanding how to enable the effective transmission of craft and design skills, how can technology be used for transmission, but also how its integration changes, hybridises or completely transforms craft skills. In particular, the role of informal education venues, channels and approaches for transmitting craft knowledge and skills are surveyed, from museums and galleries to Fab Labs and online maker communities.

2.1. Background and Rationale

We are living in a society permeated by ubiquitous and pervasive digital technology, where ways of living, professional pathways and profiles are being constantly reconfigured. Digital technology has nested itself in most industries, including the creative and cultural sectors. Increased technologisation is high on the agenda of policy makers, governments, and corporate managers. *Europe 2020 - A strategy for smart, sustainable and inclusive growth* (EC 2010b), drafted at a time when the economic crisis had "left hundreds unemployed", puts forward aims for a society and economy that develop in smart, sustainable and inclusive ways, capitalising on the potential of new technologies (particularly digital) as key innovation drivers. Digital technologies (DTs) are essential tools that can uphold the infrastructure of an interlinked economy, enabling fast and efficient operations from a Digital Single Market (EC 2010b). At the same time, increased technologisation and technology-powered innovation are not socio-economic panacea. The uptake of new technologies is known to have revolutionised markets and professional ecosystems, making some jobs obsolete, replacing others with machines, while creating new professional profiles and business models. This is happening at present at accelerated rates in what is called by some the new industrial revolution (Anderson 2014), characterised by increased pervasiveness of digital technologies at all levels of the society and the economy, causing disruptions, revolutionising systems, while opening novel opportunities for business growth and development (Bakhsi et al. 2013a). Some groups, professions, and skills have been placed in positions of vulnerability by technologically-driven innovation in all sectors of the economy, craft skills being a noteworthy example. At the same time, these same technologies have been used to put new spins on a variety of traditional and/or forgotten crafts, driving what is known as the Maker Movement. With philosophical roots in the Arts and Crafts movement of the nineteenth century and a similar ethical drive, the Maker Movement represents at the same time an unprecedented phenomenon, for the way it recognizes the value of digital technology and integrates it to re-invent, reposition and show the continued relevance of craft-related skills, materials and techniques. The worldwide resonance and impact of the Maker Movement is powered by digital technologies in several ways: Social media provide the tools and the spaces for putting makers in direct contact with their customers and communicate their products and their value. Amateur and professional makers use social media to nurture exchanges and networks, some of them growing into fully fledged online communities. Online marketplaces such as Etsy

prove that craft products, once thought to be marketable in face-to-face scenarios, can effectively be presented and sold in virtual spaces. New business models emerge leveraging the power of online media, with remarkable positive impacts particularly on vulnerable groups. Makers without access to finance can market and sell their products from their homes. The number of unemployed professionals who come back to crafts or take crafts as a new profession is growing. Old skills and new skills are cultivated in parallel, causing hybridisation, but also slowly marking their own territories. Established craft-related practices continue to produce objects that take advantage of digital technologies for marketing and distribution. At the same, time, some craft practitioners choose to use digital technology in the process of design and making, bringing efficiency to their work, or creating new objects and new designs that were not possible with old tools. Additive manufacturing (or 3D printing) is one of the technologies that offer a large array of uses for makers, whether it is used to translate concepts quickly into practice through rapid prototyping, or used to design and produce finite objects.

The examples above show the relevance of crafts for contemporary societies and that digital technologies, rather than replacing them, can be used to generate economic value, new jobs, and spearhead innovation for the benefit of makers and European societies. These impacts are, however, unequally spread. Some makers, some markets, and some economies benefit more from crafts than others. The phenomenon that is termed in this report ‘a craft revival’ co-exists with a rapid decline of crafts with coordinates that reflect, albeit in negative ways, the same phenomena that encourage the resurgence of crafts: lack of consumer demand for craft products, the decline of formal educational infrastructures for the transmission of certain craft skills, the loss of skills, knowledge and sensitivity around materials and making processes which are the epitome of the learned, highly skilled craft professional. The analysis conducted for this report situates crafts at the crossroads between these two opposing sets of phenomena: the ones associated with a revival of crafts, and the others marking its decline. The report first maps the dimensions of these phenomena, and then moves on to shed light on how crafts can generate innovation and economic value, ultimately benefitting not only craft professionals, but the entire European society and economy. While the focus of the report is economic, it also pays attention to how the status of crafts is influenced by different dynamics and actors operating in the social, cultural, economic, and legal spheres. It examines the role of museums in supporting crafts, both in economic and educational terms, and the bearing of legal and Intellectual Property frameworks for the sectors of crafts, design and fashion.

2.2. Role of this Deliverable in the Project

One of the critical aims of the RICHES project is the reconciliation of culture, investment and ultimately economic and employment growth. WP5, of which this report is part, is specifically concerned with understanding the economic valence and potential of cultural heritage and cultural resources, and map and elicit ways and strategies by which the economic value of culture can be capitalised upon. Within this work package, Task 5.1 focuses on skills and jobs in the cultural sector and creative industries: how these are affected by the digital economy, what new professional requirements arise, what are the effects of DT on careers and employment, and ultimately how can economic growth be attained through balanced pursuit of innovation while exploiting the immense value of our cultural heritage. These are the topics tackled in this report, focusing on crafts as an example of a sector and practice bearing social, cultural, historical and economic value. The report maps the mixed impacts of digital technology on crafts – on the one hand influencing its decline, as handmade processes of production are being replaced at an

accelerated rate by machines, but contributing at the same time to a revival of crafts by offering new tools for design and making that can be complemented with established techniques, and new avenues for marketing, distributing and selling craft products. The report thereafter investigates pathways for innovation and value generation for the creative economy, showing how crafts can contribute to economic performance, generating competitive advantage and the creation of new jobs.

In addition, the RICHES project acknowledges that specialised knowledge and skills associated with hand-making and manufacture are fragmented and under threat (RICHES DoW: 20). This is a key aspect treated in the present report. The study examines the factors that contribute to a decline of craft and craft skills, and in parallel maps conditions and best practices for the revival of crafts, with a focus on the Maker Movement and approaches that leverage the potential of DTs. The role of DTs in the transmission and transformation of craft skills is examined, as well as experimental informal learning approaches and venues such as Fab Labs.

This report deepens and complements the themes approached in the *RICHES Deliverable 3.1. Transformation, Change and Best Practice for Cultural Heritage Processes*, specifically the Chapter *The European Craft Sector: Mapping the Context of Change and Recommendations for Revitalisation and Skills Transfer.* This chapter mapped the changes brought about by digital technology to the craft sector, and identified trends, opportunities and challenges for a craft revival. The present report builds upon these results, and provides a deeper analysis of the strategic position of crafts and craft skills in contemporary Europe, privileging an economic perspective.

2.3. Key Objectives

Against the background described above, the main goal of this study was to shed light on how craft skills used in new contexts can generate value and competitive advantage for the European economy, particularly with respect to employment and the creation of new jobs. Two pathways for value generation have been prefigured and later examined: through the integration of new technologies to configure new ways of using craft skills; and through the transfer of sector-specific skills to other economic sectors, with a focus on the sectors of design and fashion. In relation to this, the study assessed the role of digital technologies and informal education venues in the transmission of craft skills. These analytical foci are captured in three research objectives:

1. Understand how craft skills can be a source of innovation and value generation for the creative economy by leveraging on the potential of digital technology and through their transfer in other economic sectors
2. Understand how new technologies impact on craft-related careers in the creative industries
3. Examine the role of digital technologies in the transmission and transformation of craft skills, with a focus on informal education venues and experimental approaches.

2.4. Scope and Definitions

The study situates itself in an area that has been, recently, the object of several European and national studies, since the cultural and creative industries came to be recognized as important drivers of innovation and key players for economic growth and the economic value of culture and

cultural goods began to gain in appreciation and research interest. This interest came with a plethora of studies, both national and European which asked for and proposed or adapted their own terminological and conceptual approaches (see for instance DCMS 1998/2001; KEA 2006; UNESCO 2006; European Creative Industries Alliance – ECIA publications[1]). Engaging with these debates is beyond the scope of this study, however a systematic review of current studies was conducted in order to situate the present study and agree on terms and definitions that can be used consistently. Approaches and definitions have been selected in line with the vision of the RICHES project, and the taxonomy of culture-related terms published as one of the first outcomes of the project (see RICHES Taxonomy 2014). Definitions and approaches are further outlined below, going concentrically from the restricted sector of craft and craft-related skills, to the cultural and creative industries and the creative economy.

Craft and craft skills

Craft activities are generally distinguished by the following characteristics, applied to the making, repair or restoration of objects, structures and buildings:

- "Understanding of and engagement with materials.
- The application of haptic skills and hand-controlled tools.
- The honing of skills learnt over time.
- One-off or relatively small batch rather than mass production.
- Maker impact on conception, design and aesthetics of finished product.
- Cultural embedding of finished product" (Jennings, 2012).

While these key features are generally accepted as distinctive for craft, it is notoriously difficult to precisely define and distinguish craft practice from other practices and economic sectors. A first issue is that the distinctive attributes of craft (e.g. specialised skills, hand making) reside in the *process* of production, rather than in the *products* created, as the same products can be created through hand making processes or with machines (TBR 2006). At the same time craft does not preclude the use of machines in either design or making stages. This ambiguity makes craft professions difficult to identify in European or country-based industrial and occupational classification systems. A study commissioned by the UK Creative and Cultural Skills concluded that crafts could integrate tools at three levels, with the bulk of craft activity being focused on the first two, while the third borders manufacturing:

1. Exclusive use of hand tools and hand-operated tools
2. Use of automated machinery which requires specialised skills, and where only part of the entire making process is automated
3. Use of automated machines where a low level of skills and only basic training are required (TBR 2013).

In some European economies, craftspeople and skilled industrial workers who may work exclusively at the third level above may be grouped together in occupational classification systems as 'skilled traders'. The distinction is further blurred when the term 'craft' is used to refer to skilled trades such as roofing and plumbing in the building industry (Dodd 2013).

Another aspect to consider regards the degree of original design and creative intention that goes into craft activities, by which *contemporary crafts* are distinguished from *traditional* or *heritage crafts*. Contemporary crafts are associated with the work of contemporary makers and designer

[1] eciaplatform.eu

makers, drawing on original designs and more closely associated with fine arts. Their value often lies in originality, and the designer maker's artistic intervention. Traditional crafts are, on the contrary, operating from a creative space that draws directly on cultural heritage, using inherited techniques and designs. Authenticity, rather than originality, are the trademark of traditional crafts. However, in practice the lines of distinction between contemporary and heritage crafts are blurred, especially as the former take inspiration for designs, or adopt techniques from the latter (Woolley 2007). Nonetheless, this distinction can have a bearing when mapping crafts. For example, the document mapping the creative industries published by the UK Department for Culture, Media and Sport (DCMS 1998) mentions that the analysis covers only those crafts which include both design and making processes, excluding therefore craftspeople making products based on existing designs, or work conducted for restoration and reproduction.

A third issue regards the line of distinction between amateur and professional crafts: "The question must be posed, when is a craft an accepted body of skilled techniques learned over time, with materials worked by hand (albeit often using sophisticated hand tools and hand-controlled machinery and equipment) and when is it an easily and relatively quickly learned skill of making a finished product for sale by hand?" (Crafts OSB 1993).

The difficulty of positioning crafts, as well as the porous boundaries between crafts and other sectors are revealed in some countries by the different words used to indicate craft practice. In Dutch several words are used:

- '*Huisvlijt*'(lit. 'home effort') refers to amateur crafting such as home knitting. It's connotation in many cases is 'made with love and patience', cottage industry
- '*Ambacht*' (artisan industry, also: 'tacit knowledge based industry' or 'skilled trades') refers to professional crafting, but also to handmade as in: 'the hand of the master making a unique piece'. (Haagsma, 2013)

Other terms in Dutch with their English translations are: *Kunstnijverheid* - craft; *Handwerken* – artisan industry; *Vakmanschap* - craftmanship; *etnografica/tribale* or *etnische kunst* - tribal/ethnographic art.

This report covers all areas of craft practice, both traditional and contemporary, and applied to making as well as restoration and repair of objects and structures or buildings. It considers makers engaging with reproductive work, as well as designer makers coming up with original designs, effectively covering all areas laid out in Figure 1: from reproduction to original design, and from handmade one-offs to small batch production.

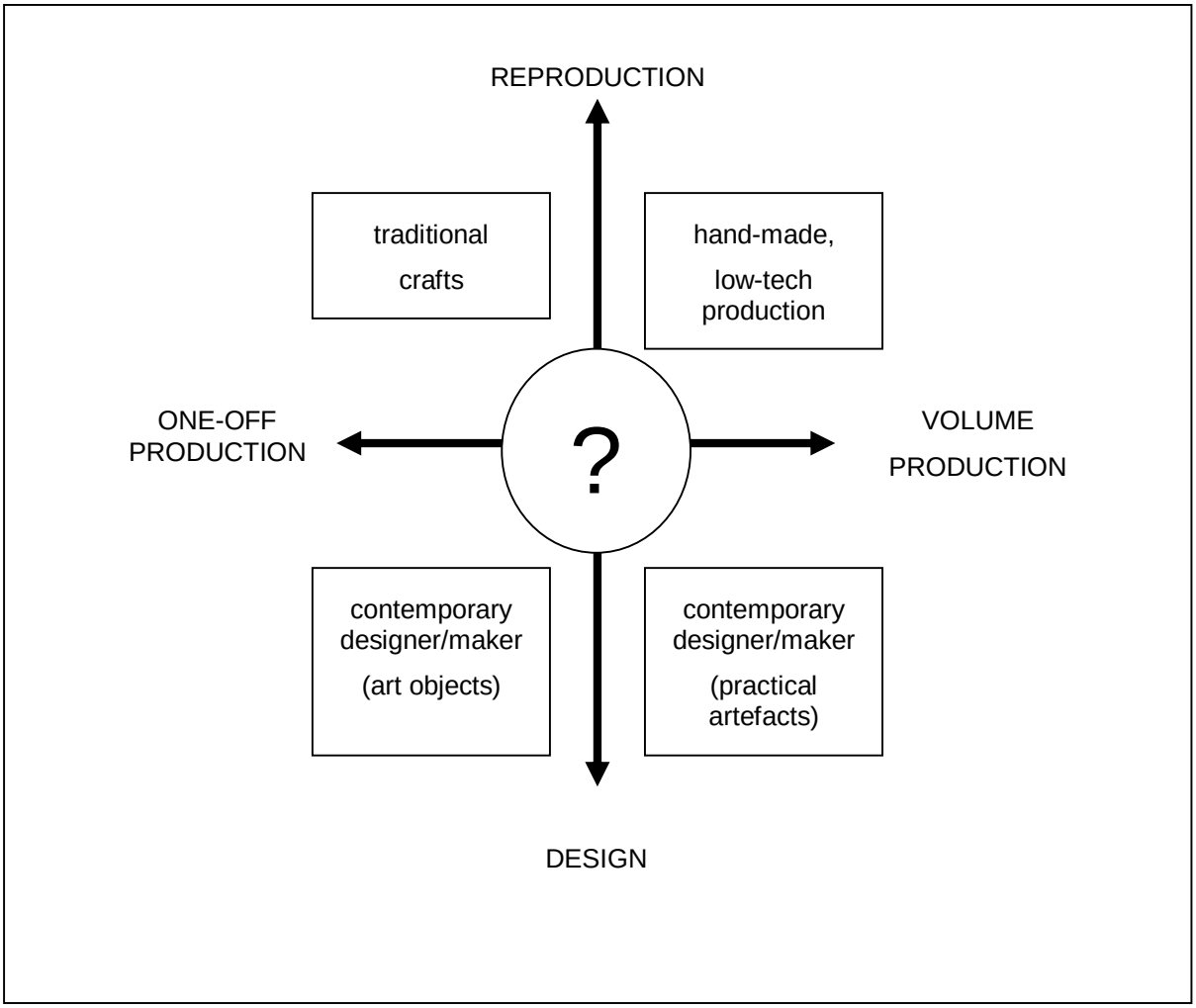

Figure 1. The range of craft activities considered in this study. Source: Woolley 2007

Craft skills are defined as:

..methods of making based on hand processes using hand tools or machines, in which high order skills are required to produce artefacts of high quality. Some of these skills are viewed as being transferable across generations and adaptable to new, contemporary practices – for example fashion accessories, in which traditional skills can lend added value to luxury goods. Traditional skills are regarded as an intrinsic part of cultural heritage and are vulnerable for variety of reasons, including displacement by automated manufacturing, the relatively high cost of labour, lack of continuity of intergenerational training, lack of recording and dissemination processes, lack of appropriate markets, low levels of remuneration, and lack of perceived value. (RICHES Taxonomy 2014)

This definition covers both skills used in heritage crafts, as well as skills employed by contemporary makers and designer-makers. In the UK, these two strands are well represented by two craft makers' associations: the Heritage Crafts Association (heritagecrafts.org.uk), the advocacy body for traditional makers; and the Crafts Council (craftscouncil.org.uk), which liaises with and represents the interests of contemporary makers and designers.

Cultural and creative industries

With increasing interest in these sectors in the past years, significantly different approaches to defining the cultural and creative industries and measuring their performance have been put forward. Moreover, there is not a single agreed terminology, so that the terms 'cultural industries', 'creative industries', 'cultural domains', 'creative sectors', 'copyright industries' are used with different meanings and with reference to distinctive sectors which include cultural or creative inputs, goods, or activities (for a review of main terminologies in use refer to KEA 2006). Seeking to be aligned with the latest terminology employed by the EC, this study opts for the term 'cultural and creative industries', acknowledging definitions put forward by the study on 'The Economy of Culture in Europe' commissioned by the EC (KEA 2006) as well as definitions by UNESCO (2006). The core distinction between the cultural and the creative industries is that the former produces cultural outputs, either works of art (e.g. a performance) or cultural goods that can be reproduced (e.g. a book), while the latter uses culture and creativity as an input, with outputs that have a more pronounced functional orientation (e.g. design products). The two differ as well with respect to the way *value* is understood. In the case of the creative industries an economic rationale prevails, bent on profitability, while for the cultural industries value is seen primarily in social and cultural terms (EC 2010c).

'Cultural industries' refer to industries which combine the creation, production and commercialisation of creative contents which are intangible and cultural in nature. The contents are typically protected by copyright and can take the form of a good or a service. Cultural industries generally include printing, publishing and multimedia, audiovisual, phonographic and cinematographic productions as well as crafts and design. The term 'creative industries' encompasses a broader range of activities which include the cultural industries as well as all cultural or artistic production, whether live or produced as an individual unit. These industries are those in which the product or service contains a substantial element of artistic or creative endeavour and include activities such as architecture and advertising. (UNESCO 2006).

At the same time, other useful definitions and approaches are acknowledged. In particular, some of the definitions put forward for 'creative industries', such as those proposed by UNCTAD and UK's DCMS are useful for pointing to the importance of intellectual property frameworks for these sectors:

..industries encompassing activities *"at the crossroads between arts, business and technology' and produce 'symbolic products with a heavy reliance on intellectual property." (UNCTAD 2004, 4).*

…those industries which have their origin in individual creativity, skill and talent and that have a potential for wealth and job creation through the generation and exploitation of intellectual property. (DCMS 1998/2001).

The creative economy

Aside from the professional context of work pertaining to the creative industries, the research covers professionals who have a craft-related creative occupation – e.g. makers, designer makers – although they may be employed in other sectors of the economy, such as manufacturing, leisure and tourism. *Creative occupations* are defined in this report following the approach of UK's NESTA, as "a role within the creative process that brings cognitive skills to bear to bring about differentiation to yield either novel, or significantly enhanced products whose final form is not fully specified in advance" (Bakhsi et al., 2013a). The concern in this study is

specifically with craft-related occupations. The focus on creative occupations effectively expands the scope of the study from the creative industries to the creative economy, which can be defined as "those economic activities which involve the use of creative talent for commercial purposes" (Bakhsi et al., 2013a).

2.5. Methodology

In line with the objectives outlined above, the study covered five key areas of investigation:

1. Social, cultural and technological drivers determining a craft revival
2. Technology-driven innovation for craft-related industries and creative occupations
3. The role of IP frameworks for the sectors of arts, craft and design
4. Impacts on employment and careers
5. Digital craftmanship and maker education

The study captured a European dimension, however to contextualise and give salience to findings, it included empirical research in three countries: the Netherlands, Romania, and the UK. The rationale for choosing these countries for empirical research blended practical considerations (project partners' location and connections), and the intention to cover economies with a sizable difference in the way craft is positioned – socially, politically and economically in particular. The task partners involved were:

- Coventry University, UK (COVUNI), responsible for designing the research, conducting empirical research in the UK and Romania on craft and the creative industries, and compiling the present report based on intermediary partner reports.
- The University of Exeter, UK (UNEXE), which investigated the role of IP frameworks in relation to arts, craft, design and the maker movement, and analysed the emergence of the maker movement and online maker communities.
- The National Museum of Ethnology, the Netherlands[2] (RMV Leiden), which oversaw the strand of research investigating relations between craft and cultural institutions, with a focus on museums.
- Waag Society (WAAG), which examined through case studies the notions of *digital craftmanship* and *maker education*.

Stage 1: Preliminary desk research

A preliminary round of desk research was conducted to understand the status of the field in terms of research coverage and gaps, and towards a better definition of the study objectives and their scope. The analysis covered European and country-based studies and reports on the CCIs and innovation with a focus on crafts, design and fashion.

In this exploratory stage, the focus and scope of the study was also refined. In the initial approach, this study was titled *Old skills in new contexts,* denoting an interest in raising attention to the endangered status of craft skills, their historical embedding, as well as demonstrating their contemporary relevance and prefiguring avenues and sketching strategies for repositioning craft

[2] Also referred to in this document as the National Museum of World Cultures, which came into being in 2014, through the merger of three Dutch museums: the National Museum of Ethnology in Leiden, the Tropenmuseum in Amsterdam and the Africa Museum in Berg en Dal.

skills in European societies and economies. The change in terminology from 'old skills' to 'craft skills' in the report title comes from a recognition of the complex forms that craft skills can take across heritage and contemporary crafts, and sought to capture as well the emergence of new skills, such as digital fabrication.

Stage 2: Concurrent desk and empirical research by task partners

Task partners employed each a combination of desk research and empirical research to assess particular strands of research. In detail:

Desk research was carried out covering the European CCIs and the role and status of craft skills in the CCIs and the creative economy. This broad view was complemented by the assessment of country-based studies conducted in the Netherlands and the UK, and looking at the contribution of the CCIs to the economy, the economic contribution of craft, programmes for craft revival, and the status of craft-related knowledge and skills.

Desk research and empirical research were conducted in the UK and Romania to explore:

- The current relevance of craft methods and skills in production contexts
- Conditions and best practices for skills transfer, reinvention, and re-purposing as the precursor of innovation
- The impacts on the creation of new jobs, professional re-integration of traditional makers, and CI careers

Methods included:

An online questionnaire aimed at traditional UK craft practitioners, which probed their professional activities, attitudes and detailed views on the transferability of their skills/knowledge, their deployment of digital technology and their future plans. The questionnaire has been sent through the UK Craft Heritage Association. Since only 14 responses have been received, these have been used as a qualitative rather than quantitative data source.

Face-to-face interviews with Romanian makers and designer makers. Fourteen interviews with Romanian makers, designer makers and designers were conducted, out of which six with traditional makers, seven with contemporary designer makers and one with a fashion designer. Traditional makers described themselves in relation to one or more crafts, their profiles including: glass making, wood work, leather work, textile design, weaving, knitting/sewing and embroidery, and object decorations. Designer makers included the following profiles: visual arts and surface design, calligraphy and mixed media home decorations, leather work, textiles and fashion design, ceramics, handmade fabric dolls, and the design of homeware and decorations. In addition, one interviewee, a maker with skills in sewing, knitting and textile design, specialised in the commercialisation of vintage ethnic outfits. The fashion designer interviewed was Sandra Galan, who debuted with the collection *Heritage,* which employed hand embroidered vintage fabrics with Romanian traditional motifs.

Expert interviews have been carried out with experts in crafts, design, fashion, and museums. In the UK, two interviews have been carried out, the first with a senior academic in the fashion and accessory field, and the second with the co-founder of a London-based online concept store, Culture Label. In Romania, three expert interviews were carried out: with Marcel Lutic the president of the Association of Traditional Makers in Moldova (AMPM); a representative of the Romanian National Union of Handicraft and Production Co-operatives (UCECOM); and the co-founder of Blouse Roumaine Shop (BRS), an online concept store that markets ethnic Romanian garments handmade by traditional makers.

Desk research, analysis of online content and empirical research were used to document the maker movement in relation to online communities. The research explored the role of interest-driven learning and DIY arts and crafts movements in the transmission and revival of traditional skills, and the actual and potential economic impacts can be identified or prefigured. A case study inquiry was included, focusing on *Stich n' Bitch*, a transnational community of knitters and crocheters founded by Debbie Stoller, knitter and author who is recognized to have contributed significantly to the revival of the art of knitting, making it a fashionable, contemporary practice appealing to both men and women.

Desk research and case study research were conducted in the Netherlands to explore notions around digital craftmanship and the educational potential of a 'learning by making' paradigm. The research focused on digital fabrication cases, including the WEAVE European project (zigzagproject.eu), Fab Academy and FabSchool in order to provide insights into innovative ways by which:

- Digital technology can be used for craft revival, especially in experimental settings
- Craft skills can be transmitted and interest can be ignited in the young generations.

Desk research and interview-based research were carried out in the UK and the Netherlands to explore the role that cultural institutions and museums in particular can play in the revival and transmission of craft-related skills and in the craft economy. One interview was carried out in the UK with the director of the Compton Verney Art Gallery, which displays folk art. Four interviews were carried out in the Netherlands. Two of these were carried out at the National Museum of World Cultures, with the curator for Oceania, and the museum shop manager, who was also an exhibition maker. A third interview was carried out with the former curator for Textiles at the Tropenmuseum[3], also curator of the exhibition *Cultuur Couture*, organised in collaboration with the Antwerp Fashion Academy. A fourth interview was conducted with the curator of the exhibition 'Hand Made' at the Museum Boijmans van Beuningen (2013), which explored the position of (European) craft in the context of global economic dynamics, technological developments (the revaluation of 'craft'/*ambacht*), as well as in relation to environmental sustainability.

Results from these research strands were outlined in intermediary reports.

Stage 3: Consolidating the evidence and testing emerging findings through desk research

Results from the strands identified above were analysed comparatively and tested through a last round of desk research, aiming to probe emerging findings and understand their scope of application. This last round of analysis and the intermediary reports stood at the basis of compiling the present report.

2.6. Structure of the Document

The remainder of the document is structured in six sections:

Section 3 discusses the strategic importance of the cultural and creative industries for the European economy, and maps a series of important changes triggered by the advancement of digital technology. It then configures the place of craft as a sector of the CCIs, and discusses the

[3] The Tropenmuseum is at present part of the National Museum of World Cultures.

status of crafts and craft skills. Particular attention is paid to laying out the endangered status of some craft skills, knowledge and techniques.

Section 4 provides an analysis of social, cultural, economic, technological and legal factors to be taken into account that configure what can be termed 'a craft revival'. *Firstly*, it looks into the worldwide social movement termed 'the maker movement', characterised by an increased interest in DIY making and heritage craft skills, along with digital fabrication activities afforded by emerging technologies. The emergence of the maker movement coupled with the increased possibilities for networking, communication, and sales over the Internet present unparalleled opportunities both in economic terms as well as in relation to the transmission of craft and design skills. The case study of *Stitch n' Bitch: Networked knitters* is introduced as an emblematic example of a community that appropriated and made fashionable a craft – knitting and crocheting – normally associated with heritage, rather than contemporary expression. *Second*, the section focuses on the role that cultural institutions (can) play in promoting, reviving and sustaining crafts – socially, economically and in terms of skills transmission. The *third* sub-section examines issues of intellectual property in relation to craft, design and fashion, and how the emergence of digital activities for promoting and selling craft and design products is affected or should pay attention to existing European intellectual property laws and regulations.

Section 5 maps innovation pathways that build on the potential of new technology and the reinvention, repositioning or transfer of craft and design skills, focusing on: innovation in processes associated with the craft product lifecycle (from design and making to marketing and distribution), new business models and organisational forms afforded by DT, and the opportunities associated with the transfer of craft skills in other economic contexts. *Section 6* analyses the impacts of DT and the trends identified previously in the report on employment and careers in the CCIs. *Section 7* looks into how digital technologies have re-invented notions of *craftsmanship*, and introduces a series of case studies focused on the transmission of craft and digital craft skills in informal venues, online and offline. The influential position of the 'learning by making' paradigm, characteristic of craft education, is critically discussed.

The concluding section offers a critical reflection on the findings, singling out recommendations for a better positioning of craft to generate innovation, economic value, new employment opportunities, and more rewarding approaches for imparting craft-related knowledge and skills capitalising on the potential of digital technologies.

3. Crafts and the European Cultural and Creative Industries

3.1. The European Cultural and Creative Industries: Culture, Creativity, Value and the Economy

> *Craft, art, and design are words heavily laden with cultural baggage. (..) (T)hey all connote the profound engagement with materials and process that is central to creativity. Through this engagement form, function, and meaning are made tangible. It is time to move beyond the limitations of terminologies that fragment and separate our appreciation of creative actions, and consider the "behaviors of making" that practitioners share.* (David Revere McFadden, Chief curator and vice president, Museum of Arts & Design, New York[4])

The European economic market, as well as the economies of the member states are currently shifting towards knowledge-based economies (ECIA 2014a), characterised by an increased usage of information and communication technologies, particularly digital, driven by more sophisticated and varied consumer markets (ECIA 2014a, EC 2010b) and intensified competition in globalised markets. More than products and services, consumers are nowadays looking for experiences, personalisation and connections (EC 2010b), with relationships between consumers and suppliers becoming more powerful and taking centre stage (NESTA 2010). The European cultural and creative industries have a privileged position within the current economy, one that has been recognised, of recent, as a great contribution in and of itself (e.g. through added value, exports, employment), as well as a driver of socio-economic innovation in other sectors of the economy (EC 2010a,c). The European Commission has highlighted the creative industries as a leading sector to take the EU out of the economic crisis and has plans for further business support to increase professionalism and access to finance to promote innovation and growth (EC 2014). This section examines the strategic importance of the CCIs in relation to the notion of 'value' in both cultural and economic terms, and innovation in the CCIs, particularly as a result of using digital technology. The review employs the inclusive terms 'Cultural and Creative Industries' (CCIs) as adopted in this report. Where studies reported use the term 'Creative Industries' (CIs) this same terminology is used.

Where value lies: how culture and creativity generate economic value

The commonality of the cultural and creative industries relies on the fact that "all originate ideas of expressive value which they commercialise" (Work Foundation 2007). This expressive value can be examined in relation to the notion of *creativity* and the conversion of cultural into economic value. As cultural economist David Throsby (2001) argues, notions of 'value' are permeating both cultural and economic spheres. While they reside in different attributes and are expressed differently, both cultural and economic value share a quality in their being "an expression of worth, not just in a static or passive sense but also in a dynamic and active way as a negotiated or transactional phenomenon". (p. 19-20). As such, value can be approached as a key construct for linking the two fields of culture and economics. In economics, value can be studied from different perspectives. Most often, it is related to utility and quantified in prices regulated by markets according to the worth attributed to goods. In labour theories, it is related to the cost of

[4] vam.ac.uk/content/articles/w/what-is-craft/

production and the amount of work and effort invested in the production of goods. A distinction can be made as well between the value in use of a commodity (the extent to which it can satisfy human needs and desires) and the value in exchange (the corresponding quantity of goods that a consumer would give up to acquire a desired product). Cultural value, on the other hand, is socially constructed in relation to manifold characteristics pertaining to, for instance, the aesthetic properties of an object, the context of its production, the process by which it has been produced, the creator, or its historical relevance. For instance, Throsby (2001) proposes seven cultural value attributes of artworks: aesthetic, spiritual, social, historical, symbolic and authenticity value.

To enable the development of an economic theory and model of culture and cultural value, Throsby started from a functional definition of culture. Culture or cultural activities are taken to encompass "the activities undertaken by a group of people, and the product of these activities, drawing upon enlightenment and education of the mind" (Throsby 2001 quoted in KEA 2006). These activities share three attributes: they reside on creativity, they employ and communicate symbolic means and their output can be assigned intellectual property (KEA 2006).

On this basis, Throsby put forward a proposal for classifying cultural sectors and positioning them in the economy according to the propagation of cultural value of goods, from core creative arts such as performing and visual arts to core cultural industries such as film and museums, to wider cultural and related industries. This economic model was adapted in several further studies, and used as tool to classify the cultural and creative industries and map their interdependence. The EC-commissioned study on the economy of culture (KEA 2006) draws on this model, employing the following classification:

- Core arts field with activities that are non-industrial and whose outputs could potentially be attributed copyright, for example visual and performing arts. Craft activities are included herein as a sub-sector of visual arts.
- Cultural industries with industrial activities aimed at reproduction and outputs that are assigned copyright – e.g. film, video, music.
- Creative industries and activities with outputs that can be assigned intellectual property, either through copyright or other forms, such as trademarks and patents – e.g. design, architecture, advertising. These industries depend on creativity, creative skills and creative people.
- Related industries – all other industries that somehow depend upon, link with or use inputs from the other sectors described, such as software products and services.

Just like value, *creativity* is a key concept both in culture and economic thought. Economic creativity has been distinguished from artistic creativity in classic economic writing, going back to Schumpeter's 'Theory of Economic Development'. In economics, the concepts of 'creativity' and 'innovation' are closely interlinked and partially overlapping: creativity indicates the origination of novel ideas, which can be new perspectives, new approaches to doing things or visions of new products. Innovation captures the means and the process by which these ideas are brought into existence (Work Foundation 2007). Just like the ideas of cultural and economic value, creativity becomes increasingly important in today's knowledge economy. In a context of increased competitiveness where products can be easily copied, produced and sold at lower prices, creativity can offer a competitive edge, by enhancing the immaterial dimension of products and services marketed (KEA 2006; Work Foundation 2007).

The concept of *creativity* and related measures and scales are used to identify and classify creative sectors of the economy. KEA (2006) proposes a model of creativity that blends ideas of artistic creativity, and economic and technological innovation. Creativity is a process that happens at the intersection of scientific, cultural, technological and economic dynamics. Several

scales and models for assessing creativity have been proposed, such as Richard Florida's Creativity Index (2002). Other models of classification and scaling blend ideas of cultural and economic value with the measurement of creativity. The UK Work Foundation used Throsby's framework to develop a close model of concentric circles around a 'creative core' focused on the production of 'pure creative expressive value', from which value is propagated to cultural industries, creative industries and the rest of the economy (Work Foundation 2007, Fig. 2).

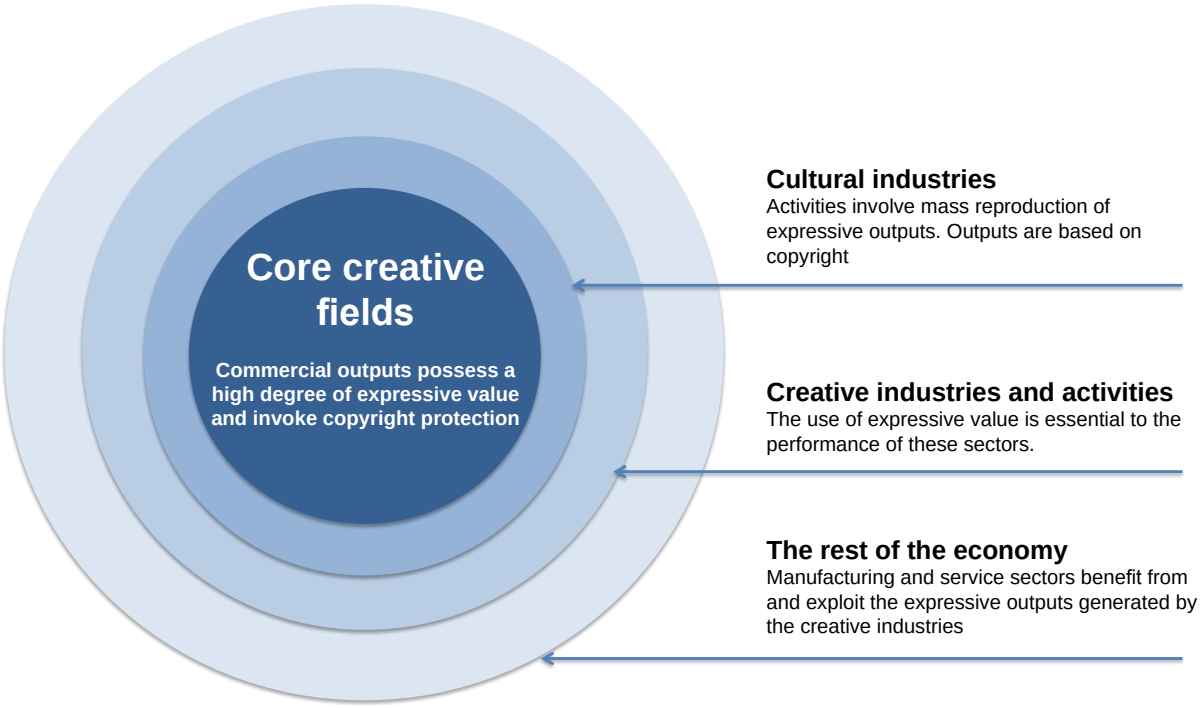

Figure 2. A model of the cultural and creative industries. Work Foundation 2007.

The UK's National Endowment for Science, Technology and the Arts NESTA (2006) proposes a framework that associates and links creative sectors with respect to the maximisation of commercial growth. The model examines how economic value is created at different stages in commercial value chains associated with different sectors and maps the distinctions between their market structures, distribution flows and patterns of consumption. The proposed classification clusters creative sectors based on commonalities in business models and value chains:

1. Creative service providers – business models rely on the provision of creative services. Examples are advertising agencies and design consultancies.
2. Creative service producers – produce intellectual property and earn revenues through different business models from subscriptions to advertising and sales. Examples are film and television production companies, music labels, fashion designers.
3. Creative experience providers – business models are usually based on charging for experiences such as theatre or dance productions.
4. Creative originals producers – business models rely on the creation, production and sales of artefacts which are invested with value, often in limited editions or one-offs. Craft and visual arts are examples.

Later, this approach was further refined by NESTA around the concept of 'creative intensity', equalling the proportion of a sector's workforce employed in creative occupations. Five creativity criteria are proposed:

1. Novel process
2. Mechanisation-resistant
3. Non–repetitiveness or non–uniform function
4. Creative contribution to the value chain
5. Interpretation, not mere transformation (Bakhsi et al. 2013a)

The economic contribution of the cultural and creative industries

In general, the contribution of the CCIs to the economy is examined in terms of quantifiable and non-quantifiable, as well as direct versus indirect impacts. The EC Competitiveness Report (EC 2010c) lists four types of impacts of the CIs, in terms of direct or indirect contribution to the economy and the degree to which the impacts are quantifiable:

1. Primary impacts capture the direct contribution of the CIs to the economy, in terms of employment, value added, exports, etc.
2. Secondary impacts refer to spillovers into the wider economy, either in other sectors or at regional level, for instance through intermediary outputs used in other sectors, or regional spillovers.
3. Tertiary impacts refer to the contribution of the CIs to innovation – for themselves and for the wider economy.
4. Quaternary impacts are indirect and difficult to quantify, and capture the contribution of the CIs to enhanced quality of life, and attaining to specific social and cultural objectives.

In 2008, the CIs accounted for 3.0% of EU 27 employment (6.7 million employees), and in 2006 it accounted for 3.3% of the EU GDP, and 4.3% of total exports. Employees in the information and communication services were the most numerous, 62% of CI employment measured for 26 of the EU countries (excluding Malta), and 1.8% of EU 26 employment (EC 2010c). Most CCI companies are small, with less than 10 employees, and the domain is driven to a large extent by self-employed creative professionals. Many creative workers have part time or temporary contracts (EC 2010c) and have a higher likelihood to hold more than one job. Eurostat statistics for 22 EU countries show that out of 1.2 million CIs firms, 95% employ less than 10 people, and 58% of CI businesses are one-person firms (EC 2010c).

In terms of export value, 65% of EU 27 exports in 2005 were design goods and services, followed by publishing and visual arts (13% each). The CIs are also recording growth rates higher than the rest of the industry. For instance, between 2000 and 2007 the CIs grew at a rate of 3.5%, compared with just 1% in the overall economy (EC2010c). It is important to note that these figures can vary in relation to the definition of the CIs employed.

The CIs/CCIs are not however homogenous, and can register significant differences by sector. For instance, in 2008 computer programming and consultancy services accounted for 37% of the total employment for the EU 27 CI. Software consulting and supply, the audiovisual sector and architecture are the fastest growing sectors, measured by employment rates (EC 2010c). Moreover, there is a high degree of variation throughout Europe, and in relation to urban-rural areas. Large urban metropolis can concentrate high numbers of creative businesses, and generate a proportionately high economic contribution. For example, according to a report released in early 2015, the creative industries generate around 10% of Berlin's sales. From 2009

to 2012, the CCIs contributed a gross value added on the rise with 4%, 3.6 billion euros more sales, and the number of companies increased with 3,500 to reach a total of around 28,200 companies. The industries employ 186,000 people, out of which 78,000 are freelancers or self-employed. The most thriving and rapidly growing sector is that of software and gaming, which employs 47,000 individuals (ECIA 2015).

Apart from these primary impacts, the CIs also promote innovation and bring value to other sectors, through a variety of means, including product and service innovation, bringing creative and design thinking to new industries, promotion of creative alongside entrepreneurial and digital literacy skills (EC 2010c).

National policies and funding schemes have an important role to play in the development of the creative industries. The UK, whose Department for Culture, Media and Sport has been acknowledged to be the first to define the term 'creative industries' in Europe, recognizes the value of the CIs and special policies for the CCIs have been drafted to encourage their development. The performance of the CIs is measured each year, and the most recent statistics confirm the economic contribution of the creative sectors, as well as the positive spillover effects to the wider economy. The DCMS, responsible with putting together and publishing the performance statistics, continues to employ the definition of the CIs released in 1998 (DCMS 1998/2001), however it has significantly revised its methodology for measuring CI outputs, economic contribution and employment throughout the years. As of 2014, the identification of those industry sectors classified as 'creative' is based on a calculation of the level of 'creative intensity' of activities undertaken by its workforce, as described above. This enabled a reduction of the 13 CI sectors initially identified in 1998 to nine creative sectors (advertising; architecture; crafts; design; film, TV, radio and photography; IT software and computer services; publishing; museums, galleries and libraries; music, performing and visual arts). DCMS studies also distinguish between the creative economy (inclusive of all creative and non-creative occupations in the CIs, as well as creative occupations outside of CIs), and the creative industries.

The latest assessment of the CIs in the UK (DCMS 2015) estimates that:

- In 2013, there were 2.62 million jobs in the creative economy, equating 1 in 12 UK jobs. 1.71 million out of these were in the CIs (5.6% of the overall number of UK jobs). Overall number of jobs in the creative economy grew by 2.6% between 2012 and 2013, higher than the UK overall economy, which registered a 1.6% increase. Employment growth has also shown a steady increase over the long term between 1997 and 2013, with an estimated yearly growth of 2.3% by year, compared to a lower 0.6% increase for the overall UK economy. Interestingly, the growth registered was driven to a large extent by the rise in the number of jobs outside of the CIs (42,000 more jobs not located in CI sectors).
- The Gross Value Added (GVA) of the CIs was £76.9 billion in 2013 (5% of the UK economy), registering a growth by 9.9% from 2012, which is higher than any other economy sector monitored. Between 1997 and 2013, a steady growth by 5.8% each year was registered, compared to 4.2% growth for the overall UK economy.
- CI exports were worth £17.3 billion in 2012, accounting for 8.8% of UK exports, and on the rise by 11.3% from 2011.

The important position of the CCIs has been recognised as well in the Netherlands. In 2014 the current Dutch government identified nine potential economic focus points called 'Top Sectors', to move them towards greater competitive advantage regionally and internationally. These were Agro-Food, Chemical Industry, Creative Industry, Energy, Life Sciences & Health, Logistics, Horticultural and Propagating Stock, and Water. Describing the way the top sectors were identified, they state:

Four factors were decisive in selecting these top sectors. The sectors must be (1) knowledge-intensive, (2) export-focused, with (3) often specific legislation that (4) can substantially contribute to solving social challenges. [They continue] ..together with industry and the science sector, the government wants to make targeted investments in preconditions for knowledge development, innovation, exports and human capital through the top sector policy. (topsectoren.nl)

The top sector Creative Industries, which includes Design, Media and Entertainment, Fashion, Gaming and Architecture was selected because it *"has a positive effect on cities, attracting tourists, companies and habitants. It creates employment and stimulates innovation in other industries, as well as provides creative solutions for social challenges.*" (topsectoren.nl/creatieve-industrie). The Dutch government strategy for encouraging the growth of the CIs states that its aim is to stimulate 'co-creation' between academies, universities and Dutch regional business partners, stimulating: a) economically successful formulas for export (for instance the Dutch Dance industry, TV-formats); b) creative solutions aiding social issues (the use of gaming tools to relief individuals suffering from a PTSD syndrome); c) digital innovations such as products from the company Layer; and d) solutions with regards to environmental sustainability (NL Agency 2013). Referring to the importance of Dutch Creative Industries, Top Sector Creative Industry team leader Victor van der Chijs, specifically highlights Dutch Design. He emphasizes creativity and skills of individual entrepreneurs should be recognized and stimulated to join forces with larger corporate structures, stating that:

Companies that incorporate designers, book demonstrably more profit. The Netherlands has several large companies in the creative sector, such as Endemol, G-Star and various architects' offices, but the majority of the 97,000 creative businesses are SMEs [small and medium entrepreneurs]. In general, they don't want to grow too much. Once your enterprise becomes too big, your creativity is hampered. These entrepreneurs prefer to join forces. By entering into innovation contracts between SMEs and professional associations, the companies obtain access to ideas for applications and scientific knowledge. This delivers great results, such as practise games for surgeons and antibacterial cuddle clothing for nursing staff. (NL Agency 2013)

Technological innovation

This study pays particular attention to technology-driven innovation in the CCIs. Overall, DTs afford innovation in production processes, new products, new means and channels for marketing, distribution, and sales and new ways of approaching and engaging consumers. At the same time, DTs are responsible as well for causing massive restructuring in production and distribution processes which have affected unequally CCIs sectors. Significant changes have especially been recorded by the advertising, gaming, music and film industries (EC 2010c).

The study looked at innovation in the product, as well as process innovation. For the latter, it sought to shed light on how technology triggers changes in the value chain that can be considered innovative, and further what are the impacts on professionals. A straightforward example of process innovation that disrupts the traditional ways of conceiving, making and marketing craft products is illustrated by Shapeways, which offers both a 3D printing service and a marketplace for selling 3D printed objects. Makers, designers, and designer-makers can send their designs to Shapeways, these are 3D printed and then put on sale online. In the value chain, it means that designer-makers reduce their contribution to the design phase, outsourcing making, and also hand over to a third party all the other activities related to marketing and distribution of products. This example shows how innovation can be fostered throughout the value chain, and is a starting point for discussing the implications on the emergence of new business models and makers' professional standing. This and other examples will be examined later in the report.

The study also looked into what is termed 'hidden innovation', referring to innovation which is not captured in typical innovation indicators (Miles and Green 2008). Hidden innovation is examined looking at new organisational forms, novel business models and innovative practices such as customer co-creation or other forms of customer engagement in craft practice. Another discourse that informed this report regards the relationship between growth, innovation, poverty and inequality. In and of itself, innovation is not necessarily an inclusive process. On the contrary, since it relies on high flows of capital, sophisticated infrastructures and the concentration of innovative components and capacities in certain markets or geographies, innovation can often take exclusionary trajectories, effectively supporting privileged segments and markets, and putting or maintaining others in disadvantaged positions (Chataway et al., 2006; Kaplinsky et al., 2009). The 2013 edition of the Innovation Union Scoreboard testifies to these discrepancies, indicating that while Europe as a whole shows progress in uptake of innovation, the gaps between member states are growing larger[5] (IUS, 2013). *Inclusive innovation,* termed also 'pro-poor innovation' or 'grassroots innovation' refers to the "the means by which new goods and services are developed for and/or by those who have been excluded from the development mainstream; particularly the billions living on lowest incomes" (Heeks et al. 2013, 1). It is positioned as an alternative model of innovation which "conceives development in terms of active inclusion of those who are excluded from the mainstream of development" (Foster and Heeks 2013, 335), where the excluded can be either the poor, ethnic minorities, women, etc. Inclusive innovation can take many forms, ranging from initiatives from the civil society and non profits, to the development of affordable products and technologies, or effective inclusion of underprivileged segments in the economy. While it is not a new concern, this model of innovation has gathered recent industry and academic attention in close connection to the capacity of technology to sustain alternative models of innovation, going back to Fritz Schumacher's ideas of 'appropriate technology' (Heeks et al. 2013). This study perused the concept and framework of 'inclusive innovation' to motion attention towards assessing pathways to innovation in relation to:

- Grassroots movements and 'innovation from below' (e.g. driven by non profits and NGOs) vs. (inclusive) innovation from above, promoted by corporations and for profit firms or governmental agencies
- Impacts on vulnerable groups based on gender (women), economic level (poor, unemployed), professions at risk (e.g. heritage craftspeople), or geographic location (professionals active in remote or rural areas, or more broadly in emerging economies)
- Employment of local resources and use of local supply chains
- The inclusion of previously excluded groups in information flows and networking (e.g. makers in rural areas)

3.2. The Status of the Craft Sector and Craft Skills

Crafts can be associated with both creative and cultural activities, and are therefore present in most breakdowns of activities of the cultural and creative industries. However, the position of craft as a creative industry sector, or a cultural domain, is not fixed, and can shift according to CI or CCI definitions, coming to be associated or grouped either with visual arts, as an arts domain, with design, or with other skilled trades. Different ways of clustering and associating crafts with

[5] See, for instance, the Interactive Union Scoreboard Dashboard http://ec.europa.eu/enterprise/archives/ius2013/IUS2013.html

other domains, from arts to design, are driven by distinct perspective on the role and place of crafts, especially in relation to on the one hand their social and cultural value, and on the other to their economic or business value. Broadly, therefore, the variety of approaches in situating crafts as a sub-sector of the cultural and creative industries reflects the same dynamics by which cultural and creative industries are separated conceptually, one with a primarily cultural value, and the second with a clear economic positioning emphasising the value of creativity.

The UNESCO Framework for cultural statistics (2009) lists together 'Visual arts and crafts' as one of six cultural domains, comprising fine arts, photography and crafts. The European Statistical System Network on Culture (ESSnet-Culture 2012) comes up with the delineation of a series of cultural domains, categorised according to the types of cultural products and services created. 'Arts Crafts' is one of the 10 cultural domains identified, characterised by closely linked functions of creation and production, often performed by the same actor. In a study commissioned by the EC (de Voldere 2013), arts crafts and design are listed together as a cultural and creative sector.

The craft sector and craft professionals are also positioned differently in classifications based on national frameworks. In some economies, for instance in Romania, they are clustered together with other professions requiring specialised skills and applied labour. In the UK, craft is listed as a stand alone sector of the creative industries, yet the craft professions listed within can vary greatly across studies and statistics. In France the so called 'métiers d'art', are distinguished from other skilled trades, and recognised by a new law passed on 18 June 2014, which acknowledges the value of skill as well as their artistic contribution to the "production, creation, transformation or reconstruction, repair and restoration of cultural heritage, characterised by mastery of skill and technique for working materials and requiring an artistic contribution" (Article 22, law n° 2014-626, 18/06/2014).

These different national frameworks are important when assessing the economic value and contribution of crafts. In France, there are an estimate of 59,000 craft professionals active in 217 different craft professions, 38,000 craft enterprises, and in 2007 they had a turnover of 8 billion euro (institut-metiersdart.org; ateliersdart.com). In the UK, several studies have been conducted that attest to the contribution of craft to the economy. The latest statistics on the UK CI (DCMS 2015) indicate that overall, craft employees within and outside the CIs accounted for 96,000 jobs in 2013. It is interesting to note that out of these, a majority of 88,000 craft practitioners are employed in creative occupations *outside* of the creative industries. In the CIs, 4,000 employees are creative craft practitioners and 3,000 are in support roles in craft businesses. Compared with design, designers (including product, graphic and fashion design) working outside the CIs are also in high numbers (55,000), yet less than the numbers employed in creative roles in the CIs (75,000).

A different estimate is put forward in a study commissioned by the UK Crafts Council (TBR 2014), which uses a more inclusive definition of crafts, and takes into account also businesses that are below the VAT threshold. According to this report, in 2012/13 the craft industries employed 43,250 people totalling registered employment and employment in micro businesses. An estimate of 11,620 craft businesses were included, of which close to 7,300 were unregistered micro businesses, and 6,200 below the VAT threshold and therefore not considered in most official economic statistics. An additional 9,630 craftspeople worked in different CI sectors, and an estimated 96,360 worked in other economic sectors.

The contribution to the UK economy assessed by the GVA has been estimated at £195 million in 2008, rising to 248 million in 2012, and to 172 million in 2013 (DCMS 2015). The more inclusive definition of crafts industries used in TBR (2014) reveals a higher GVA, of £746 million. The latter report indicates that the contribution of craft professionals in other sectors is even more

substantial: craft occupations generate a GVA of £2,410 million in economic sectors outside of the creative industries.

Employment patterns vary across Europe, however in general craft professionals operate in small-scale businesses or are self-employed. Craft businesses tend to be small and very small, often employing less than 10 people. A large number of craftspeople are portfolio workers – therefore holding multiple jobs or deriving revenues from several paid activities, from direct production and sales to consultancy, research and teaching. Craft occupations in the UK are not as profitable as the national average – the estimates are that a craft professional working within the craft industries earns £406 per week, while the national average is £461 per week (TBR 2014: 2). Craft professionals working in non-craft creative industries earn even less, with an average of £400 per week, while those employed in non-creative industries average £384 per week (Ibid.). In Romania, craft professionals tend to be self-employed, or associated with craft cooperatives.

The endangered status of craft and craft skills

Taking the example of Romania, the craft sector is experiencing a continuous decline after the 1989 Revolution, and heritage craft professionals are particularly affected. Before the 1989 Revolution, heritage craft production was carried out within 40 craft cooperatives and 80 craft sections in production cooperative with a mixed profile. These employed around 50,000 craftspeople, 75% being women and many of these working from home. Most of the products were destined for export, where the demand for handmade products such as fine carpets was higher. At present, the number of craft cooperatives is reduced to 20. There are a higher number of craftspeople that are self-employed or work in small businesses. However, with a much lower market demand, many of these businesses have a mixed profile, offering, apart from craft products, different ranges of products that are regulated according to demand (Interview, representative of the Romanian National Union of Handicraft and Production Co-operatives - UCECOM, 08/01/2015).

The following key factors can be listed, which led to the decline of crafts in Romania since the 1990s:

- Drastically reduced demand on the internal market, as consumers opt for cheaper or imported products and quality criteria become less important
- Competition with imported products, especially cheap products produced in Asian countries
- The regression of the workforce, as skilled craftspeople get older, and younger generations demonstrate little interest in taking up these professions, often considered not profitable
- The globalisation of the economy, which led to the reduction of activities of production and commercialisation, for both the internal market and for export
- Disloyal competition between craftspeople and the lack of an authority and regulations for acknowledging authenticity, which led to an abundance of low-quality products imitating craft products and offered at competitive prices
- The high rise in cost for raw materials, especially natural materials (e.g. wood, silk, cotton)

- The lack of fiscal facilities and appropriate regulatory frameworks. On the contrary, Romanian craftspeople have to give 2% of their revenues for the National Cultural Fund.
- Discouraging home-based work, due to the methodology for calculating contributions to social insurance
- Lack of interest in collaboration from tourism operators.

(Interview, UCECOM representative, 08/01/2015)

The president of the National Association of Traditional Makers in Moldova (AMPM) underlines the decline of *heritage* craft, determined by:

- The lack of effective and systematic approaches for transmitting heritage craft skills
- Lack of access to finance and difficulties in accessing funds, such European funds due to excessive bureaucracy
- Stricter legislation for authorisation, packaging and distribution and the high costs of attending craft fairs, which in Romania are among the most widely spread channels for selling craft products
- The absence of opinion formers and interfaces between specialised institutions, heritage craftspeople and the wider public
- Relatively low visibility of crafts in national media (Interview with Marcel Lutic, 16/01/2015)

The decline of crafts comes at the expense of the economy, employment, and of skills and techniques that take many years of learning and practice to perfect. A Romanian glass worker interviewed revealed how he learned glass work, a technique now endangered in Romania, through a combination of formal learning and apprenticeship throughout many years:

I inherit an old and reputed tradition of glass work, which has its roots in Râșnov in the 1400s, and Avrig, in 1700s. This is an old, very old and vary valuable art, and I am among the very last ones to still know its secrets. It takes many years of practice, and today it is slowly disappearing, its secrets are being lost. What I do goes back to medieval glass work, which was perfected by the Transylvanian Saxons [ethnic Germans living in Romania], who set up workshops in Transylvania. At that time there were the guilds, and there was the glass workers' guild. My grandfather on my mother's side was a glass worker, he had a workshop. I learned from him, but I also studied at the School of Arts and Applied Arts in Turda, wherefrom graduated in '76. I studied glass blowing (by fire), engraving, glass sculpture. In Turda I met other Saxon craftsmen, specialised in glass work and stained glass, and I also learned from them. (Interview, 16/12/2014)

The president of AMPM underlines the key role of heritage makers as "transmission links for values and principles that defined archaic society". Craft professions are "not merely means of subsistence but concrete modalities for reviving a certain state, a spirit and a certain solidarity". The value of craft products resides in their social and cultural embeddedness, seen in the work process, the traditional techniques employed and the use of traditional motifs and chromatics (Interview, 16/02/2015). Likewise, craft skills cannot be separated from the techniques used, the materials, the makers themselves and the ways of transmission. They are highly context-bound, as they rely on processes that have been historically crystallised as ways of making. This is particularly the case and more visible in traditional craft skills, as the processes of transmission are less formalised. The traditional master-apprentice ways of transmission enabled the apprentice to emulate a way of work, and not only a skill. In this way of work skills, techniques of production, materials, approaches to treating materials are contained. This ecological perspective

on crafts also offers a complex picture for explaining the underlying roots of craft decline, which resides in the transformation of the environment in which the profession thrived in the past.

For counteracting this decline and encouraging a craft revival, action needs to be taken equally by the civil society and the state (Interview with Marcel Lutic, 16/01/2015). In particular, the following vectors for supporting crafts through concerted action are proposed by an expert from UCECOM:

- The existence of a legislative framework that ensures the protection and sustenance of the activities of traditional makers
- The due acknowledgement of the importance of crafts by the state
- Augmenting distribution capacities through opportune use of tourism and encouraging market demand
- The creation of a system for certifying the authenticity of craft products
- Intensification of promotion, especially in virtual spaces (Interview, 08/01/2015)

In Romania, several associations and non-governmental organisations emerged which protect and represent the interests and rights of makers and promote the transmission and valorisation of crafts (for instance the Association of Traditional Makers in Moldova founded in 2004, the Guild of Transylvanian Makers, or, for craft cooperatives, the Romanian National Union of Handicraft and Production Co-operatives - UCECOM). These are involved in many types of activities for sustaining craft and craftspeople, such as the organisation of craft fairs, promotional and educational events, or the creation and distribution of promotional and learning materials. For effective promotion and sustenance of makers, and for ensuring the continuity of craft skills, there is a need for more systematic approaches driven by collaborations between state institutions, museums, and educational institutions (Interview with Marcel Lutic, 16/01/2015). The greatest set back is represented by the lack of adequate legislative frameworks and national strategies for sustaining craft (Interview with UCECOM representative, 08/01/2015; and Marcel Lutic, 08/01/2015). Positive steps have been taken, however, since 2005, through the National Multiannual Programme for Sustaining Crafts and Craftmanship, which aims to stimulate the development of crafts and craft businesses, protect craft professions, and to reposition and promote craft products and services in national and international markets. Actions include state funding for regional craft fairs and exhibitions and the organisation of events, seminars and workshops for promoting craft products and improving makers' entrepreneurial skills (Interview with UCECOM representative, 08/01/2015).

Steps towards strengthening the position of crafts have been taken of late also in other European countries, based on a recognition of their value – social, economic and cultural – and their continuous decline. In the Netherlands, in June 2013 the SER (the main governmental Economic Advisory Board) presented its report *Handmade in Holland* calling for a revaluation of craft (in Dutch: 'ambacht') in Dutch society, '…endangered by an ageing society and a low appreciation for skilled professions in, for instance, the education system (SER 2013). Previously, The SER pre-published an article with the tagline: "Craft has an image problem" (van Kesteren 2013), which argues that the decline of the crafts sector in the Netherlands owes much to the image it has, as a profession and sector associated with rural museums and fairs. This image discourages both young people and their caretakers to opt for crafts as a promising career. On the contrary, it is being argued that the crafts are sources of innovation and competitive advantage, and artisanal businesses are vital to the Dutch economy.

In the *Handmade in Holland* report 'ambacht' translates to 'skilled trades', varying from web designers to painters and plumbers. It refers to knowledge based professions learnt through practice and knowledge passed on from master to student. The SER report acknowledges the

contribution of skilled trades to the Dutch economy, estimated at an annual turnover of 110 billion Euro. It also recognizes that in the future "skilled workers will be in increasingly short supply, mainly because fewer young people are opting to train for a skilled occupation…". The role of education for skilled workmanship is emphasised:

To ensure that more young people with a talent for skilled workmanship opt for training, such talent must be recognised and appreciated early on. However, assessments in Dutch primary education (by CITO, the National Institute for Educational Measurement) focus on measuring cognitive skills. Manual and other practical skills vital for the skilled trades are not taken into account. Such talents are insufficiently recognised and appreciated in primary education and are not considered when selecting a follow-up programme. This may result in talent being wrongly allocated. (SER 2013, English summary, 1-2)

The SER report is based on a research report entitled *Main Cause: Revalidation of Crafts Cultures* by economist Arjo Klamer who studied the craft economy, or rather, tacit knowledge based professions in different areas of the world (Klamer 2013). The research report was proposed by the organization 'Hoofdbedrijfsschap Ambachten', a Dutch organisation protecting the interest of craft based companies, which later merged with the Centre of Craft Economy (ambachtseconomie.nl). The Klamer report compared the Dutch attitude towards craft and its current position to that in Germany, Great Britain, Italy, India, Japan and China. The Klamer report argues that the Dutch focus on trade and formal knowledge, create dismissive attitudes toward tacit based knowledge – including craft based knowledge – and therefore the Dutch did not (unlike Germany or Italy, for instance), retain the guild tradition, where professions are taught from expert/master to student in a working environment. Following from the Klamer report, the SER report states:

The declining interest in practical training and skilled occupations is also related to the image of the skilled trades in the Netherlands. [..] Unlike Germany, the Netherlands does not have a skilled-trades culture. (SER 2013, English summary, 1-2)

The SER propose the revival of the apprentice-master system (referring to the guild tradition) and to rigorously analyse the relationship between skilled trades and the contemporary labour market. They argue:

Introducing a master certificate in the skilled trades sector is one way of highlighting skilled workmanship and excellence. [..] A proper understanding of the labour market prospects for skilled workers can also make working in the skilled trades more appealing and dispel the misconception that such trades are mainly for low-skilled workers. (Ibid.)

In June 2014, in an address to the Parliament and in a response to the SER report the Dutch Minister of Education, Culture and Science, Jet Bussemaker stated that she is aware of the importance of 'professional education' (in Dutch: *Beroepsonderwijs*) and the need for educating more and better craftspeople. She stated that through processes of globalization, an ageing population and technological developments, skilled professions were disappearing, affecting primarily 'the middle segment' of the labour market. According to the Minister in order to compete with countries like China, the Dutch need to re-focus from a formal knowledge-based economy to a 'learning' economy (Bussemaker 2014).

Referring to the action plan *Focus on Craftmanship* (*Focus op Vakmanschap 2011-2015*), set up by her predecessor Marja van Bijsterveldt in 2011, Minister Bussemaker suggested starting out

with the registration system *SOS Vakmanschap* (*SOS Craft/Tacit knowledge based trades*) for gathering information on tacit knowledge-based professions that were about to disappear (SVGB 2014). She suggested that a special body should be established to stimulate creative specialized professions such as glass blower, shoe maker, and furniture maker. The organisation *The Creative Artisan* (*Creatief Vakmanschap* - creatiefvakman.nl), founded by professionals in vocational schools and industry associations is a step in this direction.

The Minister further acknowledged the importance of craftsmanship and an increasingly important 'knowledge intensive makers industry' as well as the need to overcome traditional distinctions between craft and technology, by establishing crossovers between the different industries, transforming (artisan) professions in accordance with the latest technological developments. She emphasised the importance of schooling and re-legitimisation of specialised crafts, and in general shifting the focus from an exclusive consideration of cognitive talent to acknowledging the importance of practical skills and entrepreneurship. In addition, she suggests students should be educated not for a particular profession, but learn how to skill themselves to keep up with technological developments. The proposal is to set up 'Centres for Innovative Craftsmanship' with the aim of bringing students and professionals together, thus stimulating the availability of apprenticeships. The Minister urged the professional training school ('Middelbaar Beroepsonderwijs') to focus more on forecasting changes in the future labour market, such as the emergence of the games industry, to be able to prepare students with the skills that will enable them to keep up with technological innovations. In a recent statement (Dutch Government 2015), she reaffirmed her commitment stating that she will invest 75 million Euro annually to stimulate students to learn specialized skills at Middle Professional Education, such as horseshoe makers, prostheses builders or sausage makers (Dutch Government 2015). The position of the Dutch government as articulated by the minister and the SER report indicate that great emphasis is being placed on the 'makers industry' and the 'craft economy' as part of the economic future of the Netherlands, as well as the strengthening of the labour markets. Craft and creativity thus appear to be closely linked to Dutch economic futures.

4. A Craft Revival: Recalibrating Social, Cultural, Technological and Economic Dynamics

4.1. The Maker Movement and Online Maker Communities

> *The maker movement is on the rise. There are already over one million Etsy sellers worldwide. Together, they sold over $1.35 billion worth of goods in 2013. The emerging maker movement offers the tantalizing promise of a better economy—one that puts people at the centre of commerce, promotes local, sustainable production, and empowers anyone to build a creative business on their own terms.* (Etsy 2014a, 2)

This section considers the emergence of the maker movement from the philosophy of the Arts and Crafts movement in the second half of the nineteenth century with its interest in the revival of handcrafts, uniquely designed objects and a rejection of the machine. This however, was based on medieval guilds and a return to the past in an age of industry and mass production and eventually led to the decline of the movement in the early twentieth century. It was followed by the rise of the maker movement in the 1960s as a backlash to mass production and consumerism with a philosophy on simplicity and a DIY culture. The current maker movement is contextualised

within the rapid rise of new digital technologies in an era of information and communication, the impact and opportunities afforded to contemporary makers through new technologies and systems of connecting, communicating, collaborating, networking and retailing. In addition, the chapter addresses the resurgence of interest in craft skills, the demand from consumers for unique objects and suggests that the maker movement has revolutionised not just the makers but also consumers in a new economic order. New online marketplaces have resulted in a new economic order and have contributed to recalibrating the relationship between makers, and between producers and consumers.

The second part of this section is based on a case study featuring the work of Debbie Stoller, author and founder of the *Stitch 'n Bitch* groups of online networked hand knitters who have embraced technology. Although the maker movement encompasses many aspects of making, and many different types of makers, this case study is concerned specifically with traditional arts and crafts and the resurgence of hand-knitting. In doing so it conflates two interfaces of the traditional skill of hand-knitting with that of digital technology in connecting, communicating and networking and demonstrates the transmission of craft skills in new contexts and the impact of crafts on the economy. These online, socially networked knitters who use technology to communicate but who also meet face-to-face demonstrate that the maker movement is not just an intangible and virtual movement but it is also tangible and occupies physical spaces.

4.1.1. Background to the Maker Movement

The maker movement has its roots in the Arts and Crafts movement at the beginning of the twentieth century which was based on aesthetics, craft and the hand made. It represented a rejection of the machine and was critical of mass production and shoddy goods but it was also based on a philosophy of wholeness, autonomy for the worker as artisan and pure craftsmanship in making. However, the movement was replete with contradictions and the paradox was that the production of beautiful handmade goods was time-consuming and resulted in objects that only few could afford. The rejection of technology and the economic aspects of the Arts and Crafts movement were factors that contributed to its decline (for more extensive information about the Arts and Crafts movement see Adams 1987; Blakesley 2009; Cumming and Kaplan 1971; and Naylor 1971).

The 1960s witnessed a resurgence of the philosophy of the Arts and Crafts movement as a counterculture to mainstream mass consumerism and as a political act in defying authority. Based on a philosophy of self-sufficiency and making things for yourself, it developed into a DIY culture supported by relevant literature. The Whole Earth Catalog published in 1968 by Stewart Brand gave advice on all aspects of an alternative lifestyle and making such as how to build your own house and grow your own food to empower the individual. But this was not just about the hand-made. The difference was that it embraced new technology. With the development of the internet, new ways for providing and exchanging information have emerged. For example, Kevin Kelly set up the blog *Cool Tools: A Catalogue of Possibilities,* which continued the catalogue's philosophy of making things for yourself, and recommends the best and cheapest tools and resources available for making, from hand tools to books, machines, software, and maps. During the 1960s, dressmaking and needlework became popular, for some young people in association with a rebellion against consumerism and commercialism (Lee 2005).

The term 'maker' is expansive and democratic. It can include cooks who create and make food, making one's own beer or wine, making a musical instrument or digital robot, to all aspects of needlework – everyone can invent, make and be an entrepreneur without qualifications and

barriers to become involved, “Broadly, a maker is someone who derives identity and meaning from the act of creation” (Hagel et al. 2014). The maker movement is about the individual, the self-educated, autonomy and power through a do-it-yourself ethic. In 2013 Mark Hatch published *The Maker Movement Manifesto* which states, “making is fundamental to what it means to be human. We must make, create, and express ourselves to feel whole. There is something unique about making physical things. Things we make are like little pieces of us and seem to embody portions of our soul” (Hatch 2013, 11). According to Morozov, makers are the new hackers who defy authority to do things their own way, “a hacker takes nothing as given, everything is worth creatively fiddling with, and the variety which proceeds from that enriches the adaptivity, resilience, and delight of us all” (Stewart Brand quoted in Morozov 2014).

4.1.2. The Maker Movement and Online Communities

Like the Arts and Crafts movement—a mélange of back-to-the-land simplifiers, socialists, anarchists, and tweedy art connoisseurs—the makers are a diverse bunch. They include 3-D-printing enthusiasts who like making their own toys, instruments, and weapons; tinkerers and mechanics who like to customize household objects by outfitting them with sensors and Internet connectivity; and appreciators of craft who prefer to design their own objects and then have them manufactured on demand. (Morozov 2014)

Digital technology has had an impact on the emergence of the maker movement today. It has revolutionised how we communicate and has transformed ways of networking and collaboration resulting in new relationships and new ways of working. The use of email, blogs and social media such as Facebook, Twitter, Instagram, Pinterest, Flickr, has allowed online communities to develop and connect with each other in a global online community of makers and sellers. This emphasis on technology and communication and its impact on the maker movement is outlined by Kelly, “The new economy is about communication, deep and wide … Communication is the foundation of society, of our culture, of our humanity, of our own individual identity, and of all economic systems.” (Kelly 1999, 5). For David Gauntlett, making is connecting:

Making is connecting because you have to connect things together (materials, ideas, or both) to make something new; Making is connecting because acts of creativity usually involve, at some point, a social dimension and connect us with other people; And making is connecting because through making things and sharing them in the world, we increase our engagement and connection with our social and physical environments. (Gauntlett 2011: 2).

The maker movement today retains the earlier philosophy of making as counterculture to mass consumerism along with autonomy and empowerment of the individual. However, the difference is that the contemporary maker movement has embraced the machine and technology and the potential and opportunities gained from this.

The maker movement expands equally in the virtual and intangible sphere and in the tangible physical world. *Make* magazine was founded in 2005 by Dale Dougherty (makezine.org) and Maker Faire was created by O'Reilly Media's Make Magazine in 2006. Makers can access tools and facilities, have hands-on experience, watch live demonstrations and experiments in subjects from crafts to electronics, engineering and science. They can network face-to-face and experience new developments. These are regular and usually free events around the world for makers and visitors of all ages (The Economist 2014). Entrepreneurs and innovators can access funding for their projects through online websites. For example, Kickstarter is an online

crowdfunding platform which helps to bring creative projects to life by financially supporting them. Creative entrepreneurs can publicise their project and investors can pledge money towards them achieving their goals.

Craft and the new Etailers

The maker movement and crafters have a commercial and economic aspect to them and can benefit the economy through sales of work and exports of cultural goods. Online e-commerce websites such as Etsy, founded in 2005, have created an online marketplace for makers to sell their goods to a global audience. Etsy provides an online space where more than one million independent creative businesses connect directly with buyers from around the world. In 2013, these creative businesses generated over $1.35 billion in sales (Etsy 2014b). According to the Economist, Etsy is the leading business of the maker movement and the twenty-first century heirs of the Arts and Crafts movement. It charges sellers 20 cents to list each item and 3.5% of every sale (Economist 2014). A report by Etsy states:

The emerging maker movement offers the tantalizing promise of a better economy—one that puts people at the center of commerce, promotes local, sustainable production, and empowers anyone to build a creative business on their own terms. (Etsy 2014a, 2)

One of the advantages of setting up a creative business on Etsy is the flexibility it offers, particularly to women who often have to balance work, income and family. Women make 88% of U.S.A.-based Etsy sellers, and for 42% of them Etsy is their first business or attempt to sell their works (Etsy 2013, 2). This demonstrates the democratisation of making and selling that enables entrepreneurs to start a creative business afforded by digital technologies.

Etsy has a social mission as well as an economic one and uses technology to achieve its aims. In addition to offering small-scale makers the opportunity to sell their products worldwide it also offers them advice on business, and encourages participation in offline and online meetings For example, in 2013, Etsy launched a pilot programme, the *Craft Entrepreneurship* programme with Rockford, Illinois and New York City to teach low-income, unemployed adults how to monetize their artistic skills online. This includes business skills, marketing, finance as well as technology skills and this can ensure that the opportunities of the maker economy are accessible to all (Etsy 2014a: 6). In addition, Etsy undertakes research and online surveys on many aspects of business and government policies in relation to opportunities and the economy (see for instance Etsy 2013, 2014a,b). In April 2015 Etsy went public in the USA, being valued at $1.8 billion initially and arriving at a $3.3 billion value (Egan 2015).

The maker movement: Recalibrating retail

The maker movement is thought to be reinventing retail (Burke 2013). According to Kevin Kelly the geography of wealth is being reshaped and we now live in a new economy supported by technology, and distinguished by three features: it has a global outreach, it thrives on exchanges of intangible assets such as ideas and relations, and it is interlinked. In this context, the economy and the marketplace use digital infrastructures to operate in ways fundamentally different from the past (Kelly 1999, 2). The embracing of digital technology and expanded systems of communication and has resulted in new ways of working and new relationships. Some of these are focused on making as passion, and promote free exchange of resources, knowledge, and skills, and techniques. For example, *Ravelry,* founded by Casey and Jessica Forbes in 2007, is a social networking website for “knitters, crocheters, designers, spinners, weavers and dyers to keep track of their yarn, tools, project and pattern information, and look to others for ideas and inspiration”. The content here is all user-driven; we as a community make the site what it is.

Ravelry has close to five million registered users, and its content is entirely user-driven (ravelry.com).

However, the maker movement is not just about makers making singular things for themselves. For those who want to develop their hobby into a business online e-commerce platforms such as Etsy have afforded them the retail opportunity to set-up their own e-shop and to take advantage of a global marketplace. *Shapeways* is a 3D printing online marketplace where designers and makers can offer their designs for 3D printing and sell in high volume whilst at the same time retaining their uniqueness. According to Matt Clayson the product "tells a story of a person making it, designing it, but it is something that can reach a broad marketplace. And that's the beauty of what technology is bringing to this movement" (Matt Clayson, director of Creative Corridor Centre, Detroit quoted in Burke 2013). Through using technology and online manufacturing and marketplaces such as *Shapeways*, makers have the advantage in that they do not have to deal with customers or stock quantities of products in storerooms as everything is made to order**.**

Makers create and produce unique products, but it is also the new type of consumer who values the singularity and originality in a hand-made object. A report by Etsy revealed that the market for goods produced by artisans continues to grow, driven by an increasing demand by consumers who appreciate unique and handmade objects (Etsy 2014a). Independent makers can connect and sell on a personal level to customers throughout the world and this social intimacy has contributed to their success. This growing demand has much to owe to how makers promote and market their objects. Crafts Council, UK suggests that "Makers' sensibility towards how people engage with the material world gives them a unique edge when it comes to human-centred innovation. Partly, this is because makers often work closely with their clients and customers" (Yair 2011a, 6). The growth in demand and the human element in retailing (or etailing) has helped to recalibrate the relationship between the producer and the consumer.

4.1.3. Case Study. Stitch 'n Bitch: Networked Knitters

Stitch 'n Bitch is an online website where knitters and crocheters can start up knitting groups in physical spaces such as cafes, clubs and pubs and work on their knitting or crochet projects (stitchnbitch.org). It was founded by Debbie Stoller the co-founder and editor-in-chief of the feminist magazine *Bust* in New York in 1999 due to her passion for knitting and desire to teach and pass on skills to a new generation of knitters. Stoller, who holds a PhD in women's psychology from Yale University has revived the craft of hand knitting for a new generation of knitters. The website reads, "A 'Stitch 'n Bitch' is just a group of knitters and crocheters who get together on a regular basis to stitch and, well, you know. All Stitch 'n Bitch meetings are open to the public and are free of charge" (stitchnbitch.org). The website allows the visitor to find a group, register a group and offers advice on how to start a group, for example how to choose the right location, how to publicise the group online and offline, and advice on maintaining the group.

In an interview with Stoller she explained that through *Bust* magazine she published knitting patterns and set up an online blog to invite interested people to a café in New York's East village to meet and knit. In 2001 this was followed by a group in Chicago and then Los Angeles. Debbie picked up on this and set up her own website Stitch 'n Bitch (stitchnbitch.com). The positive response and knitter's blogs and emails indicated the trend for hand-knitting by a new generation of knitters.

In responding to the question why the interest in 'handmade' knitting in an era of mass manufacturing, Stoller gave three reasons: Firstly early feminists rebelled against handmade crafts associated with the home and domestic sphere, and hand-crafts such as knitting were undervalued due to the fact that it was work done by women. Debbie, an academic, author and knitter admitted to being a 'closet crafter' who had previously kept her knitting as a secret from fellow academics. In the mid-1990s the feminist movement was concerned with a re-think on words relating to women and Debbie reclaimed the word 'bitch' as well as revaluing and reclaiming the practice of hand- knitting in a public sphere. Secondly, for some it was a rebellion against corporate consumer culture and the impact on the environment as well as the humanitarian impact of low pay and working conditions in the third world. Thirdly, in the late 1990s knitwear became fashionable but sometimes unaffordable even though these were simple designs that could be hand-knitted. "In a culture of making you could make your own clothes and knit your own culture." (Debbie Stoller interview, 11/02/2015).

This emphasis on making-it-for-yourself coincided with the rise of the maker movement and Stitch 'n Bitch groups can be situated as part of the wider maker movement and DIY culture. Knitters of any age and level are invited to join. Stoller stated that the motivation to join is diverse and that there is not one reason why people join Stitch 'n Bitch groups: some join for social reasons, as an artistic expression or as a political act in reclaiming women's work in a public space. However, she suggested that one of the main reasons people joined groups was due to their love and passion for knitting**.** As a feminist it was important for Stoller that men were included and she stated that there were some all-male knitting groups as well as mixed groups even if they are in the minority. For example, Charles Lager-Frueh, 46, a software developer from Somerville, attends a Sunday night Stitch 'n' Bitch. He thinks of himself as a rock 'n' roller more than a knitter, with his long hair and black leather motorcycle jacket. He taught himself to knit by reading "Knitting for Dummies" the year before. "I didn't know I was sort of crashing a circle of people who already had their thing for a number of reasons,' he said about Stitch 'n' Bitch. 'They had more experience, and second, the gender thing. Even the name Stitch 'n' Bitch is funny. Guys would never say they're sitting around bitching." (Tomlinson 2003)

Stoller's family is part Dutch: her mother and grandmother were makers and she learned how to knit and crochet as part of her home-life and as a form of bonding. She was concerned that today many families did not practice handcrafts and the traditional skills would be lost. Although this was one of her reasons for setting up Stitch 'n Bitch, it explains the educational value of Stitch 'n Bitch groups in the transmission of traditional knowledge and skills and sharing these with a new generation of knitters. These makers communicate and network online, they share and sell knitting patterns and yarns online and teach each other new skills as described by a Stitch 'n Bitch organiser, "One of the advantages of coming to Stitch 'n Bitch is that you really learn a lot of techniques." (Gillian Schilke, organiser of Stitch 'n Bitch group in Boston quoted in Tomlinson 2003).

The popularity of Stitch 'n Bitch groups is unprecedented and continues to grow. According to the Stitch 'n Bitch website there are 8,497 groups in 289 locations around the world, but Stoller is unaware of how many people this may consist of. She acknowledges that this constantly changes, "some people drop out and others join in – but that was the point of the groups" (Interview with Debbie Stoller 11/02/2015).

Networked Knitters

Stitch 'n Bitch members are not just hobbyists but some turn their craft into a business and many sell their own yarns, patterns and garments through online retailers such as Etsy[6]. For passionate knitters, both process and the product of knitting are important: Stitch 'n Bitch knitters practice the techniques and skills of knitting as a process and when they make and garments they create a product (Strawn, 2012). This has advantages in generating sales from tools and materials for knitting as well as knitted garments, accessories and products.

In addition to Stoller's knitting and editorial work she publishes the Stitch 'n Bitch series of books on hand-knitting and crochet. These books teach many different techniques from basic skills to more advanced ones such as DIY skills on how to design their own patterns. She sells her books through websites such as Amazon and her own website *Knit Happens* set up in 2007 (knithappens.com) where visitors to the site can sign up to the 'Bitchlist' to receive emails on new patterns, contests and events. Her first book, *Stitch 'n Bitch: The Knitter's Handbook: Instructions, Patterns and Advice for a New Generation of Knitters (2003)* has been described as "the learn-to-knit-book that started a revolution" (stitchnationyarn.com) and "a social history-cum-beginner's guide crossed with knitting patterns, observations on knitting and family history, knitting and friendship, and useful tips" (Williams 2005). The book is a guide to knitting with easy-to-follow instructions for knitting and includes patterns contributed by a variety of knitters. This demonstrates that amateur knitters can be published and become professional and demonstrates the shift from being a consumer to a creative designer or producer (or prosumer). Using irreverent, witty language with a sense of humour, it is aimed at a new generation of knitters, has sold over one million copies and is currently the second bestseller for knitting on Amazon which demonstrates the interest in hand-knitting and the impact she has made on the craft. She has since published several other books and has made The New York Times best seller list.

Stoller's website *knithappens.com* advertises and has a link to her other website *Stitch Nation* (stitchnationyarn.com) where she sells her own brand of yarns. The site has a range of free patterns to download and visitors are invited to sign up and subscribe for a free newsletter to be notified when free patterns are posted. The yarns are high quality natural wool and luxury blend of wool and alpaca including a soft baby yarn. Each yarn is priced and is available in a range of colours to buy online. There are free knitting patterns and patterns from Stoller's books are featured to show what can be knitted in the yarn. The free patterns are easily accessed and the page gives full instructions on how to knit the pattern. The website makes good use of social media and visitors can comment on the yarn using links to social media including Twitter, Facebook, and Flickr[7], connect to StumbleUpon[8], or they can link to their email or print out the patterns on offer. Stoller's knitting books are also advertised and visitors can click on the link to take them back to her website *knithappens.com* where they can buy the book if required.

Stoller's website *knithappens.com* advertises, and is linked to her other website *Raging Wool*, an e-shop which sells "t-shirts and gifts for the fibre-obsessed" all related to Stitch 'n Bitch. Visitors to the site are offered a range of logo designs, all related to knitting and then they can choose to

[6] For example, "Kimberly Tucker's story about turning a quick profit during a hair appointment. The 27-year-old production planner from Amesbury sold a fuzzy scarf she was knitting to another salon customer, turning $15 of supplies into an $80 sale" (Tomlinson 2003)

[7] Stitch 'n Bitch has had a Flickr group since 30 November 2006 and currently has 227 members and 728 photographs (flickr.com, accessed 11/03/2015)

[8] *stumbleupon.com* is a search engine which can be designed for one's own specific interests and tastes. It has a discussion forum where members can discuss projects and ask for advice on projects and can post links to their own website or recommend other websites of interest.

have this in a range of women and men's clothing (t-shirts, vests, hoodies), accessories (bags, hats) or objects (mugs, clocks) and printed products such as calendars, greeting cards and writing journals. Clothing is available in a range of sizes for toddlers through to adults. This demonstrates Stoller's entrepreneurship and business acumen. As such she is one of the maker movement's new etailers who rely on digital technology for retail sales.

In addition to her books, Stoller has a TV channel where she teaches basic techniques on how to knit and this is available to view online (bliptv/stitchnbitch). This is another example of the transmission of traditional skills in new contexts. Individual Stitch 'n Bitch makers have also developed from amateur hobbyists into professional businesses, becoming experts and selling their own designs and yarns. Although Stich 'n Bitch books give basic instructions on techniques and provides knitting patterns for readers to follow, Stoller is aware that many knitters modify her patterns. They can change the type of yarn, alter the size, or reshape the sleeves of a garment to suit their own design. In this sense they are 'knitting hackers' and Stoller actively encourages them to be creative and to think for themselves including designing their own patterns.

Impact

This case study demonstrates how the social and technological are intersecting, and further how this has enabled knitters across the globe to connect, communicate and network to demonstrate that hand-knitting has shifted from being a lone hobby into a community of craft makers. This community uses both online and offline spaces to communicate, exchange resources and learn from one another. It is an example of how a network can be supported by virtual media and then move into and create a physical and tangible culture. In doing so, it conflates two interfaces of the traditional skill of hand-knitting with that of digital technology in connecting, communicating and networking.

Debbie Stoller not only makes but teaches traditional skills. She publishes online and retails her books, patterns and yarns. Since the first day of picking up her knitting in 1999 the trend in knitting, crocheting and needlework has grown enormously – yarn shops have proliferated around the world and digital technology has allowed access to knowledge, skills, marketplaces, and online platforms to connect and share knowledge about knitting. Stitch 'B Bitch groups have proliferated and knitting has become a respected and valued craft and an important part of the creative industries which contributes to the cultural economy.

In addition, initiatives such as Stitch 'B Bitch and other online communities have contributed to recalibrating the relationship between producer and consumer, and enabled easier and seamless shifts from amateur to professional. The high volume sales of Stoller's books and yarns is an example that creative crafts can make an important and vital contribution to the economy.

Over time knitting has been seen as "mundane, so ubiquitous and commonplace that it fades into the social, cultural, and historical background" (Strawn, 2012, 2). However, the popularity of knitting today is testimony to the timelessness of craft and to makers like Debbie Stoller. The education and learning embedded in her books and in Stitch 'n Bitch groups, where they can learn from each other, is an example of the transmission of traditional skills, the development of new skills, and new ways of working. Embracing new and emerging digital technology has enabled the revival of this ancient craft and revealed the contribution it can make to the creative economy.

4.2. Craft and Cultural Institutions

> *I met designers who are studying craft, not to go back in time, or to emanate those notions such as 'a handmade product is pure or has soul', but to re-invent traditions and apply existing techniques fusing them with modern technology. When you find a way to merge old techniques with computerized techniques, and re-assessing and re-applying useful values and ethics of the past with regards to quality of life, that is a great development.* (Interview with the curator of the exhibition *Hand Made: Long live Crafts* at the Museum Boijmans van Beuningen, 2013)

This section examines the actual and potential role of cultural and memory institutions in encouraging and driving the transmission, revival and relevant reinvention and integration of craft-related skills, materials and tools in contemporary societies. Craft-related knowledge is preserved and curated in different types of cultural and memory institutions such as archives, libraries, museums, and film institutes. Each of these adopts different approaches to preserving, interpreting and curating craft-related knowledge. For instance, museums are object-oriented, and craft knowledge is mostly embedded in the artefacts themselves, offering information about materials and techniques which can be augmented through contextual documentation. Film institutes and archives may preserve archival material and documentaries that detail craft making processes. To enable a deeper perspective, this section focuses on the relationship between museums and craft-related industries, asking a series of questions: How do museums fit between different players in the craft industry? Is there a specific aim to encourage European craft? If no specific aim exists, is it desirable and what role can museums play?

Museums exhibit and curate different kinds of collections, and interpret differently the terms *craft*, *art* and *design*. Examples are provided from different types of museums: Art and design museums are considered, for instance Victoria and Albert Museum (V&A) in London, and the Boijmans van Beuningen in the Netherlands, both of which have staged exhibitions on craft. These museums tend to emphasise the contemporary dimension of craft, and relations with design. Within ethnographic museums, global craft practices have had a long history, including large collections, research and learning programmes on craft from across the world. The definitions of craft adopted by these museums emphasise the socio-cultural embedding of crafts. Examples are included herein from the practices of The Dutch National Museum of World Cultures (NMVW), which focuses on ethno-archaeological collections, and also includes objects of art, design and fashion in its collections. The shop manager and exhibition maker at the NMVW defines craft as follows:

> *In my view it refers to the artisanal industry, handmade (Dutch: 'ambachtelijk gemaakt') products; usually, although not restrictive, it refers to objects that are not machine made. Craft objects are usually made within a certain tradition, where knowledge of certain skills are transferred from generation to generation, within a specific cultural framework.* (Interview, 23/01/2015)

There is, moreover, a porous line of distinction between folk art and craft, which is explored further by bringing examples from the exhibiting and curation practices at the Compton Verney Art Gallery in the UK, which displays folk art.

After outlining the historical relationship between craft and museums, three key roles of the museums in relation to crafts are explored: passing on craft-related knowledge and skills, inspiring contemporary craft and design creativity, and their role in supporting the craft economy.

4.2.1. Museums and Craft: A Historical Relationship

Any discussion of the relationship between museums and craft cannot be complete without acknowledging historical precedence, not least the relationship between museums of ethnography, art or design and nineteenth century discussions about the loss, or the need for the revival, of craft and craftsmanship. The current craft revival (in particular the Maker Movement as described above), can then be seen to have a much older genealogy. Emerging in the last few decades, several mainstream cultural institutions such as the V&A Museum in London and the Boijmans van Beuningen in Rotterdam, staged major exhibitions in relation to contemporary craftsmanship. The V&A exhibition 'The Power of Making' in 2011 celebrated the making of objects, examining particular makers who explore materials, styles and functions in different contexts. The exhibition explored notions such as 'DIY hacking' (people making objects at home, made possible by knowledge found on the Internet), and showcased professionals rethinking production processes and re-examining 'craft' itself.

In relation to V&A craft exhibitions, Amanda Game**,** Director of The Scottish Gallery in Edinburgh states:

Craft is the knowledge of a language and its expressive possibilities. Shakespeare's sonnets; Thonet's bentwood chairs; Shostakovitch quartets: all can be described in terms of craft. Human imagination can use craft to invent freely in the world of ideas, materials and forms. Thus are the worlds of design, art, engineering, science and architecture all born of craft. (vam.ac.uk/content/articles/w/what-is-craft/)

It is, arguably, no coincidence that the V&A Museum should take up such a topic. Indeed, the very foundation of the museum in the nineteenth century coincided with the Great Exhibition of Arts and Industry of 1851 and the Arts and Crafts movement, for which questions about global craft and design were very important. In 1852, when the V&A Museum was established, "its founding principle was to make works of art available to all, to educate working people and to inspire British designers and manufacturers" (vam.ac.uk). This relationship between museums and the encouragement of craft and design practices was not restricted to the UK. For instance, in the Netherlands the Colonial Museum in Haarlem (1871), was housed in the same building as the Museum for Decorative Arts (1877), founded by the Dutch Society of Decorative Arts and Trade (Nederlandsche Maatschappij van Nijverheid en Handel) alongside the Decorative Arts Academy. The colonial museum was intricately bound-up with nineteenth century discussion about the loss of craft skills in the Netherlands, especially in relation to discussions about craftsmanship in the colonies. It is with the Colonial Museum that the Tropenmuseum, one of the departments of the National Museum of World Cultures, shares its genealogy. Very little scholarly work has been devoted to the role of ethnographic/world cultures museums in shaping ideas about craft, or in stimulating European Craft economies, even though museums like the V&A, with large collections of what could be regarded as ethnographic objects, have received significant scholarly attention.

4.2.2 Passing on Craft-related Knowledge and Skills

At the core of the museums' mission lies their role to safeguard, preserve, and transmit knowledge and cultural manifestations, particularly about material culture. Craft knowledge is embedded in museum artefacts, or in documentation surrounding them. For instance, the examination of knitted textiles can reveal the techniques used. Craft-related knowledge is also

transmitted purposefully through educational programmes and exhibitions, online resources, audiovisual representations of craft processes, or through projects and collaborations with educational institutions. For example, the V&A website features a wide range of educational materials on craft, from historical reviews, details on techniques and materials, to interviews with makers and critical reflections on the contemporary relevance and embedding of craft.

The craft-related knowledge embedded in museum collections and documentation is varied, and can have different uses in contemporary societies. Makers are concerned with techniques and materials that can support and inspire their own work. For example the NMVW is often visited by knitters who look at the collections to understand the techniques and draw inspiration. The crucial role of museums is revealed when techniques of making are lost, and knowledge about them is only preserved in artefacts and other ethnographic documentation. The curator for Oceania at the NMVW speaks about the Maori Waka project (2011):

The Waka project was part of a large Waka revival. Using and making canoes is based on traditions that are past on from one generation to another. Certain carving techniques, or knowledge about motifs for instance, were not known any more. By studying canoes and sculptures in museum collections the Maori communities was able to study their past traditions and revive, and re-invent, them. For an important part Waka traditions were rediscovered through studying museum collections. (Interview with the curator for Oceania, NMVW, 04/02/2015)

Some of these techniques may be revived, if there is an interest from stakeholders. But often, the interest is not necessarily to replicate but to embed the traditional in new, contemporary forms. The case of Motché Paris-Lima jewellery is insightful. The brand is set up by Peru-based French designer, Carole Fraresso, who studied Andean metallurgy, and was inspired by pre-Columbian jewellery drawing information and inspiration from her fieldwork and the Gold Museum in Lima, Peru.

To me it is interesting that the designer finds inspiration in the pre-Columbian gold jewellery collection of Musée d'Or in Lima, such a beautiful collection. She finds inspiration in those old designs, re-inventing them, creating contemporary jewellery. … I very much like the way the designer of Lime Motché is inspired by ancient cultures and techniques. She takes interesting elements and creates something contemporary. And in the process she encourages revival of crafts, of old techniques. (Interview with the museum shop manager, NMVW, 23/01/2015).

The reinvention of traditional techniques can have relevance beyond the field of fashion, jewellery and decorative objects. It can inspire science and technology fields, and support the design of objects and devices for more sustainable livelihoods.

Our collections hold knowledge we still can use or rediscover, especially because we live in a world with too many people. We need to find solutions to live more sustainably. I do believe, if we would study museum collections, we might discover knowledge that can be inspirational developing contemporary technologies. Maybe at first glance the objects would seem simple, but sometimes when you examine objects more closely, new solutions are discovered. I am not saying we can use the knowledge derived from our collection directly in contemporary science, or that we should apply it directly into our lives, but the knowledge that is tied to craft traditions can inspire on different levels, in unexpected ways. (Interview with the curator for Oceania, NMVW, 04/02/2015)

As Europe is becoming increasingly multicultural through waves of migration, the role of ethnographic museums becomes important also in expanding notions of craft and what makes

European craft. Non-European craft traditions emphasise elements and principles of craft practice that resonate with European heritage craft practice: the social and communal nature of craft production, the cultural roots, the master-apprentice models for skills transmission. As these are becoming increasingly isolated in Europe, museums collections and the knowledge surrounding them continue to provide a link with the past.

Moreover, we traditionally focus on working with source communities, communities that are related to the areas the collections are from. In my area of expertise for instance, Oceania, I am primarily approached by groups or individuals, who live in Oceania or have roots in the Pacific, because they are interested in finding out more about their heritage through studying our Oceania collection. They are interested in the way their ancestors made the objects. Museum objects can hold knowledge about techniques that are long forgotten, and therefore can be rediscovered. So they come over to study the objects, how it is made, what it looks like. Their observations transform into knowledge they take home to their community to apply it in their work or pass it on in order to revive a craft traditions of their community. Or they just want to have a look at the objects of their heritage. (Interview with the curator for Oceania, NMVW, 04/02/2015)

Museums have therefore a key role to play in passing on knowledge about traditional techniques, and can provide the first impetus and the relevant knowledge to revive them. For this, it is necessary to open up collections, and make people aware of the collections held by museums, which are often not on display (Interview with the curator for Oceania, NMVW, 04/02/2015). However, most museum representatives interviewed for this study emphasised that the mission of the museum is to preserve and transmit knowledge, inspire creativity and stimulate reflection on history and on the present. They do not have a primary aim to revive craft or keep alive traditions of making that are no longer relevant for contemporary societies. The use of this knowledge and its integration in contemporary frameworks depend not only on museum actions, but to a great extent on the activities of educational institutions, designers and makers which use craft-related knowledge held in museums often to create something new. In this respect, it is important to encourage collaborations between museums and contemporary makers and designer makers, and arts, craft and design educational institutions.

Case in focus: exhibition 'Hand Made: Long live Crafts'

The exhibition 'Hand Made: Long live Crafts' (Boijmans van Beuningen, 2013) explored the position of (European) craft in the context of a changing global economy, in relation to new trends in design (i.e. the revaluation of 'crafting'/ambacht) and to global developments of technology and concepts such as environmental sustainability. The exhibition was aimed at exploring, celebrating craft, as well as debunking stereotypes in relation to craft, playing into the revival efforts of the craft economy. It had a clear educational aim, explained by the exhibition curator in the Dutch magazine Metropolis:

Most people, including designers, don't seem to have much historical knowledge about the artisan industry. They have no idea about the versatility and range of 'craft'. In many cases people talk about it as idle chitchat, stating uninformed romantic notions. I want to set the record straight, tell the story as it is. (Haagsma 2013)

The exhibition was built around seven clichés, debunking them with examples and raising questions such as: Is craftsmanship dying out? When is an object considered art, design or kitsch? Where is the line between (amateur) home knitting and (professional) artisan production?

When are imperfections artistic traits, when are they considered flaws? What is the range of the artisan industry and how does it relate to the contemporary creative industry? Is a handmade object more 'honest/fair' than an industrial produced object? (Haagsma 2013).

The exhibition was designed to inspire and inform, but also had a critical edge, including a subtle critique of the current wave of the craft revival and the maker movement:

The premise of the exhibition 'Hand Made' was to be very critical about the notion of 'craft economy' and the feasibility of related ideals. I am very critical on how people look at craft and artisanship, because in my experience in many cases views related to the craft economy are overly romanticized and short-sighted. It was my aim to show the broad range of craft and to educate visitors about craft and artisans throughout the centuries. (Interview with the curator of the exhibition *Hand Made*, 23/01/2015)

Hand Made was historically informed, tying past practices to the contemporary creative industry. The exhibition afforded several ways of engagement with both contemporary and heritage crafts:

- Display of craft objects from medieval to present times
- A studio in which craftspeople demonstrated complex decorative arts techniques.
- Demonstration of contemporary crafts featuring contemporary designer makers showing how they use digital technologies to make unique objects
- A Crafts Studio was set up in the museum's education space in which craftspeople offered workshops in different crafts, from knitting to 3D printing and woodcarving.

Among the professionals invited was the only known existing knife handle carver, but also other craft professionals or digital fabricators, among whom a 3-D printing artist. The exhibition attracted 70,000 visitors, and was a revelation in many ways, especially for creating the space in which visitors could interact with craftspeople. It also had an impact on makers. A contest was organised on etsy.com, and makers in attendance could give visibility to their products:

One of the artisans, Esmee Hofman, was a 'fijnscheervlechter' (basket weaver), a very difficult craft. She had to go to Germany to take a four year course to learn that skill. When she demonstrated her skill in the exhibition she met a donor who was fascinated by her work. He now buys her work regularly. She also met artist Harmen Brethouwer. They together developed art pieces and have landed some commissions. (Interview with the curator of the exhibition *Hand Made*, 23/01/2015)

Coinciding with the exhibition several news media contributed to the discussion about the revaluation of craft. For instance in a headline the Dutch Newspaper Trouw writes about: 'Hippe huisvlijt', which can be translated as 'Hot home crafting' or 'Trendy domestic diligence'. In the article they write: "Go to your attics and take your knitting pins, embroidery threads, chisels and the macramé design out. Crafting has made its definite comeback. And it is cooler than ever. With the exhibition 'Hand Made' Museum Boijmans van Beuningen jumps on the artisan trend wagon." Similarly, a magazine dedicated to the exhibition developed in cooperation between the Museum Boijmans and the NRC Handelsblad traced the craft revival, or, rather re-discovery of the artisan industry of the last ten years in the Netherlands. In the NRC supplement the exhibition curator states:

No doubt the revaluation of craft is intertwined with the fear of losing grip of the world around us. Globalization, digitalization, and increasing distrust of technological developments have led to a

desire for recognition and the need to stay in touch with our material environment. Moreover, it is a remarkable development that the Dutch government now is actually trying to promote the artisan industry.

In the magazine Metropolis, author Lotte Haagsma connects the craft revival to contemporary economic and technological developments. For instance, she elaborates on how the financial crisis and environmental issues have damaged production processes. This has encouraged people to think about alternative production methods and look for solutions and inspiration in the artisan industries of contemporary and past societies. She mentions for instance Chris Anderson, editor in chief of WIRED, a magazine about the latest technology developments, who in 2013 published the book *Makers, the new industrial revolution*, where he explains how the Internet, by making knowledge with regards to design and production methods more accessible than ever, and new technologies such as 3-D printing, have created a 'world wide web of things', thus propelling the Makers movement.

While the Hand Made was a one-off exhibition, the Boijmans has an on-going exhibition and education programme dedicated to design and craft. In their shop, the museum actively promotes Rotterdam designers, together with internationally renowned artists and design labels. It also presents the shop itself as a design object, promoting interior design. (boijmans.nl).

4.2.3. Inspiration, Creativity and Creative Interventions

In the report 'Made in Holland: Creative Industry' (NL Agency 2013), designer Rachel Hardy (from the company Droog Design) and Peter Gorgels (Internet Manager at Rijksstudio - website of the Rijksmuseum) reflect on the varied role museums can play. Hardy explains for example how she uses the museum collections for inspiration:

At Studio Droog we are always focused on reinventing luxury. As a designer I try to add to the cultural heritage of a country. The Rijksmuseum's collection is a rich source of inspiration for this type of art, because the collection ranges from the Middle Ages to the 21st century. It is also wonderful that the copyright on most pieces is no longer an issue seventy years after the death of an artist. This is handy but also inspiring, because copyright blocks inspiration. (NL Agency 2013, 22)

Peter Gorgels emphasises how the use of art to inspire creativity and making has a two-way impact, and reverberates in an enhanced appreciation of the artwork. This relation, he argues, can be enhanced by the virtual medium, ensuring that wider accessibility to works of art is offered for the general public and creative people:

The combination of physical and digital is actually strong. In e-commerce you also see that webshops open physical shops more often. We say that a work of art has an aura, based on the theory by Walter Benjamin. We also think that it has a virtual aura, which contributes to the overall aura. Het Melkmeisje (The Milkmaid) by Vermeer, for example; all the manipulations actually contribute to her strong aura. If one can do something with works of art – such as choosing, selecting and processing in Rijksstudio – the aura becomes even stronger. We live in an image culture; everyone processes images. Rijksstudio is glad to provide a stimulus for this. Everyone is an artist. (NL Agency 2013, 22-23)

Designer Rachel Hardy expounds her views on how creative engagement with works of art act as linkages between past and present and lend an aura to contemporary works, and the role that emerging technologies such as 3D printing can play:

The Rijksmuseum asked us, as ambassadors, to think of examples of what one could do with the images. I designed a still life flower tattoo. The flowers can be worn in your own composition on your skin. I still ask myself how I can make pieces from then important in present-day situations. It lends real context to our work, as well as richness in cultural weight. The art itself has also become easier to digest…Together with designers from De JongeKalff we made a rubber tablecloth with antique embroidered patterns, we stacked antique plates and pulled the colours apart in four stacked plates, we printed 3D metal cutlery which you no longer see in daily life, such as a salt spoon. We featured a cheerful centrepiece: a magnetic entirety of miniatures from the collection. During the meal you could rearrange the piece according to your own taste or mood. When I studied the antique glass collection I noticed their beautiful silhouette. I took the silhouette and made the glasses matte black, to demonstrate the concept of blind wine tasting. (NL Agency 2013, 23)

These examples illustrate how museums and their collections can interact with the craft-related or creative industries. Engagements differ in relation to the museum and the types of art displayed, and the types of programmes set up to encourage craftspeople and designers to interact, manipulate, interpret or create new objects. It is interesting to compare how intellectual property rights issues can play out differently in different museographic contexts. While, as specified above, copyright is no longer an issue for works over 70 years old displayed in Western museums, finer nuances of intellectual property are raised by engaging with manipulation of, or drawing inspiration from indigenous and ethnographic arts. These engagements raise issues that are difficult to grasp uniquely through Western regulatory frameworks, as intellectual property is seen to lie not with the individual, but with the community, and its is also intricately bound up with cultural protocols and taboos. As the Curator of Oceania at the NMVW observes:

For many Pacific communities this practice is problematic, because it comes close to appropriation and that is a big problem. (..) When you use a certain style or motif, it implies you are keeper and holder of the cultural knowledge that the design is connected to. And that is the problem. (Interview with the curator for Oceania, NMVW, 04/02/2015*)*

There have been several cases when the manipulation and integration of indigenous motifs and patterns, for instance in fashion, have been brought to court.

Last year Fiji Airlines presented a new design for their planes, based on bark cloth motifs. The community related to that design was very much offended and took the aviation company to court and stated only women from their community were allowed to use designs connected to their tradition. Intellectual property is a very hot item in the Pacific. The women won the court case. Fiji Airlines then invited a bark cloth artist from the community to design a motif for their planes. That way the community still had ownership and decided themselves to share their culture. The artist created a design, inspired by her heritage, a re-interpretation suited for an airplane. (Interview with the curator for Oceania, NMVW, 04/02/2015; see also Egan 2013)

The Tropenmuseum in the Netherlands has a long tradition of working in partnership with designers, particularly drawing on its textiles collection. For the Batik Exhibition, staged in 1996, the Tropenmuseum collaborated with the Rietveld Academy and especially the lecturers from their Textile group to create new works. Later, for the exhibition *Cultuur Couture,* the

Tropenmuseum's curator for Textiles collaborated with the Antwerp Fashion Academy to present and stimulate young fashion designers to create new designs inspired by museum collections. Students in their second and third year had to create six new works inspired by objects from the museum, looking attentively at style, techniques, etc. An exhibition was therefore organised featuring the best designs alongside ethnographic costumes. Two exhibitions have been organised on this concept, which were very well received by museum visitors.

This kind of practice could potentially raise copyright issues, as discussed above. The line of distinction between copying and inspiration is very thin. A former curator for Textiles at the Tropenmuseum comments on the way museum artefacts were used to inspire young fashion design students, and the difference between inspiration and copying:

I do not think that this is stealing. I do think that this issue is important, but in the case of the projects that we did, this is not a situation of appropriation. The contemporary designs took from the ethnographic collections and then made it their own. In most instances you could not see the relationship between original museum objects and the new design. Copying was not the issue. (Interview with the curator for Textiles, Tropenmuseum, 27/02/2015)

The work at the Tropenmuseum is an interesting example of an expanded vision to the practice of ethnographic museums:

Instead of only concentrating on objects from there, a normal practice of ethnographic museum we wanted from there and from here. We also wanted to have objects from the past as well as from the present. (..) Of course there is an ongoing question, should museums stimulate or catalogue? But to work together with people who are interested in different crafts is more active not so passive; museum should work with people, should be active. (Interview with the curator for Textiles, Tropenmuseum, 27/02/2015)

The Compton Verney Art Gallery in the UK sees the relation with contemporary creative people as a strategic alliance which strengthens the position of the museum. The museum is encouraging collaborations with contemporary creative people – artists and craftspeople – which is a strategic line of action to fulfil the museum's aim of becoming an important cultural resource in the region.

(W)e are trying to act really as a cultural resource more and it's really about what I've been doing over the last six years, which is moving away from that elitist thing and really hosting events and asking local groups and art and music societies what they would like. (Interview with the director of Compton Verney Art Gallery)

The collaborations with creative people are mostly oriented towards creative interventions, and less towards exhibiting their contemporary works. This is explained by the fact that the museum has to be aligned with its general exhibiting policy and plan its exhibitions strategically to attract a large number of visitors. In this line, creative interventions are more promising and attract more visits than exhibition of contemporary works. For example, a 2010 exhibition with local artists for Warwickshire Arts Week had a disappointingly low number of visitors. However, a 2012 creative intervention engaging 17 artists who interpreted and repositioned folk art items in the museum galleries, was very successful. This intervention was regarded as positive particularly as "it made people look at the folk art differently and indeed the other objects differently." (Interview with the director of Compton Verney Art Gallery).

4.2.4. An Economic Role

Museums contribute to sustaining craftspeople economically in both direct and indirect ways. Direct economic support comes by offering a retail venue, either through the museum shop, or through the organisation of fairs and exhibitions with sales. Indirect support comes from educating consumer tastes, and building the economic value of craft objects, often in association with the name of the museum. Museums are however more than a retail venue. They lend brand value and distinction to the objects on display. Brand value can be enhanced by communicating the high level of skill, authenticity, cultural provenance or rare or endangered techniques used in crafting an object.

Case in focus: Museum shop, National Museum of World Cultures

The NMVW shop is positioned in line with the mission and type of collections of the NMVW, and presented as a 'fair and sustainable shop', which wants to stay close to and support makers, and mediate relations between makers and buyers, by providing information on the provenance and story of objects on sale (Interview with the museum shop manager, NMVW, 23/01/2015). Objects are acquired from varied European and non-European sources, directly from makers, or through intermediary companies. Some of the objects they sell come from poor communities in the Global South, obtained either through intermediary agencies or, more infrequently, directly from makers.

Monkey Business, set up by an Australian and a New Zealand woman (...) work with women from South African Townships, most of them suffering from HIV. Monkey Business provide the beads, the women from the township select the ones they like, take them home and make all kind of designs for their beaded stuffed animals. Monkey Business guarantees a certain amount of purchases and therefore provides a steady income for these women. (Interview with the museum shop manager, NMVW, 23/01/2015)

Principles of fairness and sustainability are balanced by the interest NMVW has in offering for sale objects that have contemporary relevance. The museum does not want only to offer ethnographic objects of a historical nature on sale, but objects that appeal to contemporary customers, that are desirable and relevant.

I don't feel we should [as an ethnographic museum] sell solely ethnographic objects. I prefer to sell products with a contemporary character. (..) I certainly aim to be more than the aid oriented Third World shops (Wereldwinkel). I want our products to have an interesting contemporary edge.' (Interview with the museum shop manager, NMVW, 23/01/2015)

Ideas of authenticity are important when selecting objects, yet authenticity does not mean necessarily that only objects produced in certain non-European countries are selected. These can be made as well by Dutch designers. The museum has set up a network of suppliers of objects inspired by ethnographic traditions, but which have at the same time a contemporary outlook and appeal. Objects are often designed by contemporary Dutch designers. For instance, for the exhibition 'Geisha', objects were acquired from pop-up store 'City Dwellers' in Eindhoven, made by Dutch designers who had acquired Obi fabric from Japan.

Of course, these products are not Japanese, but they are made out of Japanese material and are created with a love for Japanese culture. I think those elements make their products suited to sell during the Japan exhibition. (Interview with the museum shop manager, NMVW, 23/01/2015)

The museum shop manager is careful about how the selection of objects and their communication to the public builds the brand value of the museum objects sold. Some of the objects offered for sale have their own brand name, or are distinguished through particular making techniques. The brand Motché Paris-Lima jewellery, put on offer by the NMVW, is presented as a particularly appropriate example. The NMVW website emphasises those features of the objects that enhance its value – rare technique, cultural embedding, authenticity:

Only in our story we sell jewellery of the exclusive brand Motché Paris-Lima. [..] Through close collaboration with Peruvian artisans, Fraresso rediscovered lost and forgotten techniques. Through these ancient old metal techniques the jewels emanate knowledge and creativity, while they at the same bring back lost religions and rituals.

The geometrical shapes of the pre-Columbian cultures are the foundation of the Motché designs. The jewels are produced using the exact same materials and techniques as the original pre-Columbian jewellery.

A further incentive to buy is given by mentioning that object sales contribute to the preservation of World Cultural Heritage. The story of Motché Paris-Lima is interesting in itself as an example of how old techniques can be reinvented and the role that museums can play in this.

In conclusion, the case studies presented above offer inter-related but varying ideas about the role of museums in questions of craft, craft revival, and craft economies. While government policies to stimulate creative industries, to recover traditional skills and to turn craftsmanship into economic futures have gained importance in the Netherlands and other European countries in recent years, little consideration is given to the role ethnographic museums, or other kinds of museums can play. Similarly museums have themselves no established policy on their role as alternative sites for the training of craft skills or as spaces to support, inspire and educate stakeholders in the craft industry. It is unquestionable, however, that museums can play an important role; whether through their shops, through their exhibitions or through the ways in which they use their collections to stimulate craft and design practices. This is not to suggest the museum as a recuperative space for traditions – which would coincide with ethnographic museums' nineteenth century practice of 'salvage anthropology.' Rather, museums are ideally positioned to offer access to knowledge that can be used to sustain or inspire contemporary practices. The exhibition 'Hand Made' at the Boijmans was an important example of how a museum can participate in broader national discourses about craft, craft-related skills and the creative industries. The examples coming from the practices at the National Museum of World Cultures illustrate the importance of museums as spaces for learning and creative inspiration, as well as their role in supporting the craft economy. As the curator for Oceania at the NMVW suggests, the collections provide a wealth of knowledge that can stimulate creative inspiration. The question is how to tie these collections to educational institutions or design schools. Similarly, the examples raised questions about the sensitivity of issues of appropriation and intellectual property in the use of craft knowledge. If ethnographic museums collections are used, then there is the need to ensure that relationships are developed or proper modes of use are found that do not infringe on indigenous craft knowledge. The exhibition *Cultuur Coutour* was a good example of how the collections can be mobilised for talent development, for creative inspiration, without having to step into cultural appropriation.

As a concluding note, two initiatives currently under implementation (2015) by the National Museum of World Culture are worth mentioning. The Museum is developing two research,

collecting and exhibition lines around Global Design and Global Fashion. In both these research initiatives the Museum intends to place its collections at the centre of critical questions about craft, design, fashion and contemporary creative industry. This is intended as an important part of the future positioning of the museum, connecting it with different stakeholders including craft peoples and designers. This initiative is an important step for capitalising upon the role that (ethnographic) museums can play in craft and design economies.

4.3. Legal Perspectives: The Role of Intellectual Property in the Maker Community

The fashion and arts and crafts sectors are amongst the most creative within Europe. The products of these industries permeate our daily lives; from furniture, through wallpapers to dresses. Underpinning the creation and exploitation of the fruits of these industries are intellectual property laws. Copyright and design rights have a role to play in ascribing ownership rights in and to the fruits of the creative efforts of the producers of these goods, while trade marks operate to prevent consumer confusion and patents to protect inventions.[9] The purpose of this section is to outline just some of the intellectual property laws within Europe that are relevant to the fashion and arts and crafts sectors and to show how they are relevant to the maker movement as it has emerged and is now reviving traditional skills, creating employment and contributing to the economy.[10] It is not the intention to be comprehensive as the laws are complex and detailed. Rather the intention is to highlight the laws that are relevant to these sectors and which are most implicated by the increasing use of digital technologies and the recalibration of relationships as between producers and consumers. In discussing fashion the intention is to show how all the intellectual property rights can be used by those in the industry; in discussing the arts and crafts sector, the focus will be on copyright, works of artistic craftsmanship. Design rights will be discussed both in the context of the fashion industry and in relation to their juxtaposition with artistic craftsmanship. The role of trade marks will also be highlighted in the context of fashion. The discussion will continue by considering how the maker communities use new technologies to develop communities and to find ways for their products to reach markets and the relevance of IP in this. Examples will be given from maker communities of the use of intellectual property rights to demonstrate the importance of IP law in the reconciling of culture, creativity and employment growth.

4.3.1. Fashion Sector

From top to toe, hats to shoes, and all parts in between, all Intellectual Property Rights are available to and used in the fashion industry to protect and promote all aspects of items of clothing, shoes, watches, jewellery, bags and other forms of attire. While the fashion industry is fast moving and depends on creativity and innovation, IPR can be used as part of a strategy to protect and exploit many different items that are created.

Designs

At the heart of the fashion industry is the notion of *design*. Each year designers must come up with fresh new ideas to tempt the consumer and a significant investment is made annually in

[9] Refer to RICHES Taxonomy for explanations of ‘copyright’ and ‘digital copyright’.
[10] Refer to RICHES Taxonomy for explanation of IPR Law.

showing these to the public.[11] Design rights can help to protect "the appearance of the whole or a part of a product resulting from the features of, in particular, the lines, contours, colours, shape, texture and/or materials of the product itself and/or its ornamentation".[12]

Within Europe there are two different types of design protection available: registered community design (RCD) and unregistered community design (UCD).[13] In order to be protected a design must be novel, meaning that no prior identical design must have been made available to the public,[14] and the design must have individual character meaning that the informed user would find it different from other designs.[15] Where a design forms part of a complex product, the novelty and individual character of the design are judged on the part of the design visible during normal use.[16] So, for example, a garment might have a particularly complex interior design, perhaps in the addition of pockets, then those parts would not be capable of protection unless visible during normal use.

Dolce and Gabbana Ring

Stella McCartney Glasses

Louis Vuitton Bag

Figure 3. Some examples of RCDs relevant to the fashion industry

Both RCDs and UCDs are protected throughout the Member States of the EU.[17] RCDs are protected against similar designs even where an infringing design has been developed with no knowledge of the registered design.[18] The right lasts for an initial period of five years from the date of filing and can be renewed in blocks of five years up to a maximum of 25 years.[19] The current fee (2015) for registering and publishing one design is €350 for five years protection.[20] When registered, the design can be found on the RCD database held at the Office for the Harmonisation of the Internal Market (OHIM) the organisation responsible for registering designs based in Alicante, Spain (oami.europa.eu/ohimportal).

[11] Marc Jacobs spent nearly 1 million dollars on his 2011 Fall show http://www.nytimes.com/2011/02/17/fashion/17Curtain.html?pagewanted=all&_r=1&
[12] Article 3A
[13] European Council Regulation (EC) No. 6/2002 of 12 December 2001 on Community designs (consolidated version) implemented by Commission Regulation (EC) No 2245/2002 of 21 October 2002 implementing Council Regulation (EC) No 6/2002 on Community designs (Design Regulation)
[14] Design Regulation Article 5
[15] Design Regulation Article 6
[16] Design Regulation Article 4 b
[17] Design Regulation Article 1.3
[18] Design Regulation Article 10
[19] Design Regulation Article 12
[20] Route to registration, Registered Community Design. oami.europa.eu/ohimportal/en/rcd-route-to-registration

Registering a design entails a cost; not only the €350 for the first five years of registration (renewable) but in addition the cost of searching and going through the registration process need to be taken into account – all factors that would demand the development of a careful strategy to ascertain whether it is financially viable to register a design. It is the case that for some designs this protection could be most useful to mark out the time and space needed for a design to become well-known in the marketplace – potentially resulting in a product that becomes iconic. The Birkin bag by Hermes is one example for which (it is alleged) there is currently a waiting list – although the length is not clear. New, a bag can cost anything up to £100,000 and they are so coveted Forbes magazine dedicated an article to 'How to buy your first Birkin bag.' (Forbes Life 2013).

A UCD is a right that is narrower in scope and time than the RCD, although, as the name suggests, does not have to be registered and accordingly does not cost anything for the protection to subsist. A UCD gives the right to prevent the commercial use of a design but only if it is an intentional copy of the protected design.[21] This right lasts for three years from the date on which the design is first made available to the public within the EU and cannot be extended.[22]

Both rights give the exclusive right to: manufacture a product incorporating a protected design; put a product on the market incorporating the protected design; offer a product incorporating the protected design for sale; market a product incorporating the protected design; import/export a product containing the protected design.[23]

At present there is a dearth of case law within Europe interpreting the extent and scope of the rights. In addition, it is currently unclear as to the extent to which either the RCD or UCD are used and enforced in practice. To fill this lacuna the UK Intellectual Property Office will commission a piece of research in 2015. The results of this will be reported on, as, and when available. But it is not only design rights that are relevant to the fashion sector. Copyright, trade marks and patents all have a role to play.[24]

Copyright

While the notion of design is at the heart of the fashion industry, copyright can protect elements of the expression of the ideas that go to make up the design, and can also protect the final fashion item. Within Europe, copyright laws are shaped by obligations undertaken in International Conventions including the Berne Convention on the Protection of Literary and Artistic Works 1886, the Agreement on Trade Related Aspects of Intellectual Property Rights 1994 (TRIPS), and the World Intellectual Property Organisation Copyright Treaty 1996 being some of the main ones. The obligations in these treaties and conventions have been included in a draft of European Copyright Directives which have also added measures specific to Member States.[25]

[21] Design Regulation Article 19.2
[22] Design Regulation Article 11
[23] Design Regulation Article 19.1
[24] Trade secret law is also relevant but will not be commented on here.
[25] Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs (Codified version); Directive 2004/48/EC of the European Parliament and of the Council on the enforcement of intellectual property right; Directive 2001/84/EC of the European Parliament and of the Council on the resale right for the benefit of the author of an original work of art Directive 2001/29/EC of the European Parliament and of the Council on the harmonisation of certain aspects of copyright and related rights in the information society; Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights (codified version); Council Directive 93/83/EEC on the coordination of certain rules concerning copyright and rights related to copyright applicable to satellite broadcasting and cable retransmission;

The overall copyright framework within Europe has resulted in the retention of the territorial scope of copyright (laws in individual Member States are applicable within individual territories) but the substance of the laws are converging through the basic minimum standards to be found in the international treaties[26] and the use of the principle of national treatment,[27] the harmonising and approximating standards to be found in the Copyright Directives[28] and the interpretation of these European measures by the Court of Justice in Europe (CoJ).[29]

Many garments and other artefacts produced in the fashion industry will start life as a pattern. A pattern is a set of (usually) written instructions on how to make a garment or other item. The approach in the UK legislation, the Copyright Designs and Patents Act 1988 (CDPA), is to protect copyright works within particular categories. A pattern would be protected as a literary work.[30] The standard of originality required is that of "skill, labour and effort" and that a work should not be copied.[31] Recent case law from the CoJ interpreting the copyright directives[32] suggests that these criteria have changed in a way that appears to conflate the concept of the work and the requirement of originality.[33] The CoJ has stressed that the European scheme of protection for copyright protects works where the subject matter is original in the sense of being the author's intellectual creation.[34] What the work is called, in other words for our purposes whether it is a literary work, is irrelevant, although it seems that a work would need to fall under the Berne Convention categories of a literary or artistic work.[35] The standard of originality for all types of work is the same: it is one of intellectual creation.[36] To reach this level the author should express her/his creative ability in an original manner by making free and creative choices,[37] and stamp her/his 'personal touch' on the work.[38] Where choices are dictated by technical

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Directive 2006/115/EC of the European Parliament and of the Council of 12 December 2006 on rental right and lending right and on certain rights related to copyright in the field of intellectual property (codified version). Refer to RICHES Taxonomy for limitations and exceptions to copyright

[26] Including the Berne Convention and TRIPs.

[27] Berne Convention Article 3; TRIPs Article 3.

[28] Above n 17.

[29] See for example the cases cited in fn 26 where the CoJ has handed down a series of cases on originality in 'European' copyright law.

[30] CDPA s 1(1)

[31] *University of London Press v University Tutorial Press* [1916] 2 Ch 601.

[32] Referenced above as the 'harmonising approach of the Court of Justice'.

[33] van Eechoud, M, 'Along the road to uniformity – diverse readings of the Court of Justice Judgments on copyright work' 3 (2012) JIPITEC 1 para 60; Handig, C 'The "sweat of the brow" is not enough! – more than a blueprint of the European copyright term 'work'', 2013, EIPR 1; Rahmatian, A, 'Originality in UK copyright law: the old "skill and labour" doctrine under pressure', 2013 IIC 3; Rosati, E, 'Towards an EU-wide copyright? (Judicial) pride and (legislative) prejudice', 2013 IPQ 46; J Pila, 'An intentional View of the Copyright Work' (2008) *Modern Law Review* 71; C Handig, "*Infopaq International A/S v Danske Dagblades Forening* (C-5/08): is the term "work" in the CDPA 1988 in line with the European Directives?" (2010) *EIPR* 32(2), 53

[34] Case C-5/08 *Infopaq International A/S v Danske Dagblades Forening* (*Infopaq*) paras 33 38. See also Case C -393/09 *Bezpenostní softwarová asociace (BSA*) para 45 What is not protected is expression which is limited by its technical function. Case C- 406/10 *SAS Institute Inc. v World Programming Ltd* paras 38-40. Case C-145/10, *Painer v Standard VerlagsGmbH et a*l (Painer) In the UK see *SAS Institute Inc.v World Programming Ltd* [2013] EWHC 69 (Ch) para 27.

[35] Berne Convention Article 2(1). *SAS Institute Inc v World Programming Limited* [2013] EWHC 69 (Ch) para 27.

[36] Case C-5/08 *Infopaq*, Case C‑393/09 BSA para 45; Joined Cases C‑403/08 and C‑429/08 *Football Association Premier League and Others*; Rosati, E, 'Originality in a work, or a work of originality: the effects of the Infopaq decision' E.I.P.R. 2011, 33(12), 746. Derclaye, E, 'Wonderful or Worrisome? The Impact of the ECJ Ruling in Infopaq on UK Copyright Law' (2010) EIPR 32(5), 248.

[37] *Infopaq*, para 45; *BSA*, para 50; *Painer*, para 89.

[38] *Painer*, para 92.

considerations, rules or constraints that leave no room for creative freedom, then these criteria are not met.[39] It is also clear that the standard should be the same for all Member States: thus protection for patterns will converge throughout Europe.

In relation to infringement of the copyright in a pattern, each State will currently decide this differently in accordance with their laws. In the UK copyright can be infringed in a literary work (the knitting pattern) by making something to the pattern if the pattern is for something that is an artistic work – but not otherwise.[40] The intention is to treat documents for functional objects as design documents and as such under the protection of design law, rather than copyright law. The aim is to avoid cumulation of IP protection. Thus making, for example, a knitted dress to a pattern that contained or was an artistic work for which the instructions were given in the pattern could infringe copyright under the CDPA.

Where the making of the article to the pattern is not an infringement of copyright – if it is not an artistic work – then selling the item made to the pattern will not infringe copyright.[41] Care should however be taken of the terms and conditions that may be attached to the pattern. These might state that an article made to the pattern should not be commercially sold. Acting contrary to this term would amount to breach of contract.

Where copyright does subsist, then this protects the ways in which the ideas are expressed in the work. Copyright does not protect ideas, or styles, or particular stitches, or methods: these are treated as ideas and well-known techniques under copyright law, and thus in the public domain and free for all to use.[42] To infringe copyright a substantial part of the original work needs to be copied and what is substantial depends on the facts.[43] It is both a quantitative (how much) question as well as a qualitative question (the quality/importance of the work taken). Making a few changes to a pattern will not avoid an infringement of copyright

Trade Marks

While designs rights and copyright protect the ideas expressed in the design and in the article, trade marks operate to ensure that the consumer is not confused as to the origin of the goods sold under the trade mark. For instance, when a consumer purchases a bag carrying this trade mark

Then they know that the bag originates from Mulberry. There is, in other words, a link between the owner of the trade mark, the goods, and the consumer who has purchased the goods: the trade mark acts as an indication of the origin of the goods. Trade marks are exceptionally important to the fashion industry as they are an integral part of the branding of the fashion goods

[39] *BSA*, paras 48 and 49, F*ootball Association Premier League and Others,* para 98.
[40] CDPA s 51. *It is not an infringement of any copyright in a design document or model recording or embodying a design for anything other than an artistic work or a typeface to make an article to the design or to copy an article made to the design.* Although if the categories of work are now redundant it is not clear how this might work.
[41] CDPA s 51
[42] TRIPs Agreement Article 9.2.
[43] CDPA s 16)3)(a).

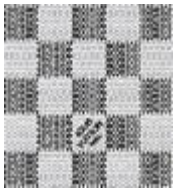
and many owners work to develop value in their brands. The Birkin bag was mentioned above. There are many other well known brands working in different sectors of the fashion market.

At International level both the Paris Convention for the Protection of Industrial Property 1883 and the TRIPS agreement contain substantive minimum requirements for the protection of trade marks in signatory states.[44] In Europe trade marks within Member States are regulated by an EU Directive which deals with the rights surrounding national trade marks.[45] There is also a pan-European trade mark – the Community Trade Mark (CTM) - which is applicable throughout all of the Member States of the EU.[46] Thus while not totally harmonised the laws in Member States of the EU are converging, and as with copyright, the CoJ plays an active role in this approximation through cases brought before it ruling on both the Directive and the Regulation.[47]

Within Europe the legislative measures provide that a trade mark can consist of a sign which is capable of being represented graphically and which is capable of distinguishing the goods and services of one undertaking from those of another.[48] This definition is underpinned by a series of cases determining what can, and cannot, be registered as a trade mark. Suffice it to say that there are few signs that are unregisterable. One example is smells: a smell cannot be registered largely because it cannot be represented graphically.[49]

Some examples of registered marks from the fashion industry are illustrated in Figure 4.

Dolce & Gabbana CTM No: 001529114



Louis Vuitton CTM No: 009844127

Stella McCartney CTM No: 002433399

Figure 4. Trade marks in the fashion industry.

[44] E.g. Paris Convention Article 6; TRIPs agreement Section 2.
[45] Directive 2008/95/EC of the European Parliament and of the Council of 22 October 2008 to approximate the laws of the Member States relating to trade marks. (Trade Mark Directive).
[46] Council Regulation (EC) No 207/2009 of 26 February 2009 on the Community trade mark (codified version). (CTM Regulation)
[47] Many cases have been brought before the CoJ concerning trade marks. For details see Waelde C et al 'Contemporary Intellectual Property: Law and Policy', Oxford University Press: Oxford 3rd ed. 2012. Part V.
[48] CTM Regulation Article 4.
[49] Case -273/00 *Ralf Sieckmann v. Deutsches Patent- und Markenamt*

A CTM trade mark needs to be registered in the trade mark register at OHIM,[50] and a national trade mark in the national register.[51] As with designs, registration is not cheap. It currently starts (2015) at €900 for one registration of a CTM in one class.[52] Registration lasts for an initial period of five years and can be renewed every five years indefinitely.[53] However, and in order to remain on the register, the trade mark must be used and can be revoked for non use after a period of five years.[54]

A trade mark protects the trade mark owner against the same or confusingly similar use of a trade mark by a competitor on the same or similar goods and services.[55] In addition, and where the trade mark has a reputation, then the owner can prevent the use by a third party on dissimilar goods.[56] This is an important measure for the brand owners in the fashion industry who will want to seek that the value of their trade marks is not diluted. However, not all uses by third parties can be prevented. For those jurisdictions that have the defence of parody in their laws, the US case of *Louis Vuitton Malletier S.A. v. Haute Diggity Dog*,[57] is both fun and instructive. Diggity Dog sold high end products for animals whose names parodied high end products such as perfume, handbags and shoes. Louis Vuitton took issue with the 'Chewy Vuiton' dog toys including handbags of a similar design and colour. This was judged to be a parody and therefore a non-infringing use.

Figure 5. Louis Vuitton interpretation in Chewy Vuiton

As with the registration of designs, the registration of trade marks should be one element in the intellectual property strategy of stakeholders in the fashion industry.

Patents

Patents have their place in the fashion industry. Patents protect technical innovation and can serve to give a competitive advantage. Within Europe, protection arises through a mixture of national legislation[58] and patents granted by way of the European Patent Convention 1973. In order to be patentable, an invention needs to be new, it needs to involve an inventive step, and it needs to be capable of industrial application.[59] An example of a patented technology used in the fashion sector is that owned by the Danish biotech company Novozymes. This company specialises in enzymes and microorganisms and their use in the treatment of fabrics. The

[50] oami.europa.eu/ohimportal/en/trade-marks
[51] For example in the UK the register can be found here https://www.gov.uk/search-for-trademark
[52] oami.europa.eu/ohimportal/en/fees-and-payments
[53] CTM Regulation Articles 46 and 47;
[54] Trade Mark Directive Article 10.
[55] CTM Regulation Article 5; Trade Mark Directive Article 5.
[56] Ibid.
[57] LLC United States Court of Appeals for the Fourth Circuit 507 F.3d 252 (4th Cir. 2007)
[58] E.g the Patents Act 1977 in the UK
[59] European Patent Convention Part II Chapter 1.

company developed and patented a technology for the treatment of stone washed denim jeans to give the fabric a washed look. The technology has been licensed world-wide.[60]

4.3.2. Arts and Crafts Sector

As has been described elsewhere in this report, the Arts and Crafts movement developed as a backlash to mass production and mechanisation. The law in the UK protecting the products of the arts and crafts sector provides an excellent case study of how domestic copyright law responded to the movement. As will be discussed below, the courts found some difficulty in deciding on the parameters of protection for the many and varied works that were developed during this period. More recently, both copyright law and designs law have been converging in Member States of the EU bringing protection for these types of works more closely together.

Arts and Crafts and Copyright

In 1911 the UK Copyright Act was amended to include a category of works of artistic craftsmanship. In 1976 in the case of *Hensher v Restawile*[61] it was observed that "there can be no doubt that, when Parliament, in 1911, gave copyright protection to 'works of artistic craftsmanship', it was extending to works of applied art the protection formerly restricted to works of the fine arts, and was doing so under the influence of the Arts and Crafts movement…"[62] The amendments to the 1911 Act were also in response to the need to implement the applied art provisions of the Berlin Revision of the Berne Convention.[63]

There are many fine examples of works produced by the Arts and Crafts movement ranging from buildings to wallpaper.

Interior of Morris Room in the V&A cafe, London

Adjustable-Back Chair No. 2342, Gustav Stickley, 1902

'Artichoke' wallpaper, by John Henry Dearle for William Morris & Co., Ca. 1897 (Victoria and Albert Museum)

Figure 6. Examples of works produced by the Arts and Crafts movement

[60] Intellectual Property in the Fashion Business. WIPO magazine June 2005 available at wipo.int/export/sites/www/sme/en/documents/wipo_magazine/5_2005.pdf
[61] [1976] AC 64 (HL) 90F

[62] *Hensher v Restawile* [1976] AC 64 (HL). Pila, J 'Works of artistic craftsmanship in the High Court of Australia: The exception as paradigm copyright work' (2009) 36(3) *Federal LR* 365; *Coogi v Hysport* [1998] FCR 154; *Lucasfilm Ltd v Ainsworth* [2012] 1 AC 208 (SC); *Burge v Swarbrick* [(2007) 232 *CLR* 336.
[63] Ricketson S and Ginsburg, J *International Copyright and Neighbouring Rights: The Berne Convention and Beyond*, (Oxford: Oxford University Press, 2006) paras 8.59 – 8.69.

Although British copyright law has protected works of artistic craftsmanship for more than a century,[64] there is no statutory definition of the term. When called on to determine what a work of artistic craftsmanship is, the courts have said that works should both have elements of 'craftsmanship' and of 'artistic quality' in their execution.[65] In *Hensher v Restawile* noted above, the court was called upon to decide whether a prototype for a sofa (described by expert witnesses as 'flashy'; 'horrible'; and 'middle of the road') was a work of artistic craftsmanship. While the court was split on its reasoning it did decide that for a work to be one of artistic craftsmanship it must be of a quality making it capable of being described as artistic. The challenge then is one of how to test artistic quality without becoming involved in subjective discussion on the merits of a work. While the court agreed that the prototype sofa was not one of artistic craftsmanship, there was disagreement as to why not. One view was that the intention of the author was critical; a second view was to ask whether a substantial part of the public would regard the work as artistic; a third view was that given the influence of the Arts and Crafts movement on the inclusion of the section in the 1911 Act and given the emphasis of the Arts and Crafts movement on the necessary connection between form and function, the words 'artistic craftsmanship' should be construed as a whole rather than separate examination. The question to be asked therefore was whether the work is by one who was an artist craftsman. As a result, cases have shown what is not protectable by this category of work: *Hensher v Restawile* (prototype of a sofa), *Cuisenaire v Reed*[66] (teaching rods), *Burge v Swarbrick*[67] (hull and deck of a yacht), and *Lucasfilm v Ainsworth*[68] (military helmet).

Copyright and the link with design law

It is the case that the dearth in case law on infringement of designs suggests that there are limited opportunities for misappropriation of three-dimensional artistic objects.[69] The test for infringement of a two-dimensional work in three dimensions (the pattern being made into an artistic work), works of artistic craftsmanship and the role of designs have been noted above. Another effort to avoid duplication of rights in the UK can be found in CDPA section 52. This section contains an exception to the permitted use of a work of artistic craftsmanship by limiting copyright protection when the works have been industrially manufactured. When 50 or more copies of an artistic work are made the current period of copyright protection is limited to 25 years as compared with other artistic works which are protected by copyright for 70 years pma (post mortem auctoris).[70]

This section is now due for repeal following the ruling of the CoJ in *Flos SpA v Semeraro Casa e Famiglia SpA*.[71] This case concerned the distribution of imported lamps from China which

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[64] Copyright Act 1911 s 35(1).
[65] *Cuisenaire v Reed* [1963] VR 719, 730; *Hensher v Restawile* [1976] AC 64, 77 (Lord Reid); *Merlet v Mothercare plc* [1986] RPC 115; *Bonz Group v Cooke* [1994] 3 NZLR 216, 222.

[66] *Cuisenaire v Reed* [1962] FLR 180

[67] *Burge v Swarbrick* (2007) 232 *CLR*.

[68] *Lucasfilm v Ainsworth* [2012] 1 AC 208

[69] Cf Bradshaw S *et al*, 'The Intellectual Property implications of low-cost 3D printing' (2010) 7 *ScriptEd* 5; Rideout, B 'Printing the Impossible Triangle: The Copyright Implications of Three-Dimensional Printing' (2011-2012) *J Bus Entrepreneurship & L* 161; Braun V & Taylor M, '3D Printing' [2012] *CTLR* 54 (three-dimensional printing increases the risk of copyright infringement).
[70] See RICHES Taxonomy for further explanation of copyright terms.

[71] Case C-168/09

infringed the copyright in the Arco lamp which belonged to Flos but which had fallen into the public domain. While the question was whether ten years was a reasonable moratorium period during which competitors could make competing designs prior to the assertion of copyright, to which the court considered it was not, the UK took the view that the case underscored the position that it was not lawful to exclude industrially manufactured artistic works from copyright protection. As with CDPA section 51, the desire in enacting CDPA section 52 had been to avoid cumulation of protection as between copyright and designs. As a result, the UK Government will repeal section 52 of the CDPA – likely to come into effect on 6 April 2020.[72] This will mean that in the UK, as in other countries, works such as these will be capable of protection by both RCD, UCD and by copyright.

In deciding *Flos* on the facts of the case, the Italian court found that there was sufficient proof that there was agreement among cultural fields on the ability of the Arco lamp to represent the trends of post-war Italian design. Moreover, the court thought it important that the lamp had been included in the collection of the New York Museum of Arts and Design for over ten years. Other cases have followed this in Italy. A Milan court was asked to determine whether a chair by Le Corbusier was protected by copyright.[73] In deciding that it was, the Court used an objective test looking to the appreciation of the design work in the cultural and institutional sector irrespective of its daily use.

Similarly, Vitra Patente AG's 'Panton Chair' by Verner Panton was capable of protection by copyright: the exposure of the work in famous institutions was evidence of its artistic merit.[74]

Figure 7. Designer chairs.

Parallels can be seen in this reasoning and some of the reasoning outlined above in *Hensher*. The challenge for courts within Member States in general when deciding on whether copyright subsists in designs is what the test should be. There will no doubt be divergence in the law until such time as the CoJ has the opportunity to rule in this area. Nonetheless, these changes to the law, coupled with the emerging European standard of originality in copyright, and the European law of both registered and unregistered designs outlined above, combine to suggest that the standards for the protection of works which are rooted in the ethos of the arts and crafts movement will be protected by both copyright and design right.

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[72] Bringing into force s 74 of the Enterprise and Regulatory Reform Act 2013. There will be transitional provisions. See Transitional Provisions for the Repeal of Section 52 of the Copyright Designs and Patents Act 1988 available at gov.uk/government/uploads/system/uploads/attachment_data/file/404525/Transitional_provisions_for_the_repeal_of_section_52_of_the_CDPA__2_.pdf

[73] Court of Milan, injunctions of April 26, 2011 and of July 7, 2011.

[74] Court of Milan, decision published on September 13, 2012.

There are plenty of examples of registered designs in OHIM – but whether they would also be protectable by copyright is a moot point (Figure 8).

Chair. Nautilus Furniture Ltd

Stained glass windows
Magon Vetro S.R.L.

Wallpaper
Magon Vetro S.R.L.

Figure 8. Examples of registered designs in OHIM

4.3.3. The Fashion Sector, Arts and Crafts, and the Maker Movement

Therefore, all forms of IPR are relevant to the fashion industry. Yet the fashion industry seems surprisingly quiescent about copyright and it is relatively unusual for the industry to enforce copyright and design rights. There are writers who suggest that the fashion industry thrives on a certain amount of copying; the copying is referential and enables fashion designs to move from the catwalk to the high street; from the supermodel to the lives of the general public (Raustala and Sprigman 2006). By contrast, safeguarding the reputation of the brand and preventing the consumer from being confused as to the origin of goods and services is important, as can be seen by the numbers of trade marks registered and enforced by traders in the fashion industry. For works emanating from the Arts and Crafts movement it is the categories 'copyright of artistic works' and 'works of artistic craftsmanship' in the UK that provide the most relevant protection, while design rights also have a role to play most particularly for those designs that do not have iconic status. As the protection of arts and crafts in the UK has shown, protection by copyright is relatively specialised, and there are hurdles to be overcome. Recent Member State case law suggests that courts are considering similar criteria for copyright protection for 'iconic' designs. While, as can be seen from the discussion above, RCD and UCD are both relevant forms of protection for designs that meet the criteria, it is likely to be more challenging to show that designs should also be protected by copyright. That said, the *Flos* ruling has been welcomed by the design sector, as has the impending repeal of section 52 CDPA in the UK. Whether this will result in more recourse to asserting and enforcing rights remains to be seen.

How, therefore, does the law now deal with the fashion and arts and crafts sectors in the context of new jobs, digitisation and the raison d'être of the maker movement?

The maker movement

As has been discussed earlier in this report, the maker movement has its roots in the Arts and Crafts movement. As with the Arts and Crafts movement the maker movement eschews mass production and consumerism, seeking rather to celebrate simplicity and individual design. Digital technologies are key to connecting the communities and enabling individuals to access the market.

Seen through a legal lens, the maker movement presents a mixed picture. The Maker Manifesto, written by Mark Hatch (2013), has been noted elsewhere in this report. One of the calls within that manifesto suggests that the fundamental ethos of the movement is one based on sharing. One of the key provisions of the manifesto says:

SHARE

Sharing what you have made and what you know about making with others is the method by which a maker's feeling of wholeness is achieved. You cannot make and not share. (Hatch 2013, 1)

In addition, Hatch urges the reader to "take this manifesto, make changes to it, and make it your own. That is the point of making." (Hatch 2013, 2)

These statements suggest that the maker movement shares not only knowledge and tools, but also *what* is made. This in turn would have implications for copyright and design laws: sharing in the way suggested would be an infringement of both design and copyright laws done without permission.

While some or even many maker communities may share what they make,[75] a glance at what actually goes on within the fashion and arts and crafts communities suggests something of a different picture: that sharing is around tools, skills and knowledge and not what the makers make. Using Etsy and Ravelry as case studies, this section will describe and analyse the legal environment in which the platforms, that enable connections to be made between the members of the communities and its markets, operate.

Etsy – connecting the Makers. Ravelry – connecting the knitters

As described earlier, Etsy is an online platform that provides a marketplace for goods sold by the makers, such as jewellery, craft supplies; clothes; art; bags – to name but a few. Etsy connects a wide range of makers with each other and with their customers. Ravelry is also a technology platform but in contrast to Etsy, it is a community of "knitters, crocheters, designers, spinners, weavers and dyers" (ravelry.com), a part of which enables its makers to reach out to the market.

Etsy is a big business: founded in 2005, in 2015 it had 625 employees and facilitated $1.93 billion of gross merchandise sales in 2014.[76] Ravelry makes its money in a completely different way. Briefly, the strategy includes advertising, selling merchandise, selling patterns, Amazon commissions, extras on the site including uploading images, commissions made from affiliate stores, contributions and events including talks and classes[77].

While Etsy does not itself produce goods, and does not make money out of copyright or designs, complying with copyright law is still an essential part of its business strategy. Based in Brooklyn in the US, Etsy complies with US law. An important IP element is the notice and take down procedure available on the site as required by the US Digital Millennium Copyright Act 1998 (DMCA). Anyone who thinks that their copyright is infringed by goods available on the site can

[75] e.g. bloomberg.com/bw/articles/2012-02-16/the-diy-maker-movement-meets-the-vcs
[76] etsy.com/uk/about/?ref=ftr
[77] Full details of Ravelry's money making strategy can be found here: blog.ravelry.com/2012/01/25/how-does-ravelry-make-money/

send a notice using the procedure specified. The goods will then be removed from the site.[78] There is also a procedure for replacing works if not infringing. Ravelry similarly has a notice and takedown procedure although in simpler terms than Etsy's.[79] The equivalent procedure in the Member states of the EU can be found in the E-commerce Directive[80] although Etsy states that it will remove 'infringing' goods where notice is given using the DMCA procedure by someone outside the US. By complying with the DMCA procedure Etsy and Ravelry can avoid allegations that it infringes copyright that could arise if they made the facilities available by which infringing goods were sold and did nothing about it.

Ravelry also operates community discussion fora in respect of which it has a number of guidelines.[81] There is a statement that the users are not permitted to use Ravelry to ask for copies of copyrighted patterns and must not post or share works protected by copyright on Ravelry without permission of the owner. It is clear that these guidelines are policed on Ravelry. A search in the fora for 'copyright infringement' shows the extent of the discussion on this matter, as well as indicating the number of offending posts that are removed.

Branding is very important to Etsy, and as such it has a number of registered and unregistered trade marks including "Etsy, Etsy graphics, logos, designs, page headers, button icons, scripts, and service names". Etsy has promulgated detailed instructions on how these may be used by third parties: the intention is to avoid confusing or diluting use.[82] Ravelry's strategy in respect of trade marks and brand protection is less clear. There is no obvious discussion on the site surrounding protection or use of the word 'Ravelry' or other aspect of the service that might be thought to have brand value.

These two cases show that the IP framework is important and relevant to those who supply the technology platforms that connect maker communities to each other and to the public. They also show the very different ways in which the technology providers can make an income from connecting the makers.

The makers and intellectual property

Makers on Etsy

One of the key aspects of Etsy (and of the maker movement) is that the goods sold are unique. In other words, they are not mass-produced and are intended to be 'one-off' goods. As the discussion above indicates many of these will be protected by copyright and at least some will be capable of protection by design right. Whether makers would actually apply for RCD is a moot point. As noted, registration has a cost; many, although by no means all, of the goods sold via Etsy are relatively low value which making applying for a registered design uneconomical. On enforcement, the notice and takedown procedure that protects Etsy from being liable for facilitating the sale of infringing goods could be an important low cost means for makers to

[78] etsy.com/help/article/482
[79] ravelry.com/about/terms
[80] Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (E-commerce Directive Article 14)
[81] ravelry.com/about/guidelines
[82] etsy.com/help/article/481?ref=hc_policy

enforce their rights should goods infringing their copyright be offered for sale either on Etsy or on other platforms offering similar services and thus subject to the same legal framework.

Makers on Etsy do make use of works that are in the public domain. One can find all manner of goods using public domain images, ranging from jewellery to T-shirts although in some ways one might expect more use than is evident. While purely speculation, that not more use is made of public domain works by makers may stem from the challenges identified by Melissa Terras, Professor and Director of the Centre for Digital Humanities at UCL.[83] She notes that there are practical issues that hinder the re-use of digital cultural heritage including poor interfaces and images quality but goes on to argue that copyright also plays its part. As it is only public domain images that will generally be re-usable, many of the images available for re-use come from the Victorian era and thus have there own specific aesthetic that does not appeal to everyone. She also argues that when institutions do put material on-line it is often accompanied by restrictive licensing conditions. What, wonders Melissa, are they afraid of? The RICHES IPR strategy (Deliverable D2.2 Digital Copyrights Framework: *Re-thinking Intellectual Property Relationships within the Cultural Heritage Sector*) advocates that Institutions should take an 'open' strategy to IPR where possible but does also recognise the practical limitations including for example, where Institutions have to, at least in part, contribute to their financial self-sustainability.[84] If policy makers and heritage institutions pursue the RICHES IPR strategy and seek to keep our digital cultural heritage re-usable, then future innovation within the maker movement may witness much greater use and re-use of this resource.

Makers on Ravelry

Knitting patterns and the final garment made up to the pattern, referenced elsewhere in this report as maker case study, serve as an example of how copyright operates within this part of the fashion industry. Indeed, a glance at some of the websites and online fora linking knitter makers together show how important copyright is to them and to their work and disputes are not unknown. An example of a challenge over a garment is available on Ravelry, relating to a pattern for a snuggle cowl[85].

Figure 9. Snuggle cowls on ravelry.com

The owner of the pattern reports:

This afternoon I was informed that this pattern is similar to another pattern Snuggle Cowl [see below] that was published recently. Please know it's a complete coincidence. (..) While there are*

[83] blogs.lse.ac.uk/impactofsocialsciences/2014/10/10/reuse-digital-heritage-content-in-a-creative-context/
[84] Refer to RICHES Taxonomy for an explanation of 'open access'
[85] ravelry.com/patterns/library/cashmere-perle

similarities (that great stitch pattern!) there are differences in gauge/yarn usage/shape. Please be assured that the concept was authentic and original. One can never have too many cowls and I do believe there are differences between the two patterns and encourage you to try them both on for size!

Applying the law discussed above on originality, making articles to patterns, and the limits of infringement, it seems clear that copyright has not been infringed as not only does it seem that has there been no copying, but what is similar between the two cowls amounts to no more than techniques and ideas, not in themselves protectable by copyright. There appears to be no RCD of these cowls. As indicated above, UCD would only be infringed if there was direct copying – which it seems is not the case here. Nonetheless this does illustrate how aware the makers in the knitting community are of IPR.

There are other instructive uses of IP law by those within the knitting community. One concerns the use of the phrase 'Stitch 'n Bitch'. This name has apparently been in use by knitting groups since at least WW11 (MacDonald 1988, 302). In the mid 2000s, a US organisation called Sew Fast, Sew Easy started requiring knitting groups using the name 'Stitch 'n Bitch' to cease so doing on the basis of a number of trade mark applications that it had filed for the name in the US.[86] Debbie Stoller, a knitter who started a Stitch 'n Bitch group in New York also made a number of trade mark applications for the name in connection with a series of books about knitting. Ultimately a settlement was reached whereby Sew Fast So Easy retained the registration for sewing and Stoller obtained the registrations for knitting. While described by some as a "tempest in a tea cozy" (Petrovsky 2006), the events do indicate the importance that is placed on trade marks within the community.

Both the snuggle cowl and Stitch 'n Bitch discussions illustrate what might be termed 'traditional' uses of IP laws in respect of the goods made by the maker community and of the importance of trade marks to provide visibility within the market. The discussion on the platforms – Etsy and Ravelry – by contrast shows the new uses of IP laws within the maker community as new technologies provide the means for the communities both to reach out to each other and to the market. Beyond the platforms, IP laws are relevant to many other ways in which new technologies are used by makers. One example of a copyright strategy when using social media is described on the Doggrelldesigns.com site.[87] The owner of this site is aware of the rights that exist in the knitting patterns under copyright law. In addition, copyright subsists in images hosted on the Doggrell website as well as images posted on other sites including Flickr, Ravelry, Etsy, Facebook among other sites. The author notes that if she does not want her images appearing on any particular site that she can add code to her website preventing this. She mentions that she can also use the notice and take-down procedure described above should she find her images appearing on other sites without her permission. She also notes that it is important to read the terms of use of a site before uploading content to ensure that content is not inadvertently 'given' away. In order to keep control of her work, her strategy is to focus on her own website rather than other platforms.

[86] web.archive.org/web/20060202190241/http://freetostitchfreetobitch.org/
[87] doggrelldesigns.com/2013/12/08/copyright-and-crafting/

5. Innovation Pathways and Value Generation for the Creative Economy

As outlined above, several concurrent processes encourage a revival of craft and a resurgence of interest in all it has to bring – skills, techniques, materials, new ideas, new products. This revival integrates, rather than being opposed to or threatened by digital technologies, yet it is wed, at the same time, in a set of paradoxical trends and processes. On the one hand, there is an increased interest in making and a maker culture, permeating wide social segments and resulting in manifestation of interest as buyer, building up skills as amateur or hobbyist maker, or merely wanting to understand its underlying philosophy. These phenomena have triggered renewed interest in both traditional forms of craft (e.g. ethnic patterns, old making techniques, old materials) as well as for new forms of craft and digital craft. At the same, time, an inverse process sees the crafts in a continuous decline, particularly as it goes for heritage crafts. These two broad tendencies affect unequally makers in different geographical areas, or operating in distinct areas of craft practice.

In the context of the craft revival phenomena outlined above, the sections below single out pathways to innovation and value generation for the creative economy, focusing on two non-exclusive trajectories: innovation supported by new technologies and innovation coming with the transfer of craft-related skills in new contexts. The aim is to single out opportunities, challenges and best practices so that potential routes for strengthening the position of crafts as creative sector, and of the maker as creative practitioner, can be prefigured.

5.1. Technology-driven Innovation

> *If the past 10 years have been about discovering post-institutional social models on the Web, then the next 10 years will be about applying them to the real world.* (Anderson 2010)

The integration of technology in craft practice has affected virtually every aspect in the craft products lifecycle from conception and design to final sale. The opportunities opened up by technology need to be seen in the context of broader shifts and changes that influence how products are marketed and sold. Some of these are associated with impacts of the maker movement, which contributed to:

- A resurgence of interest in making and craft products. This means that there is a broader consumer market, but also one that is more demanding, with educated tastes;
- The democratisation of design, with patterns, techniques, tools and resources being freely exchanged, and consumers often involved in co-creation of products and services;
- Promotion of ethical approaches advocating sustainability, ecologic use and local production and development;
- Promotion of a DIY culture which blurred significantly the boundaries between professional and amateur craftspeople and designers.

Moreover, the democratisation of design comes along with the democratisation of production: barriers to market entry for businesses are much lower than ever before. Complex manufacturing processes, which in the past could be conducted only by large companies, are now easily overseen by micro-entrepreneurs who outsource the production of components for objects they design or have others design for themselves. Micro-factories worldwide but especially in emerging markets and China-based, produce components that can be made to order, responding

to the needs of a varied range of businesses, from large corporations to micro-entrepreneurs (Anderson 2010). These components are ordered and produced quickly through the mediation of web-based specialised portals. All operations can be conducted seamlessly from behind a computer, which means that with creativity, a strong business concept, a feel for consumer demand, a flair for choosing the right suppliers and a good marketing strategy, a creative entrepreneur can start and conduct a successful business from the comfort of his home-based office.

Expertise, free access to mostly Internet-sourced information and prototyping tools and accessibility of suppliers also opens the field for the democratisation of innovation. As Eric von Hippel argues in his book, 'Democratizing innovation' (2005), we are experiencing a gradual but steady shift from organisation-led to user-led innovation. Users are those best aware of their needs, the spark of innovative products and services. Moreover, they can now access the know-how and the tools to design and produce those products that can answer these needs. What started as a trend in user-led innovation in open source software development is now expanding rapidly to manufacturing. As for open source software user communities, online communities exist that produce and share the knowledge and results of innovation, setting in motion self-sustained hubs in which new ideas can thrive and be pursued in the creation of new products and services. General manufacturing online innovation hubs such as Quirky (quirky.com) use the power of crowdsourcing and user votes to help decide, and then take steps to bring selected ideas to life in new products.

This is the economy in which makers are now operating. The sections below outline how makers themselves can get hold of technology to innovate their work. The focus is on process innovation – therefore in the practice of design and making, and further down the line of the craft product lifecycle, in marketing and sales. Finally, elements of new business models and organisational forms are examined.

5.1.1. Innovation in Design and Making Processes

A wide range of established and emerging technologies can be used in the phases of conceptualisation, design and making craft objects: computer-generated imagery (CGI), laser cutting, Quick Response (QR) and additive manufacturing (or 3D printing) among others. From these, additive manufacturing is the most novel, and its promises are only beginning to unfold. Through additive manufacturing, 3D objects can be crafted through the addition of layers of material, following a digital pattern. Additive manufacturing can be used in crafts for:

- Creative design. Additive manufacturing offers new creative prospects, for example the production of forms and spatial cuts that cannot be produced with other means.
- Rapid prototyping. This enables makers to save time by quickly seeing the results of their ideas. It can also save them money, as they do not have to go all the way to final product to see the outcomes of ideas. And it can afford better communication with customers, and customisation of objects based on their feedback.
- Creating moulds and patterns. This allows makers to change their designs more frequently and speeds up the production process.
- Direct Digital Manufacturing, where it is employed for creating end-use products (Barnatt, 2014).

From all technologies that can cover design and making processes, additive manufacturing is one of the most all-encompassing, as it can be integrated at any stage, from initial concept

development and testing to making end products. While the space of intervention and the way it challenges human creativity is still widely debated, designer-makers can find ways of investing their personal touch and skill in objects made wholly or partially with the aid of additive manufacturing. The technology can be used as well only for concept development and prototyping to test initial concepts.

Overall, the added value and opportunities brought by new technologies to crafts design and making can be mapped in relation to four aspects: enhanced *efficiency*, *creativity*, *interactivity,* and *customisation.*

Efficiency is brought by speeding up the design and making processes and increasing production volumes. It is afforded by technologies such as laser cutting and additive manufacturing in particular. One of the challenges is to enhance efficiency while retaining the value of the handmade and leaving enough space for choice and human creativity. This can be done, for instance, through hybrid manufactured and handmade production, by which objects are speedily produced by machines in raw forms, and then finished by hand.

Creativity is enhanced through the exploration and visualisation of concepts and ideas (e.g. through CGI), and also by enabling experimentation. Rapid prototyping, afforded by additive manufacturing, can be used to rapidly translate abstract concepts into prototypes, which can breach what otherwise would be laborious tasks and encourage makers to experiment, change, refine until they obtain the desired result. Additive manufacturing enables makers, moreover, to play with space and form in ways that could not be afforded by previous technologies or by hand. For instance, some 3D printers have the option of adding dissolvable materials to the products crafted, which can then be removed by water, creating shapes that would not otherwise be (easily) crafted by hand. Apart from digital technologies used directly to support design and making, creativity can also be spurred by interaction over the web. Active maker communities exchange ideas, concepts, models, and resources that are used by makers to get inspired and advance their ideas.

Interactivity refers to the capacity of craft objects to interact in an intelligent manner with users, for instance through the integration of QR codes. Information can be added onto objects, or these can be augmented to fit seamlessly in environments and respond in complex interactive patterns. British designer maker Michael Eden, for example, designed the Babel Vessel, which features a QR code printed in bas-relief and linking to his website to offer contextual information. Interactive technology can be integrated into craft objects to support people with special needs, as exemplified by the work of British designer maker Jayne Wallace. For one of her projects she created digital memory boxes for people with dementia (digitaljewellery.com).

Customisation refers to the personalisation of objects in response to a customer's taste or desire. In itself, customisation is not a new thing. Handmade objects can be custom-made, and craft has retained for long the distinctive age of customisation as a critical advantage over machine manufacturing. However, the handmade is laborious. Customisation by additive manufacturing, on the other hand, is fast and effective. It can be integrated in a variety of contexts ranging from commercial venues to museums, offering customers the possibility to choose a model or desired modifications to a model and have it printed on the spot for them. Innovation in design and making is afforded by digital technologies also indirectly, by mediating relations between makers and customers in online media, and offering opportunities for customer involvement in design. Makers can create bespoke objects for clients, or get information on consumer tastes and desires and adapt their product range. Moreover, customers can be involved in the design of new craft objects, making the design process effectively one of co-design. This can be done on a one by one basis, or take a collective dimension through crowdsourcing.

The opportunities afforded by new craft-related technologies are also associated with a series of *challenges and pitfalls.*

Firstly, there is the issue of accessibility to new technologies, tools, and associated digital skills. Some of the most sophisticated technologies are still expensive, especially additive manufacturing. They also require specialised skills, such as the skills needed to model objects and programme them before being 3D printed, or skills needed to work with CGI. Such skills and digital training programmes in craft-related technologies are increasingly integrated in formal education programmes, yet the most advanced techniques and skills (e.g. modelling software for additive manufacturing) are still seen as experimental. Many makers, especially heritage makers and contemporary makers already well advanced in their career are less likely to have access to such training.

Second, questions arise around the desired degree of integration of new technology, in relation to how it affects the value of craft objects and the makers' practice. New technologies bring with them new layers of mediation between the designer maker and the made, and subtract the human element in processes ranging from ideation, concept development and design to making, which traditionally would be done by hand. As Aldersey-Williams (2004) suggests, "A tool or technology always distances maker from object. At the heart of the present debate is how great that distance can become". Any integration of technology can therefore be seen as a substitute for human intervention. This can happen for instance by using a computer to visualise several variants of a design, or by creating moulds and patterns through additive manufacturing rather than by hand. Ultimately, an entire object can be created through machines, reducing the space of human intervention to directing the making process and making several choice along the creative and production continuum.

There are several angles that can be employed to look at this process. *Table 1* compares craft and mass manufactured objects, showing distinctions across *product features, makers, and markets.* This comparative view is helpful in determining how technological intervention can affect the positioning of a product from pure craft to machine-manufactured. Notions of value, embodied skill and creativity, quality and longevity are associated with the crafted *object*, which technology can affect. Similarly, thinking of *the maker*, the crafted product is positioned in a sphere of personal work and expression, which can be affected by integrating new technology. *The market* for crafted and mass produced products are also distinct, and attention needs to be paid to the consumer segments targeted for products created through the integration of technology. These objects can retain uniqueness and the value of the handmade, and therefore still be fit for a specialist market, or step into the zone of mass manufacturing, where their attributes need to be communicated differently.

Table 1. Comparison of craft and mass produced object characteristics (Woolley 2007)

	Craft objects	**Mass Produced Objects**
OBJECTS	Embody 'the hand of the creator'	Embody the precision of the machine
	Directly embody the manifestations of skill and creativity	Indirectly embody the skill and creativity of the design, production and marketing system
	Longevity a priority	Built-in obsolescence
	Positioned within a wider (historical, societal and craft)	Positioned within a wider (historical, societal and craft)cultural context

	cultural context	
	Associated with originality	Associated with innovation
	Limited formal 'functionality'	Predicated on 'functionality'
	Limited range of object archetypes	Wide range of object archetypes
PRACTITIONER / PRODUCER	Goals related to personal & professional development	Goals related to organisational growth and profitability
	Project personal values	Project corporate values
	Designer/maker continuum	Designer / producer schism
	Located within a developing body of personal work	Located within a developing product/service range and/or brand
MARKET	Specialist market	Non-specialist markets
	Narrow-cast advertising and promotion	Mass-marketing and advertising

The *value* of craft is often seen to lie less in aesthetics (which can be reproduced by machines), and more in the process, the element of human intervention, and the labour involved. More machine intervention can therefore translate into less value – social, cultural, but also economic (i.e. how much people are prepared to pay for it). According to the president of AMPM, new technologies can be used without detracting from the value of craft products, if employed for facilitating the mechanical part of making. On the other hand, making processes that are mechanised to an extent exceeding 50% are more likely to be categorised as mass produced objects rather than handmade (Interview with Marcel Lutic, 16/01/2015). Asides from the question of technology, consideration needs to be given as well to the preservation of other making aspects, such as traditional motifs and chromatics (Ibid.) and natural materials (Interview with UCECOM representative, 08/01/2015).

On the other hand, technology may also add substantially to the value of a product. For instance, CGI can be used to imitate the folds and movement of historical fabric, something that cannot be done with traditional means. It can also be used to create very sophisticated designs. Additive manufacturing can be used to give shape to objects that cannot be created by hand. Ultimately, technology can both add and subtract value to the crafted product. This suggests that the impact of technology on the value of craft products needs to be assessed in specific cases, in relation to the product and also the type of technology used, and the stage in the making process at which it is integrated. Considerations over increased efficiency through higher volumes production is also to be pondered against the value detracted by replacing the handmade. Hybrid handmade and machine-manufactured crafts are mainstream examples of how the value can be preserved, while increasing in production and efficiency (Interview with Marcel Lutic, 16/01/2015; and UCECOM representative, 08/01/2015).

Inherent in questions of technology integration in craft is also the type of relation established between a maker and their work. For many makers, craft work is a fulfilment – artistic, human, cultural – residing in the effort, attention and engagement they dedicate to making. A Romanian heritage maker – wood worker, sculptor and painter, mentioned:

Every piece of bark, I enliven it, I put soul into it. This is not a profession, it is a calling. It is a gift that has been bestowed upon me, so I do my best to be worthy of it. I do not call it work. I was born to make this. If I were to be born again, I would do the same. (Interview with Romanian wood worker, 16/12/2015)

For her, the question of integrating technology could not be assessed only in terms of efficiency or functionality, and not even considering the value of the object. After looking for and examining options that could enhance her work, she eventually chose not to use any new technology:

I tried to look on the Internet and see what tools are there, what new technologies. But this is a way of communicating, it is a communication. If the machine intervenes I do not know if it would communicate the same thing. It would help me professionally, but not as a human being. (Interview with Romanian wood worker, 16/12/2015)

Similarly, a Romanian heritage textile maker, weaver and knitter explained that her work is done entirely by hand deliberately, even for processes which would require the use of the sewing machine (Interview, 18/12/2015). The rejection of the machine was expressed also by contemporary makers interviewed:

I want to be and stay in control, I am not interested in automating the entire process. I am interested in what I can personalise as much as I can. It is true that the medium I use is very time-consuming, but I do not consider I am losing money. Every activity is defined as well also by the time you dedicate. (Interview with Romanian contemporary weaver and textile designer, 21/12/2015)

The empirical research suggests that from the position of the maker, technology appropriation and integration in making processes is regulated by a craft ethos. While no hard bound lines can be drawn between contemporary and heritage craft, findings suggest as well a distinction between a *cultural and ancestral ethos*, rooted in a long tradition of making and an *artistic ethos*, rooted in personal expression. These constitute different premises for the integration of technology in making. In the first, the maker situates herself/himself in a socio-cultural environment from which s/he often draws techniques, models, patterns, ideas. Craft work is a means to carry forward and enhance the value of that tradition. This does not mean that only faithful reproductions are allowed, nor that there is no space for personal creativity. Yet the machine can be seen as an intervention which disturbs the orders of the cultural ecosystem in which the craft profession, the maker, the techniques and tools have their own place. The artistic ethos, on the other hand, has to do with *personal* expression and creativity. It is this space of creativity, the zone of personal artistic expression which a contemporary designer maker would not like to see overcome by machine integration.

The handmade is not able to sustain the demand of a large market. I situate myself in between handmade and machine-made. And I try to keep my part as an artist very visible. I try not to allow technology overtake the process, lest my role as an artist vanishes. (Interview with Romanian painter and designer-maker, 21/12/2015)

A Romanian object designer used computer design software to vectorise calligraphy done by hand, and laser cutting for neatly shaping the objects on which calligraphy was printed. However, she was sceptical about using other technologies, such as additive manufacturing, considering it would undermine her expressive power:

I am not interested, I do not feel I can express with the help of 3D printing, then I would be out of the zone of personal expression. (Interview, 21/12/2015)

5.1.2. Innovation in Product Marketing and Distribution

The integration of digital technologies is much more common and wide-spread among makers for processes related to product communication, marketing and distribution than it is for design and making practice. Impacts and opportunities for business are also more varied and more pronounced, yet they all share a commonality in that most capitalize upon the potential of the Internet. The web grew into a virtual space where relations, networks, marketing, communication, and transactions are conducted seamlessly. It created its own rules, and from these different models have been devised by which virtual and real-life spaces are connected, determining new routes by which craft products are presented to customers and sold.

In broad terms, digital technologies can be used for five purposes which are either part of or influencing the process of taking the finite craft products from makers to consumers:

1. Product showcase and communication of product attributes
2. Product sales
3. Engaging and relating with consumers
4. Networking and relating with professionals, makers, and peers
5. Learning and resource and information exchange

A wide range of technologies and online tools, applications and portals can support these activities. For their being largely accessible and free, social media are the most widely used web tools for craft marketing activities. Social media can be used for all patterns of activities listed above. Since they are tailored particularly for networking, exchanges and communication, they are mostly used by makers to engage in online sharing and communication with customers and peers. Moreover, social media are used as well by makers to showcase their products, communicate their attributes, and sell them (Interview with UCECOM representative, 08/01/2015).

Considering the above, the following *opportunities* are opened up by digital technologies, particularly over the online medium:

Communicating value and brand image building. Digital media, particularly the web, offer makers the possibility to showcase their products and communicate their attributes. Moreover, these uses of technology also need to be regarded in the context of a changing economy, one more focused on experiences, valuing the immaterial side and the story of products, where competitive advantage needs to be sought after beyond the physical attributes of the objects sold. Online spaces offer the possibility to display the product and showcase their material attributes, while stressing those attributes that confer them value. This can be done by using a variety of approaches and media, from storytelling to videos of the making process, to communicate such attributes as artistry, skill, use of special techniques, relation to heritage, timeless motives, etc.

For example, on Folksy.com, a set of clay dishes patterned with cherry blossom feature a product description where the designer maker lists the various ways the dishes can be employed, and then goes on to explain how the dishes were made. On the side, a text lays out the artist's inspiration for making the dishes.

Cherry blossom ceramic dish perfect for soap, or as a trinket dish, ring holder or jewellery dish.

The glaze is food safe and my mum uses these for little nibbles and starters.

This has featured as a ring holder in a wedding.

I made this dish by pressing a cherry blossom twig into soft creamy white clay and biscuit firing. I then paint with underglaze colours and cover with clear glaze and fire again.

Each one is handmade and painted and completely unique.

Inspiration

I love the delicate but strong winter flowering cherry blossom. It flowers and brings beauty when everything else is dormant. This dish [can] be for soap, trinkets or a ring dish.

(Folksy.com, description for 'Ceramic dish, cherry blossom' by Marieanne Cavaciuti)

Table 2 samples a series of attributes that can be communicated to raise the economic value of the product.

Table 2. Relationship Between Tangible & Intangible Values (Woolley 2007)

Tangible Added Value	Resulting Intangible Values
Quality or preciousness of materials & finishes	Luxury
Longevity	Timelessness
Rarity	Uniqueness & originality
Creative reputation of the practitioner	Artistry
Part of a wider body of work or collection	Depth & continuity of the creative vision
Discernable process & making skills	Mastery
Embodied traditions	Historical significance

New routes to (global) markets. A variety of ways for approaching customers and closing transactions have emerged, which can be employed by makers singularly, or in complement to traditional channels – shops, boutiques, commissioning, galleries and museums etc. Online marketplaces operating globally, such as Etsy, or locally, such as Breslo in Romania and Folksy in the UK have revolutionised the way craft products are marketed and sold. Their contribution to the maker economy is not quantified only in supporting transactions. Online marketplaces proved that craft products can be appreciated and sold online. Moreover, as they started to build strong brands, they became guarantees of quality and safe deals for both makers and customers. This opened up global markets for makers, who can now sell internationally. They also made it easier for craftspeople to use imaginatively other online tools, particularly social media, to market and sell their products. Many of the Romanian makers interviewed confirmed that they used Facebook for receiving commissions or settling deals for sale. They would sell locally or nationally, so that payments could be done either offline or online, through systems such as PayPal.

While social media platforms were not initially configured to enable sales, opportunities for etailing via social media increase as platforms managers and technology entrepreneurs are quick to capture market demands and respond with added features or new tools. For instance, Facebook allows the owners of a dedicated Facebook page to set up an online store. This can be done linking automatically to e-commerce websites, or built on purpose through apps available over the web. Solutions can be free or close to free for people who have minimum technical expertise, or can come at a price choosing from a variety of software for online store building. Building e-commerce platforms with integrated apps for setting up sales platforms on social media are also becoming increasingly cheaper. E-commerce online store builders such as Volusion (volusion.com), Shopify (shopify.com) and Bigcommerce (bigcommerce.com) offer different models for building e-commerce websites and linking these to Facebook or other social media.

The opening to global markets does not necessarily entail that makers sell internationally. According to a recent survey, UK makers continue to sell prevalently to the local market – more than 70% of makers do not export their products, though for those who do sell internationally, exports turnover can be up to 20% of turnover (BOP Consulting 2012). The president of the Association of Traditional Makers in Moldova also confirmed that Romanian heritage makers in the region of Moldova tend to sell almost exclusively nationally rather than internationally, even if many of them have websites, Facebook pages and even online shops (Interview with Marcel Lutic, 16/01/2015). On the other hand, some other examples confirm that craft products can be marketed internationally. Blouse Roumaine Shop (blouseroumaine-shop.com), an online concept store that markets ethnic Romanian garments, particularly blouses, sells to an average of 20% foreign customers (Interview with BRS co-founder, 17/12/2014). To address an international range of customers there is a need for customised marketing strategies, based on a good knowledge of customers tastes, needs and desires. The founder of BRS, a young entrepreneur trained and experienced in marketing and the media industries had a targeted communication strategy for addressing foreign customers, in addition to Romanian customers. Apart from setting up the online shop in English, she paid attention to communicating the value of the products, residing in authenticity, the handmade, links with tradition and the idea of having products custom made for each commission by a Romanian heritage maker (Interview, 17/12/2014).

Engaging and relating with consumers is significantly leveraged by online spaces and tools. Social media services such as Facebook, Instagram and Pinterest are used to maintain a constant flow of communication on products. This serves to attract new customers, build loyalty, and guarantee rapid response. Customer satisfaction becomes important also as a direct mechanism for accountability. Negative accounts from unhappy customers can make or break a brand, make an online business flourish or pressure it into closing.

Networking with peers and involvement in *online maker communities* serve product marketing indirectly, yet they are not less important. By engaging in such communities makers can expand their network of contacts, learn from best practices and examples, see and adopt more efficient ways of marketing products. In the longer term, these communities also serve to awaken and keep alive the interest in craft objects and educate tastes. Traditional weaving is an example. The interest in weaving with traditional devices such as the loom, a laborious activity that was almost disappearing, has risen, taking several forms. Facebook communities such as 'Romanian weaving and weaving techniques' share techniques, ideas, patterns, unearth models and precious woven pieces from museums and family archives. Detailed instructions on how to build a loom from scratch are available online, such as the one on the Instructables website[88]. At the same time, the founder of BRS remarked in an interview that blouses woven with the traditional loom are the bestsellers on the BRS online shop (Interview, 17/12/2014). This could be explained by the lower prices, however the tag 'Blouses woven on primitive loom' is also a marker of authentic handmade products that adds to the value of the blouses. These trends are then carried forward by young craft and design students who can opt for reviving such traditional techniques in their own practice. A young Romanian graduate in Textile Design told the story of her interest in weaving and traditional techniques. Her dream was to make tapestry, and for this, she had just ordered a weaving loom from the United States.

I use traditional techniques, but in a way that tells something to myself as well. (..) The hand made has roots in the traditional making, we do not reinvent the wheel, we take over techniques

[88] instructables.com/id/Discover-and-Build-an-Inkle-Loom/

from the past. But in here it is difficult to access information on these techniques, they are much better in other parts of the world. My weaving vocabulary is English, I learnt online, I communicate with weavers in the United States, and there is plenty of information online. (Interview with Romanian contemporary weaver and textile designer, 21/12/2015)

These examples demonstrate that the influence of online communities and online interest groups are far reaching – they may educate consumer tastes, push objects back in demand, as well as encouraging students' interests in craft techniques and ways of making. This is due to the power the web has for bringing people together, offering them a space to share and learn, and ultimately helping some of them to put spins on new businesses.

5.1.3. New Business Models and Organisational Forms

Elements of innovative business models are offered by technology integration at all stages in the product lifecycle. By integrating technology in conceptualisation, design, and making stages makers can speed up production processes, innovate their product range and address different consumer markets. Further in the product lifecycle, makers can build their businesses around innovative models drawing on etailing and capitalising on the potential of web tools, social media in particular, for communication and promotion.

The adoption of innovative business models is conditioned by broad trends and processes affecting the global economy, especially the democratisation of design and production as described earlier in the report. The democratisation of production is a phenomenon of the manufacturing industry, yet it deeply affects crafts as well. Insofar as the trends in manufacturing are concerned, it means that there is an invasion of products of increasing variety and at competitive prices. For makers, it implies increased competition. Outsourcing production also affects directly makers' businesses, especially through the rise of 3D printing. Objects can be designed by professional designers or designer makers and then sent out for being printed, marketed and distributed by third parties. Shapeways, the 3D printing service and online marketplace is an illustrative case. Designers can send their models, which are then 3D printed and marketed. This is an example of a massive disruption in the craft value chain. It can have different implications based on who is using this type of service. For makers and designer makers, it is a new business opportunity, but also a completely different way of conducting their work, which completely obscures the making from their practice. This is also an opportunity for other professionals to step in, some of whom may possess skills in digital fabrication rather than the pure craft making sphere.

Examples and best practices show that the democratisation of design and production serves best micro-entrepreneurs. At the crossroads between crafts, design and digital manufacturing, the USA-based company Local Motors, an open source car company, demonstrated that crowdsourcing can be used to design and manufacture innovative, secure and reliable cars. Local Motors opened up a contest for choosing a design for its first car, and off the shelf components were then assembled in local centres, where 'build experiences' were organised (Anderson 2010). The designs of other car components from doors to handles was also crowdsourced. The vital components for car functions such as the engine and transmission components were instead made by professionals, ensuring that a safe and reliable vehicle was produced. All designs are released under a Creative Commons licence, and customers are free to change, improve and use them in their own home-based manufacturing.

To these add models thriving on e-commerce, which can be supported by online marketplaces, social media sales pages, or one's own e-commerce website. They require little or no technical expertise to be set-up, and all it takes thereafter to close the deals is the service of transport and delivery companies. Most of these are micro-businesses, often with one or two founding partners. A survey of 5,500 Etsy sellers reveals that for 42% this is the first business they had ever managed and 97% of sellers manage their Etsy business from their homes. Such businesses may also require little start-up capital. Same survey indicates that 56% of sellers used their own savings to start the business, and 35% did not need any kind of investment to start their business (Esty 2013).

The figures above indicate pronounced trends towards flexible working patterns and home-based businesses. E-commerce benefits especially those makers who in the absence of Internet would have found it difficult to start a business and live off making.

There are however a series of open questions regarding the long-term viability of these business models. Firstly, these are models largely dependent on individual talent and creativity, with unstable grounds and easy to shatter in the face of economic crisis or fluctuations in demand. Most of them do not scale up, and in many cases the owners themselves have no intention to scale up. The Etsy survey reveals that 61% of 5,500 sellers surveyed prefer to keep their stores at a size that they can manage on their own (Esty 2013).

Another issue regards who can benefit from these models, and how their appropriation can be widened. At a first glance, some of the most promising of these new business models look quite simple: product marketing and transactions can be conducted entirely online, and after being set up operations can be conducted as a matter of routine. Yet there is more to these operations than meets the eye. The most successful etailers, such as the people surveyed by Etsy, are people with taught or self-taught entrepreneurial skills, comfortable with the online, imaginative, creative and often risk-takers. Many of them have grown well accustomed with the Internet and have learnt the intricate workings of a changing economy. They know therefore how to make their products stand out, how to engage with customers, how to stress competitive advantage and how to cope with downfalls and change their sale strategies on the run. The qualitative research in Romania revealed that contemporary makers are much more prone to use the online systematically to sell their products, than heritage makers were. The latter could have websites and Facebook pages that would at times receive commissions or generate interest in products. However sales tend to be sporadic, and more systematic marketing strategies are required to move towards functioning business models. For what e-commerce and etailing are concerned, the following attributes appear to be critical for setting up and maintaining successful businesses:

- Entrepreneurship and strategic business skills
- Knowing the market, customers and competitors, along with a clear understanding of product positioning
- Knowing how to communicate the *value* of products, which can stand in product attributes or process of making
- Skills to enable a seamless use of a variety of web-based tools for displaying products for sale, communicating attributes, and engaging with customers

Possibilities are open also for makers who cannot afford or do not want to sustain an online business, and who can instead widen their business and reach new markets through partnerships and craft collectives. According to a representative from the Romanian National Union of Handicraft and Production Co-operatives (UCECOM), association represents a promising organisational form for Romanian makers, particularly heritage makers, which is at present explored very little due to an interest in individual business models or self-employment. The idea

of association should be promoted through image campaigns which evidence the advantages it brings to makers (Interview with UCECOM representative, 08/01/2015).

Emerging business models that couple up business entrepreneurs with makers prove to be a win-win situation for both parties. The online concept store Blouse Roumaine Shop was founded by a young Romanian entrepreneur who got hold of the rising interest in ethnic and traditional clothes, and partnered with heritage makers and craft cooperatives in rural Romania to sell traditional Romanian *ie* blouses. Initially, the founder wanted to set up a business model based on a full partnership with makers. However the partnership model did not work in practice. In the business model adopted, BRS was ordering and buying the blouses from makers, for then marketing and distributing them through the online shop. This case, presented in detail in RICHES deliverable D3.1 (2015), has some lessons to offer with respect to the success of such initiatives, and pitfalls to consider. On several grounds, the initiative was a huge success, meeting a high market demand, which was therefore translated also into a steady income of revenue for the partner makers, at least for a period of time. It also had an impact on Romanian makers of traditional blouses indirectly, as it responded to and strengthened the market demand for such products. This impact was greater through the contribution of other online shops opened in Romania at about the same time, in 2013, such as Romanian Label (romanianlabel.ro) and Iiana (iiana.ro). With similar business models but slightly different market positioning, these shops managed contributed to a trend that is already on the rise, repositioning folk lines in fashion and craft objects within the contemporary market. This opened the market not only for partner makers, but also for other craftspeople who traded objects through fairs, exhibitions or physical shops. A series of challenges were also encountered by BRS, which proved to be accountable to a clash of mindsets – between the entrepreneurial spirit oriented towards profit-making, rapid response to customer demand, attention to customer satisfaction, *and* a mindset by which making was an activity deeply embedded in a lifestyle, not oriented towards making high profits, and committed to a work rhythm regulated by other duties, rather than consumer demand. Makers found it difficult to adapt to a rhythm of work set by the customer demand. In practice, this meant that the high number of orders received by BRS could at times not be honoured in the times set, especially during summer time, when makers were busy with seasonal work. Makers also demonstrated an anti-capitalist mindset by which they did not look to obtain more than they needed, thinking more about covering their immediate financial needs, rather than saving or securing a steady capital flow for future times (Interview with BRS co-founder, 17/12/2014). This case demonstrates that the success of partnerships of this kind is accounted by factors that are not limited to economical aspects, and mindsets and attitudes need to be considered which can influence the success of the partnership.

Online concept stores can also be founded on models different from Blouse Roumaine Shop, for instance putting together carefully selected objects from a variety of makers. An example is Culture Label, a London-based online shop that markets selected art, craft and design objects at affordable prices[89]. Culture Label seeks to find and promote new talent along with maintaining a high standard for the objects it puts on sale. It sources its stock from museums, arts galleries, boutiques, art and craft associations and directly from makers. It has therefore built a name and a brand for itself, which can serve as a spring-board for makers whose products are sold in the shop. Culture Label is illustrative for pointing to the importance of brand and brand value when

[89] Culture Label was acquired by Bridgeman Images, a supplier in arts and cultural products. The acquisition was officially announced in early 2015, bridgemanimages.com/en-GB/explore/news/bridgeman-news/2015/January/bridgemanimages-acquires-culture-label.

building a design and craft-based business. Brand value translates into willingness to pay and therefore economic value.

5.2. Transfer of Craft Skills in Other Economic Sectors

The contribution of craft can extend to many other sectors of the economy, both in the CCIs and non-creative sectors, from manufacturing to tourism. This contribution can be seen two ways: *Firstly*, through a broad influence that can take effect in the way products are conceived, designed and presented to customers, as well as in educating and shaping customer tastes thus indirectly impacting upon market demand. This can be seen as the pervasive influence of a craft ethos, "a conflation of values, beliefs, culture and aspirations, underpinned by developing technologies" (Woolley 2011a), which can encourage innovation and generate economic value. *Second,* the contribution can take a more direct route, through craft interventions in specific sectors of the economy, where craft-related knowledge and skills are employed.

The territories open to craft intervention range from luxury goods manufacturing to fashion, architecture, tourism and furniture industries. In many of these industries, production processes are automatized, and crafts can bring distinction and competitive advantage by producing unique, one-offs or limited edition items. In other sectors, such as architecture and interior design, it is the craft person's intimate knowledge of spaces and objects positioning in space, a vision of spatiality and ergonomics that can be the source of novel ways of thinking spatial arrangement. Craftspeople can also be at the forefront of innovation, and use their knowledge and sensitivity towards certain kinds of materials, such as wood, glass, or clay, to produce new materials or new ways of working with these materials (Schwartz and Yair 2010).

Craft interventions in general have to do with bringing uniqueness, vision and distinction in processes that are otherwise automated. The capacity of craftspeople to contribute to this is derived from a series of attributes combining skills, knowledge, vision, but also attitudes and different ways of thinking that are the result of dedicated, long-term work with certain kinds of materials and making processes. These include:

High-level skills. With the rise of DIY cultures and the maker movement, 'skill' acquired a meaning that is synonymous with 'knowing how to do' certain activities, or build certain objects. Yet in crafts, *skills* refer to a high-level of knowledge and know-how resulting from prolonged practice. Figure 15 proposes a continuum between different levels of understanding skills. The added value of crafts stands at the top, in high-level skills. They go beyond knowing how to make a certain range of objects, and include a sensitivity towards materials and making processes that is distinctive for craftspeople. Skills also combine design and making, and while there is the tendency to separate between these, in reality many craftspeople, designer makers particularly, employ design-related and making skills in a continuum, in iterative cycles (Woolley 2007). What the crafts have to bring, therefore, to the creative economy, is more than the simplified skills that can be acquired informally by amateur makers. High-level skills, on the contrary, are increasingly rare, a result of a general process of deskilling in the society, or the simplification of skills in industrial production and DIY cultures (Woolley 2007).

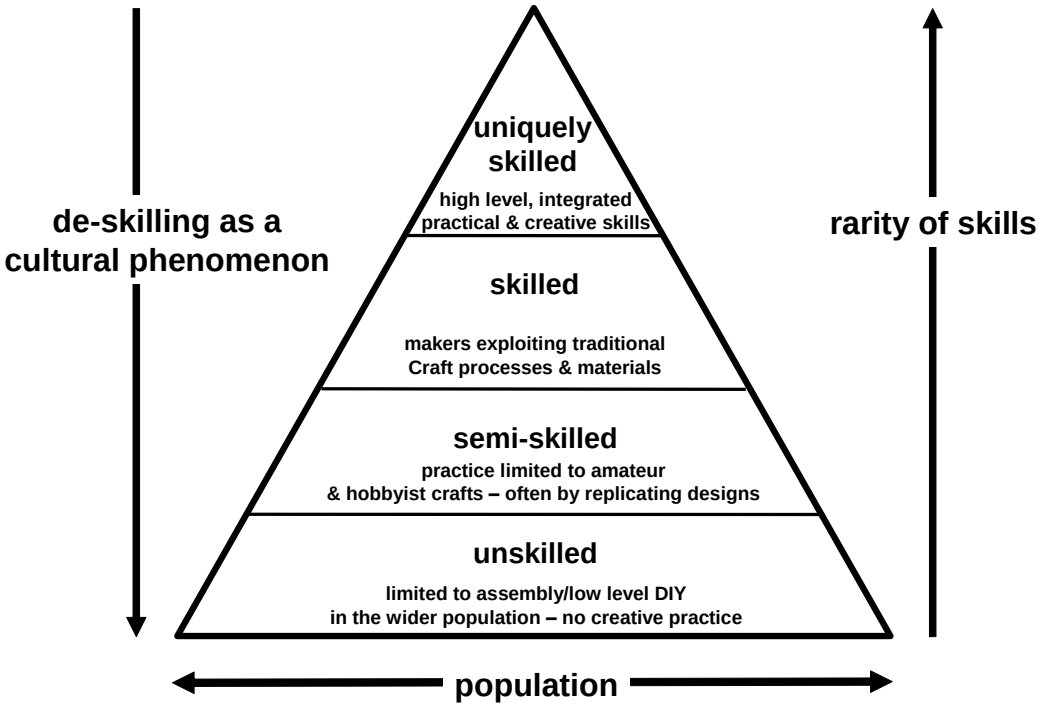

Figure 10. From DIY to studio craft skills. A continuum (Woolley 2007)

Personal vision and creativity is, in an analogous manner to skills, acquired by craftspeople in long years of practice. This can be employed in other sectors to bring fresh insight and different ways of thinking which can influence the choice of materials, aesthetics, form, and generate ideas in initial design processes.

Close knowledge of materials is derived from an enduring direct contact with specific materials, from textiles to glass making. This knowledge and intimate understanding of materiality can influence the way materials are combined, how they may react under the impact of technology, and can lead to the invention of new materials.

Knowledge of hand manufacturing processes can bring value in direct hands-on interventions, but it is useful as well for understanding how handmade and automated production can be hybridised with best results, where new technologies can be integrated, or what materials are best used to obtain desired outcomes.

In-depth knowledge of a craft area which includes high-level skills, knowledge of materials and design and making techniques is the epitome of skilled makers in different types of craft, from glass making to pottery. The transfer of this know-how to other industries can take the form of sharing knowledge (e.g. in tourism festivals and workshops), production of limited edition luxury items, or interventions for hand finishing in hybridised handmade-automated making.

Upon employment in new contexts, these craft-related attributes contribute to generating economic value, which can take many different forms, for example:

- Innovation – new materials, new products, new ways of making, skilful integration of new technology
- The production of one-offs or limited edition items
- Product customisation

- Brand distinction - contributing to unique designs that are difficult to replicate

The above are illustrated further through examples from the sectors of luxury goods manufacturing and fashion.

Europe is a global leader in the luxury goods market, with European brands accounting for more than 70% of the global market, a high contribution to the GDP (440 billion Euro and 3% of the European GDP, in 2010), employing close to a million people directly and an additional half a million indirectly (Frontier Economics 2012). Alongside the aura of the luxury goods, investment in IP, and selective distribution, craftsmanship and creative people are considered to be one of the pillars of the luxury goods industry. The leading position of the luxury goods sector is therefore highly dependent on the contribution of a skilled workforce. Craftspeople can contribute in varied ways to the luxury goods market: through the development of cutting edge designs, innovation in materials, or by direct hand manufacturing of unique products.

Craft products have a distinctive position in goods manufacturing, as illustrated by Table 3. They display unique designs, can be customised, and address a specialist market. Their economic value increases with the communication of the process by which they were made, and the high-level skills that went into their production. Established fashion brands such as Hermès, Vuitton, Chanel constantly employ skilled craftspeople for high end pieces. They are also good examples of how the economic value of certain branded products rises exponentially through proper communication of handmade elements, high-end market positioning, and selective distribution.

Table 3. The positioning of contemporary crafts within the production continuum (Woolley 2007)

PRODUCTION SECTOR	**Automated Mass-produced**	**Flexible mass-production**	**Hand-finished mass production**	**Volume hand-made**	**Contemporary crafts**
PRODUCTION METHOD	Early, inflexible manufacturing systems	Flexible manufacturing systems	Mixed mass manufacture and hand production	Developing world production	Handmade, crafts
PRODUCT CHARACTERISTICS	Limited choice, ubiquitous commodities	Highly variable, customised products	Upmarket, luxury commodities	'World design', tourist and/or ethnic goods	Personalised, unique, one-off's
MARKET	Mass market	Mass market	Exclusive	Tourism, niches, low-cost	Specialist

It is not only established brands that can derive economic value from craftmanship. Contemporary makers with an entrepreneurial spirit can build a brand name for themselves on the basis of skill and a flair for market positioning. *Furor Brillante*, with the tag line 'Broderie de luxe sur mesure' (Bespoke luxury embroidery) was founded in Paris by Greek craftsman Andreas Kanellopoulos. He founded the business after several years as costume designer for the Paris

National Opera, deciding to dedicate himself exclusively to embroidery and textile embellishment. He has developed his own unique style, at times incorporating pieces of rubber band or foam into carefully crafted needlework. His clients include Haute Couture as well as ready to wear luxury brands such as Carolina Herrera, Donna Karan, Calvin Klein, Ralph Lauren and Oscar de la Renta. He wishes to expand as well into fields beyond fashion, such as furniture and interior design.

A fashion trend which deserves attention is the integration of traditional folk motives, patterns and themes, reminiscent of different European and non-European traditions. This trend contributes in direct and indirect ways to repositioning the value and relevance of heritage crafts for contemporary audiences. Most directly, new fashion lines and products that integrate handmade elements or ethnic motifs open up jobs or collaborations for heritage makers. For example, a Romanian heritage weaver and textile maker interviewed for this study narrated the story of her collaboration with the French fashion designer Philippe Guilet. For the haute couture collection 'Prejudice', inspired by Romanian national outfits and culture, Guilet collaborated with Romanian traditional makers. The collection included outfits inspired by Romanian tradition, featuring rich embroidery, beadwork, and integrated ethnic motives and patterns. Guilet involved Romanian makers as advisors or to elaborate handmade pieces and embroidery. The textile maker interviewed for this study contributed with her embroidery and bead adornment skills. This experience left her proud of the recognized value of Romanian heritage, and of the fact that her own work was appreciated "not only as craft, but also as art" (Interview, 18/12/2015).

Indirectly, this fashion trend contributes to uplifting the value of the handmade, repositioning the work of heritage makers, and educating consumer tastes thus conferring to handmade products a contemporary appeal. In Romania, several fashion designers created collections inspired by or which integrated folk motives. Adrian Oianu is generally considered the first Romanian fashion designer who interpreted and integrated Romanian heritage themes and patterns in his design. Since 2006, each of his collections was dedicated to a certain Romanian motif or theme. He is also campaigning for sustainability and the conservation and revitalisation of Romanian heritage, and is involved in fashion design education (Design School Adrian Oianu). Moldavian fashion designer Valentina Vidrașcu reinvented the traditional Romanian blouse 'ie' and other Romanian folk garments for our times using modern materials (silk, velvet) and contemporary cuts. She launched her first collection inspired by Romanian folk outfits in 1999, and continues to create clothes that valorise Romanian tradition. Her works use only natural materials and are handmade.

Young fashion designer Sandra Galan came up with a different way of integrating tradition in contemporary creations. For her collection 'Heritage', she used precious vintage materials embroidered with golden or silver thread. These materials were used in the past for traditional Romanian skirts, featuring intricate designs and embroidery (Figures 11-12).

Figure 11. Vintage fabrics integrated in the work of fashion designer Sandra Galan, collection 'Heritage'

I fell in love with the traditional Romanian skirts ('fota'). I first found several treasures – this is how I call them – in a barely lighted, dusty boutique, and I realised I found a treasure, quite literally. And I just had this idea, I realised this is what I wanted to do for my degree. And I started hunting them, I made a stock of old skirts, especially from the area of Muscel. I have selected the skirts of Muscel, they are embroidered with gold and silver thread, and most have around 100 years old. We are talking about pieces that were expensive also 100 years ago, they were worn for weddings, special occasions, they were left to daughters as a dowry. (Interview with Sandra Galan, 16/12/2014)

Sandra Galan integrated the precious materials in her creative process, which draws inspiration from the nature of the fabric (Figure 12). The collection was launched in 2008, at a time when the folk trend in contemporary fashion was peaking up, and generated an enduring demand in similar one-off creations featuring vintage embroidered fabrics.

Figure 12. Vintage fabrics integrated in the work of fashion designer Sandra Galan, collection 'Heritage' – the designer's creative process starts from the fabric.

The integration of folk motifs in fashion design also raises questions with respect to intellectual property. A Romanian heritage maker interviewed, specialised in weaving and textiles, pointed to the huge difference in price between Romanian traditional blouses handmade in Romania by craftspeople, and similar models confectioned and sold by reputable fashion houses such as Ralph Lauren or Oscar de La Renta. A handmade blouse sold directly by the maker is typically priced in the order of one to few hundred euros, depending on the richness of the embroidery and the time invested. A similar garment may be priced at more than a thousand, or several thousand euros when put on sale by luxury fashion houses. Traditional motifs and patterns such as the ones used in embroideries and textiles are not protected by IPR (Interview with AMPM president, 16/01/2015). It is interesting to note that while the difficulty to regulate such uses is evident, this case can be paralleled with more notorious ones in which the use of indigenous patterns in fashion and other fields was brought to court, and the rights of indigenous communities over their cultural patterns was acknowledged (see Egan 2013).

The examples above show that crafts can bring value to the creative economy beyond sector-specific activities. At the same time, these activities also strengthen the position of the makers, who can take them as full time jobs or be involved in shorter-term projects and collaborations. Craftspeople can adopt different roles in these processes, for instance advisor, design consultant, maker. As argued in the 2010 report *Making value* by the UK's Crafts Council (Schwartz and Yair 2010), contributions to other economic sectors do not require craft practitioners to abandon their core work, rather they can broaden their professional portfolio. The makers interviewed in the *Making value* study were portfolio workers, therefore being involved in different kinds of activities additional to their core creative practice, from consultancy to teaching and research.

To capitalize on the potential of crafts skills transfer and widen the scope of such contribution, a series of conditions have to be met both on the side of the makers and the industry.

From a legal and policy-making perspective, there is a need to clarify and strengthen the position of craft and the craft sector. This means, firstly, acknowledging the distinct position of craft as different from other skilled trades, to which craft is associated in certain European countries. The Romanian makers interviewed, for instance, are well aware that a betterment of their economic position needs to start from changing the current legislation, in which their profession is amalgamated with other skilled trades. An example of a country where such position was duly acknowledged is France. In France, the value of crafts became more and more appreciated in recent years, so that in June 2014 a new law on commerce, artisans, and small enterprises was passed, in which the specific place of crafts ('métiers d'art') was acknowledged as distinctive (Article 22, law n° 2014-626, 18 June 2014).

Second, craft needs to be seen in a different light, beyond the maker and workshop-focused paradigm. A good example comes again from France, where the value of its craftspeople and craft enterprises is recognized across many domains, contributing to social development and maintaining the distinctive position of French artistry. The French National Crafts Institute (Institut National Métiers D'art) acknowledges the contribution of crafts beyond sector-specific activities, listing among others: museums, public spaces, architecture, decoration, design, fashion, luxury manufacturing and contemporary arts (institut-metiersdart.org).

The craftspeople themselves need better information with respect to the wide range of activities they can lend their expertise to, as well as better networking opportunities. The small-scale qualitative study in Romania revealed that makers perceived roles in some economic sectors such as manufacturing or furniture industries to be of a lower status. They also valued the independence and flexibility that came with being self-employed. A representative from Romania-based UCECOM remarks:

For traditional makers, professional reconversion is at times beneficial in financial terms, but at a psychological level demoralization and frustration may arise, because they cannot earn a living by performing the profession for which they have an affinity and a passion. For the industry, employing craftspeople is highly beneficial, because they bring something new in creative processes, they are attentive, meticulous and hard working, these qualities being characteristic for the craft profession in general. (Interview, 08/01/2015)

This indicates that in Romania the possibilities to employ craft people in non-craft industries that enable them to retain and exercise their calling and high level of skills are still scarce. However, as examples from the UK demonstrate (see Schwartz and Yair, 2010), employment of makers in non-craft industries can take forms that are beneficial and rewarding for both the industries and the makers themselves. The study cited demonstrates as well that patterns of employment can be accommodated that do not require craftspeople to leave their core profession, but rather embrace portfolio working. The advantages of portfolio working, very common in some economies but less in others, can therefore be better communicated.

6. Impacts on Employment and Careers

The preceding section outlined how craft skills augmented by craft-related new technologies can spearhead innovation in the European CCIs. However, innovation is not a final end, but rather a means to improving industry performance, measured especially through employment growth and increased productivity (EC 2010c). At the same time, innovation can also change the premises for professional work, resulting in requirements for different skills sets. This section outlines a series of broad trends characterising shifts and changes in craft-related employment and careers and associated requirements for new skills.

Self-employment and (home-based) micro-businesses on the rise

Self-employment and micro-businesses are typical of the craft sector. With the increased uptake of etailing, even more craftspeople make a career as self-employed professionals, or start micro-businesses. The various possibilities to promote and sell products online complement traditional marketing and retail venues such as shops, fairs, exhibitions, and direct commissions. For many makers, traditional sales channels continue to prevail. For instance, a 2012 UK survey indicates that 30% of contemporary makers sell through their own website and 3% through social media, yet for most makers revenues continue to be channelled through traditional sales venues (BOP Consulting 2012).

For a smaller percentage of makers, the online medium represents an opportunity to start and manage a business which requires minimum start up capital and no direct contact with retailers or other intermediaries. This trend is particularly pronounced outside of Europe, in the USA, where, as reported above, there is a rise in home-based craft businesses, run particularly by women – 88% from a 5,500 sample (Etsy 2013). This indicates that the potential is there, but steps need to be taken to enable more makers to profit from it.

Portfolio working is embraced by more and more professionals. The 2013 survey of 5,500 Etsy sellers reveals that 48% of them are independent workers or have part time or temporary jobs (Etsy 2013). In the UK, 65-70% of contemporary craftspeople are believed to maintain portfolio careers (Schwarz and Yair, 2010). Portfolio working implies flexible work patterns, cross-disciplinary skillsets and high mobility. It can involve, in addition to design and making, community-based work, teaching, research, consultancy services on craft and design, organisation of craft-related events such as fairs, writing about craft, curating exhibitions etc. For some professionals, these additional activities can take central stage to the detriment of making, for instance researchers or educators.

Increases in career change and career return. Craft is becoming an appealing career for people who have been made redundant or otherwise decided towards a career change. The phenomenon of craft graduates who return to craft after pursuing another career is also rising. In a 2012 report by the Crafts Council, UK, *career changers* (who take up crafts as a new career, usually in mid-life) accounted for 27.5% and *career returners* (who return to craft, in which they were originally trained, after pursuing some other career) for 22.5% from the sample surveyed.

Blurring boundaries between amateur and professional craftspeople. With the rise of the maker movement, many people take craft as a hobby, supported by online communities such as Ravelry and Stitch ‘n Bitch. They usually make items for themselves and close families and friends, yet some of them may arrive to change this into a fully-fledged profession. A Romanian contemporary maker interviewed, trained in architecture and mechanical engineering, used YouTube to learn leather craft:

I learnt on my own, experimenting. There are many tutorials on YouTube, many people that post videos. I took a course before, but it did not help me as much. I learnt by watching videos and trying on my own, I am a perfectionist and this came naturally. (Interview with Romanian leather worker, 21/12/2015)

There are several implications for this phenomenon. First, for amateur craftspeople this is an unprecedented opportunity: maker communities and access to online resources can enable people to take up crafts without formal training or apprenticeships. At the same time, there are significant distinctions between professional and amateur craftspeople in terms of expertise, knowledge and skills. Mastery of a skill is a time-consuming process, which is often only afforded through practice and interaction with other skilled and knowledgeable professionals. This simplification of skills (Woolley 2007) caused by DIY cultures can, in the long term, erode the bases for the identification of high-level skills. This suggests that the skill set of professional makers, especially at the high end, needs to be communicated, and mechanisms for its recognition need to be ascertained.

New professional profiles. Novel professional profiles are emerging, encompassing digital fabrication skills as well as mixed profiles blending old and new making. The term 'maker' itself has expanded to include equally craftspeople (both traditional and contemporary) and people skilled in digital fabrication. These new profiles are largely a phenomenon of the maker movement and the advent of digital technologies. These professionals are often self taught, or build up their skills through informal education workshops and courses. Educational curricula for supporting their growth are not yet formalised, nor are there systematic descriptions of professional types and associated skill sets.

Requirements for complex skills sets bridging craft, technology, and entrepreneurship. The opportunities opened up by digital technology, especially for self-employed craftspeople or those in micro-businesses are actuated when professionals have the necessary skills to position their businesses strategically, communicate their competitive advantage and engage successfully consumer markets. Complex skills sets are required, covering digital technology, marketing, and entrepreneurship in addition to craft-related knowledge and skills. The 2012 survey of UK contemporary craftspeople indicates that a significant minority of makers lack marketing, especially digital marketing skills (BOP Consulting 2012). These skills requirements become important in the context of growing competition, in particular from opening markets to low-priced products confectioned in countries with low labour costs. To be successful, makers need to learn how to be strategic about the way they promote and market their work, and how to communicate their competitive advantage to potential consumers. Digital literacy is only one step on the required skills ladder. The ability to work with computers needs to be complemented by abilities to communicate well, have a sense of potential markets and consumers, and act strategically within an increasingly competitive market.

7. Digital Craftsmanship and Maker Education

As the previous sections suggest, the (job) market is shifting. The industrial age required specialists, homogeneously trained workers. At present, professionals are needed who think in cross-disciplinary ways and cover interdisciplinary skill sets. People need to make better use of networks and embrace emerging technologies and creative forms of (digital) creation and expression. Yet our scholarly systems are still shaped by the needs of an economy and society of long ago. In order to have this next generation workforce available, we need to critically (re)evaluate formal and informal education and explore the options to teach and learn in a new way.

To generate the premises for this inquiry, two notions are brought to the forefront: (digital) craftsmanship and maker education. Both notions are associated with the emergence of the 'maker movement', as described above. The movement explores the possibilities of learning by making, a learning approach analogous with the learning by doing paradigm advocated by constructivist theories. It advocates the benefits of learning in a social environment and emphasises informal, networked, peer-led, and shared learning, motivated by enjoyment and self-fulfilment. The most recent wave of the maker movement is closely connected with the availability and accessibility of new technologies. Open source resources like 3D printers and milling machines have slowly moved the production process from the factory to the 'maker space' such as a Fab Lab. These spaces have changed traditional understandings of what a maker and making are, by proposing closer associations with digital fabrication.

The notion of *digital craftsmanship* in the 21st century refers to digital crafts such as app development, web engineering, graphic design, game development or interaction design. These crafts utilise digital communication platforms to empower product development, digital fabrication, and distributed production. They rely on new ownership models and alternative forms of value creation. 'Maker spaces' connect (digital) craftsmanship to open source machines for digital fabrication. Digital technologies also provide opportunities to connect and reinvent certain (traditional and/or outdated) competences and crafts. They can introduce them to new areas and applications. This leads to more interesting products, following cultural innovation rather than a commercial drive alone.

With the emergence of the maker movement, and a changing society, we also see a shift in the types of skills to master, often referred to as the 21st century skills (Framework for 21st century learning), and the competency level that is required of these skills. For instance, according to Benjamin Bloom in 1956, the highest competency level was 'evaluation' (Bloom et al. 1956). Andrew Churches replaced, in a revised version of Bloom's Taxonomy, the highest level of competency by 'creation' (Anderson and Krathwohl 2001). Designing and making things by oneself is, following this chart, now the highest level of competency.

The process of making things hands-on, envisioning the connection between creativity, imagination and technology, appeals to different talents and problem solving skills. For the most part, 'maker education' has no set place in curricula at schools yet. But there are plenty of opportunities to experiment with different formats to teach and learn. As long as most curricula are not sufficient, and the school-environments are not yet fitted for acquiring this kind of knowledge, 'maker spaces' are essential in curating and developing these 'maker skills'. Through creative manufacturing processes, facilitated by these spaces, people discover their talents in an informal way, and are supported in the development of their skills.

The Massachusetts Institute of Technology (MIT) in Boston developed the concept of the Fab Lab in 2003. A Fab Lab is an open access space, open to anyone, where you can find the

majority of the current digital fabrication tools. The concept is based on sharing tools, skills and knowledge; you are free to use everything in the Fab Lab, as long as you bring your own material and share your designs and knowledge (also digitally on the various Fab Lab platforms) afterwards. In a Fab Lab people use high tech equipment to realise their ideas in a prototype or product. The strength of the concept is in its interdisciplinary nature. There are people and organisations working in different disciplines, fields of expertise, and with different skill sets on projects together.

At the moment there are more than 200 Fab Labs scattered all over the world: from America to Asia, from Europe to Africa. And all these Fab Labs are connected to each other via videoconference screens so that help is always close by - even when the people working in the Fab Labs are on other sides of the world. This illustrates the next phase of the digital revolution. People want to give, more than ever, meaning to their own products. New professions arise at the intersection between virtual and physical reality: the crafts of the 21st century.

7.1. Cases and Impact

In the last few years a variety of initiatives have worked with the principle of 'learning by making' using new technology and reviving craftsmanship. They are executed on different skill-levels and for different age groups. What they have in common is that they have thrown out the existing 'classroom teaching model' and started to focus on stimulating the potential of the individual - in a variety of ways. These initiatives do not necessarily prepare a new workforce for the industry. Their impacts are, rather, on the individuals, whom they assist to pursue self-development and update their skills so that they are better prepared to shape their own world and surroundings. These statements are illustrated by discussing three cases and their impact.

Fab Academy

The Fab Academy was launched by MIT's Center for Bits and Atoms (CBA) under the supervision of Director Prof. Neil Gershenfeld. It met a need for people using the Fab Lab environment, but who were running into the limitations of their (technical & digital) abilities. The programme provides advanced digital fabrication instruction for students all over the world through a unique, hands-on curriculum and access to technological tools and resources. At the Fab Academy, students learn how to envision, prototype and document ideas through many hours of hands-on experience with digital fabrication tools.

The Fab Academy displays a great example of a distributed educational model. It spreads over an international base and provides a unique educational experience by combining both 'long-distance' learning via conference calls and/or video lectures and hands-on 'making' by using local Fab Labs.

During a period of five months (starting in January of each year) students view and participate in global lectures broadcasted from MIT every Wednesday. These lectures are recorded and available to students throughout the semester. In addition to the lectures, there are 2 to 3 lab days each week where students have access to the digital fabrication equipment and get personal help with projects. Each participating Fab Lab has their own schedule for their students. Each Fab Lab that participates in the Fab Academy program is part of a global Fab Lab / Fab Academy network. Fab Lab Amsterdam, part of Waag Society (RICHES project partner), is one of the participating labs where one can enrol in the Fab Academy.

The programme is a fast paced, hands-on learning experience where students plan and execute a new project each week. They tackle different technical challenges - but in the process they also revisit old techniques and crafts that might help and inspire new projects. Each student documents their progress for each project, the steps they've been taking, and the techniques they've been using. Since it is a fast paced process, alterations to techniques and design can be implemented quickly and the knowledge is transferred to the entire network of Fab Labs and Fab Academies. This documentation results in both a personal portfolio of technical accomplishments for the student and a growing backlog of all designs and techniques for the entire community. The progress is evaluated by skills and projects rather than by time put in or credits.

Impact

After six months, students show their projects by videoconference to the other participants at various locations. The information and techniques learned from previous classes and assignments is gathered in order to propose, analyse, develop, and fabricate new products/objects with function, which embrace a variety of fields: arts, energy, textiles, toys, interaction, and more. Even though the Fab Academy is still growing and maturing, it is anticipated that in the near future a Bachelor's degree (under regional accreditation) can be offered as well as a post-graduate course.

FabSchool

The Fab Academy initiative addresses (design) educated adults. While it is set up in an informal setting, the entry level is rather high, in terms of knowledge of design and/or technology. The programme is also international and taught in English, and requires enrolees to dedicate a fair amount of time each week. However, there is a growing need for skilled people with a multidisciplinary knowledge spanning digital and making processes who can be active at a local level. This knowledge and skillset are best taught at a younger age, when children are fast to absorb and make sense of how things are made, and be creative about how things could be used and improved. This thinking inspired FabSchool, a joint initiative by Waag Society and Rotslab (a medialab based in Utrecht, The Netherlands), which was imagined as a way to do more than open up the tools for children and young adults, rather it thought of ways to open up and re-imagine education in an informal context.

FabSchool originated in 2013/14 as a research project of Waag Society and Rotslab to explore the options to open up the current educational system in favour of maker education. The main research question was: *How can creative maker processes contribute to the social, creative, technical and entrepreneurial skills of young people - and what role is there for maker spaces (such as Fab Labs) in education?*

Pilots

The question was researched by undertaking three pilots with high school students, in three different contexts. To support the observations interviews and surveys with students, teachers, and parents were also conducted.

The pilots were performed in cooperation with two high schools: a regular high school: Openbare Scholengemeenschap Bijlmer (OSB) in Amsterdam, and one 'grafimedia' school, X11 in Utrecht, a school where students are already working in design. At both schools a FabSchool-course of ten weeks was given to 13/14 year olds, within their curriculum. At the OSB a second ten-week course was offered, but in this case it was extracurricular, and students between the age of 11

and 18 could participate. The pilots for the OSB were conducted by professional designers and performed at the Fab Lab Amsterdam where the students had access to a wide variety of digital fabrication tools. The pilot at X11 was conducted at their own school, with their own teachers, where they had access to computers with graphic design tools and a 3D printer.

In addition to the applied research, desk research was performed to construct a theoretic base to build a methodology on, drawing on constructivism, experiential learning (emphasising the role of reflection on the experience of doing) and a learning by making paradigm.

FabSchool rules and guidelines

This research led to a set of rules and guidelines for future FabSchool initiatives:

Positioning: FabSchool is the entry-level educational programme that broadens the spectrum of skills and knowledge, by applying the 'learning by doing' principle. It could be either implemented in an existing school situation or be extracurricular.

Educational approach: Any FabSchool programme starts with the definition of a real problem, usually linked to a social theme. This creates context so that learning becomes meaningful. FabSchool offers students the opportunity to work on an assignment or a specific challenge and are given practical tools to take action. In these assignments 'making' is a prerequisite and plenty of room is given for new ideas and interpretation.

Principles: FabSchool is based on four basic principles. These principles are always applicable, regardless of the form of execution (workshop, series of lessons, inspiration session, etc.):

1. *Learning by making*. By going through the creative processes, students learn how 'things' and 'systems' are put together. Everyone works from their own motivation to make / know / achieve something.
2. *Working in multidisciplinary teams*. Each student discovers and develops his own talent and works from his own discipline. Differences should be celebrated. Students learn about the skills of others and are encouraged to explore possibilities for teamwork.
3. *Open / share*. Students document their work and share it with each other and the world. This way they can build on (each) other's ideas. Opening and sharing are important building blocks for the enterprise of the future.
4. *Meaningful learning*. By linking learning to a social issue or external client (business, social organization, individual) learning is contextualised.

The students are an integral part of the learning process. The teachers are not so much educators as they are facilitators and motivators. The students decide what they want and need to learn in order to fulfil their assignment or explore their (societal) challenge. The teachers are there to guide the students and help research their options. The students are the 'users' of the knowledge, but they also work with real clients that can give input on their designs.

The design process always starts with a question or a problem that the students solve together. Secondly, they create a prototype that can be investigated as a possible solution. Then the prototype is tested to see if it provides answers to the initial question or a suitable solution for the problem. Often these findings bring up new questions that motion a new iteration of the design process. Within the *Ask, Make, Try framework* (Figure x), the Design Thinking method that is incorporated in the FabSchool programme, there are five steps to go through in order to reach a

solution. At each step other skills are needed, and each step can be repeated as often as needed.

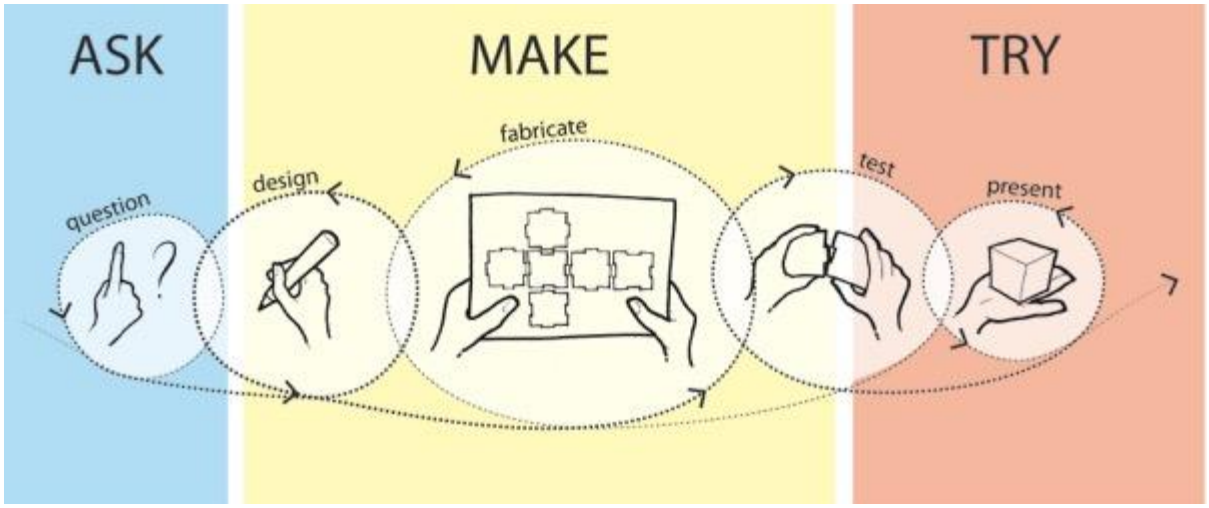

Figure 13. The *Ask, Make, Try* framework and design process implemented in FabSchool programmes. Source: WAAG Society

As different from the Fab Academy, the FabSchool methodology is applicable to all ages and audiences. However, to yield best results the methodology needs to be customised for each target group. The principles remain the same, but the level of difficulty, the degree of freedom that a student can handle, the abstraction of the assignments, and the preparation will be adapted for each group of students. Ten-year-olds might know more about the latest technology but lack knowledge of the physics and crafts that might come with the design process. A retired welder might be knowledgeable about construction and hands-on production, but needs to be brought up to date with the digital fabrication techniques. A hobbyist knitter, who is web developer by trade, might come across new ways of combining his skills in new projects. The fact that all these different backgrounds can be brought together is one of the strengths of the FabSchool programme and methodology: people can learn from each other, pick up old and new crafts, and experience cross-disciplinary work.

Any FabSchool initiative needs to start, therefore, from a thorough assessment of the groups that will be involved, and make an inventory of knowledge, skills, as well as available tools. A FabSchool can be staged in a Fab Lab, however this is not necessary. The right setting and tools depend, rather, on the skills, knowledge and/or crafts to be mastered. If one's focus is on woodworking a workshop space might be sufficient. But if one's focus is on textile-development, staging the course in a (digital) weaving mill or screen painting studio might be best. Importantly, FabSchool provides an adaptable methodology, and facilitators as well as the students are flexible in adjusting goals during the course of programme.

Impact

The teaching methodology, and the various trials of FabSchool, resulted in many new experiments and teaching situations such as the weekly episodes of FabSchool Kids at Fab Lab Amsterdam. On September 24th 2014, Waag Society's Creative Learning Lab and Rotslab organised an afternoon about DIY technology, creativity and making in education.

Sylvia Libow Martinez, writer of 'Invent to Learn' (Martinez and Stager 2013) was one of the keynote speakers.

It also resulted in the creation of a Makers' manifesto that was handed to the Dutch parliament and discussed and approved as part of the discussion on educational priorities and budgets (http://waag.org/en/news/petition-put-making-back-education). A separate publication 'FabSchool' was published in 2014 describing the rules and guidelines, mentioned above, in more detail (WAAG Society, 2014). In September 2014 the online platform FabSchool.nl was launched to give children, parents and teachers easy access to a variety of maker projects to execute at home or school.

WEAVE - ZigZag

Textile plays an important part in curating cultural and social heritage, besides having an industrial function. It expresses ways of living, geographical areas, history, traditions, values, and symbols. This is why textile is a wonderful way to highlight cultural historical values. Next to this important role in the preservation of heritage and culture, textile also represents a vast amount of age-old information and expertise. Even though many of these techniques have now been forgotten, the urge to curate them is still very present and digital technology might just be the way to achieve this. By way of example, Jacquard weaving is now a very common technique used to produce intricate patterned fabrics. But not too long ago it was an endangered practice, as it was deemed to be a very inefficient way of producing fabric in an industrial age. The complicated patterns (which sometimes got a different setting for each thread) required highly trained professionals, and since human error could compromise easily the design, it was considered a very costly technique both in time and in money. The introduction of the computer saved the technique. The looms were automated and patterns were created on computers, which could be as intricate as anyone would want. Yet the weaving technique stayed the same, technology was just an added support. This development opened many new possibilities in pattern design, so that new projects could emerge. At present, this technique is endangered, since there are not enough people being trained in the craft of designing the patterns, be it digital or analogue.

In the European project WEAVE (Weaving Europe: Artefacts, Values & Exchanges) children (aged 4 to 12), their families and teachers were stimulated to get familiar with European textile culture, crafts and heritage through a hands-on approach. In the project, children worked together with artists and museums on projects focused on materials, techniques and historical and cultural background of the textile industry. Playful learning (learning by making) and experimenting with the textile arts and technology were a key element in the shaping and transfer of knowledge.

In this project artists and craftsmen had an important function in the (re)introduction of (forgotten) craft techniques and new applications, such as the use of smart textiles, sensors and digital fabrication, to the next generation. Children were actively involved in these topics. By doing that the project followed both the FabSchool principle 'learning by making' and the 'Users as Designers' methodology (WAAG Society, 2011): a co-creative way of involving the target group in the design process. By organising co-creation sessions and focus groups, a dialogue with a variety of people was opened to create the best programme for achieving transfer of knowledge and skills in techniques, crafts and heritage. The project was run by means of workshops and co-creation sessions, which culminated in three events organised in Amsterdam, Sofia and Rome. The overall process was designed as follows:

Various artists and craftsmen were asked to work on the content of the workshops and events together with the in-house designers. The crossover between these specialists were streamlined

by conducting two separate co-creation sessions with adult experts, and two sessions with children, the target audience. In the first co-creation session the craftsmen took the floor. During this session the content and scope of the general Zigzag programme was discussed. What crafts and techniques are most relevant? Which ones do we need to focus on? What is the needed skill-level? What is a suitable entrance-level for this age group? These conversations with craftsmen resulted in a clear focus and structure.

The second co-creation session involved conceptual thinkers. Textile artists helped shape the creative and technological directions, and the process was guided by a series of key questions: What is the relationship between art and textiles? How can we translate them into innovative workshops? In what way can one make old crafts appealing to a young generation? This input raised the bar for the quality of the workshops; they were no longer simply educational, they were also inspirational and intriguing. The artists' insight contributed as well to understanding what kind of techniques and crafts were suitable to incorporate in an event. Following these sessions, all the workshops were tested at least twice in primary schools, and altered where needed, following the input of the children and teachers.

The co-creation sessions resulted in the following focus points for the organisation of the events and the workshops:

Exploration: It seems that children are very keen to play and explore new areas. This can be in both physical and technical or skilful areas. Children are eager to learn but need to be motivated from their perspective. They need to be challenged, interested and intrigued. A way of integrating this element is by creating open spaces, physical structures and playgrounds in which children can explore and build a new world for themselves. These are environments in which children can sense, provoke and challenge themselves and each other in a playful way.

A new life: Much been said about the revaluation of the 'old' crafts. For children to feel engaged with these (handy) crafts they need to feel targeted in their own perceptual world. Technology plays a big part in their immediate environment. Integration of the technical tools and media in the 'old' crafts is one way to bridge the direct making techniques of the past with the technologically-enhanced world in which today's children grow up, to forge new pathways to maintaining and updating them, making them relevant. All activities related to 're' experiences are suitable in this context: remixing, reusing, rethinking, replaying, reacting and reloading.

Blow Up: Children's imagination is engaged and triggered when they are presented with something out of the ordinary. Something they can wonder about. It needs to be magical or inspirational. Enlarging an ordinary object can create this effect, and also makes it easier to explain techniques on larger scale objects.

All these elements were incorporated in the workshops, the collective artwork and the general atmosphere of the events.

Impact

During the ZigZag-festival on the Nieuwmarkt in Amsterdam about 800 children were introduced to different craft, technical and creative aspects of textile in twelve educational workshops and a fair where children were allowed to explore and experiment freely. Similar public events were organised in Sofia and Rome. All educational workshops were documented and made transferable through video tutorials and Instructables (instructables.com). In addition, in each participating country (The Netherlands, Bulgaria, and Italy) 50 textiles, education and museum professionals were trained to conduct the workshops. All three events also showcased three

collective textile artworks that were created by the participating children, artists, designers and employees of several museums.

The ZigZag-festival offered a place for imagination and wonder. Children discovered, explored and learnt through play. By creating an open space, with physical elements and character of an open playground, visitors were motivated and challenged to create a new world. Young or old, big or small, everyone was a creator and inventor. Technology played a major role in this. By having children experiment with sensors and digital fabrication they were challenged to create new things from textiles. Magnifying objects, machines and structures, stimulated the children's imagination. This made the crafts understandable, appealing and intriguing, even for the smallest or most sceptical visitors. And even though the festival site was geared towards children from 4 to 12 years old, there was plenty to explore for teenagers and adults. Everybody could independently roam the site and had the authority to decide what they wanted to do and make. During the workshops for school classes, more detailed instructions were given and students worked together with teachers to produce a wide range of outcomes.

8. Conclusion

8.1. Results

This report argued for and illustrated the strategic importance and continued relevance of craft-related knowledge and skills for today's economy, and their role in driving innovation, improving competitiveness and eventually generating new employment opportunities. Craft as practice and set of knowledge and skills are situated at the merger of social, cultural, economic, and technological dynamics. They also have a contemporary and a historical dimension. They are so deeply embedded in European histories, cultures, and societies, that in many environments their social and cultural value overshadows their economic value and potential. In particular, heritage crafts are perceived in some economies as expressions of the past, bearers of cultural and historical value, rather than professions of the present. A body of related knowledge and skills, bearing inestimable value, are therefore endangered. A key aim of this report was therefore to show that the cultural, social, and economic functions and values of crafts can be reconciled, and that digital technologies can be used strategically to this purpose.

The report showed that in the process of shifting towards knowledge-based economies, established, traditional knowledges are not less relevant. Digital technology has proved to reposition craft in the economy and contribute to increasing the value of craft products. It has potential for further strengthening the link between the past (heritage, traditional craft) and the creative future, as the power of creativity can seep in all segments of society, within and beyond the creative industries.

The report has firstly examined the parameters of a craft revival, characterised by a resurgence of interest in craft, craft skills, and a DIY culture. The maker movement, with emphasis on the autonomy of the bespoke artisan maker and the production of unique products and decentralised commerce, has enabled the development of new online retailers (or etailers). This, in turn, has created a new consumer who values and demands these unique products, which has led to a recalibration of the relationship between makers themselves, and between producers and consumers in a new economic order. While the maker movement and the craft revival are in many ways a result of decentralised, post-institutional processes, this study argues that there is space for *bridging* between and *networking* individualised cells and institutions. Collaborations and partnerships are essential for moving from what are often small-scale successful practices to initiatives with a wider scope. These collaborations need to include institutional entities that are custodians of craft knowledge, as well as those operating at the forefront of innovation. Museums are often neglected in these collaborations. However, as this report has shown, museums perform complex and manifold roles – they support transmission of knowledge and skills, can spur creativity and innovation, and can support the craft economy through their retail function. To make the best of these capacities, best suited are creative and educational collaborations between museums and educational institutions, for instance fashion and design schools.

It is also essential to consider, reading through the best practices outlined in this report, that many of the achievements are the result of bold, creative, skilled young makers and entrepreneurs that were not afraid to experiment and take risks to cultivate innovation. They have sketched some paths, and indicated what can work and what does not work, as well as raising the stakes by putting forth innovative products and services. There is the need, moreover, to ensure that these initiatives scale up and spread. These successful ventures co-exist in Europe with a continuous decline of crafts and an eroding position of highly skilled craftspeople. A first

key issue to address regards the ambiguous position and status of the craft sector. The proposal is to both:

- Establish the distinctive place of the craft sector and craftspeople as different from other skilled trades, and
- Operate a paradigm shift, to position craft beyond the maker and workshop-based paradigm, thus acknowledging its distinctive contribution to manifold domains, from fashion and design to tourism and architecture.

Second, it is important to document experimental initiatives and new ventures and create a growing body of evidence which can fasten the adoption of innovation across European countries. Thirdly, attention should be motioned towards craft professionals that are cut off from information access and the promises of globalised markets. Heritage makers, often working in rural areas are in a disadvantaged position, with lack of access to information and skills – digital and entrepreneurial. Apart from facilitating access to information and training, this study found that collaborations between makers and entrepreneurs and other forms of association hold great promises and present a still untapped business potential, which should be better communicated.

The role of IP frameworks in supporting, protecting and promoting the work of craftspeople is also insufficiently acknowledged in some European economies. The emergence of the fashion and arts and crafts maker communities, the use of digital technologies and the attendant recalibration of relationships within the cultural heritage sector does not in theory or in practice result in the IP framework being any less relevant now than it has been in the past. IP is used by maker communities in very traditional ways with respect to what is made. In other words, IP protects the works through copyright and designs, the brands through trade marks and inventions through patents. But in using new technologies both to link the maker communities with each other and to their markets, IP is used in news ways to support those communities and trade channels in the move from analogue to digital. IP in other words can be used in conjunction with the technologies as a tool both to protect and promote the fruits of the maker communities. In terms of re-using content, it seems clear that what is important to these communities is innovation. Unlike what is suggested by the maker manifesto, it seems that in the fashion and arts and crafts sectors what is shared is the living heritage of intangible knowledge and skills rather than tangible content and artefacts which are the outcomes of creative processes. To stimulate innovation around the re-use of cultural heritage content in new creative initiatives, cultural institutions are advised to opt for an 'open' strategy to IP exploitation (as advocated by *RICHES deliverable D2.2 Digital Copyrights Framework: Re-thinking Intellectual Property Relationships within the Cultural Heritage Sector*).

Notions of craftmanship and craft skills have also undergone changes that require a re-consideration of established paradigms. *Maker* and *making* are nowadays used to refer both to craft activities and professions engaging with such materials as clay, wood and metal, as well as to digital fabrication using emerging technologies such as digital manufacturing. Yet both profiles continue to be active, maintaining distinctive identities, which do not necessarily reside in the products made, but rather in the process of making and the link of continuity with the traditions or contemporary spaces from which makers draw their knowledge and skills, while constantly updating them. A maker working with clay may use digital technology to enhance her production process, or create new types of responsive, digitally enhanced clay dishes. A digital fabricator experimenting with the use of additive manufacturing may use high-end technology to produce very simple clay dishes. These dishes of diverse provenance are differently produced, embed different values and address different customer segments. The emergence of the latter does not

mean that the products, the professional standing and the importance of established making paradigms are becoming obsolete.

Changes to craft skills are not only due to the integration of digital technologies, but also to the simplification of skills, through the proliferation of DIY cultures. Today craft skills may mean 'knowing how to', yet in craft traditions skills are associated with high level expertise, one that builds upon years of dedicated practice. The simplification of skills opens up questions and ambiguities. On the one hand, DIY cultures are great ways for craft amateur practitioners to open up businesses and step into professional craft practice. At the same time, the risk is there for high-level skills associated with enduring craft practice to be eroded, as well as their status. This suggests mechanisms for the recognition of high-level skills should be set in place, recognizing that it is this high level of skills that brings added value through crafts interventions in luxury goods manufacturing, fashion, architecture, and high end automotive industries.

Finally, the question of craft education, and how skills can be transmitted to account for these changes is one upon which the current report has touched, but which is however too complex to exhaust within. Current generations of children and students are brought up with the Internet, computers, smart phones, and soon 3D-printers are expected to be widely available in school labs. The technology and design industry will continue to grow, following these inventions, and more and more specialised jobs will eventually be automated. However, the same generation will also grow up in a society where doctors, pilots, farmers, and other specialists will still be needed, where houses will still need to be built and textiles fabricated. Specific knowledge and skills, such as those associated with specialised crafts will still need to be sustained and improved. In short, as argued above, new skills do not make old skills obsolete.

There is also the question of basic knowledge and skills in digital fabrication. The danger for technology to become a black box, understandable only by a few specialists is an important aspect to consider. While the benefits of technology and innovation are enjoyed by wide social strata, the risk is that those knowledgeable of its intricacies and underlying structures will become fewer and fewer. Moreover, expanding knowledge of technology can be the precursor of innovation. Once users understand how things work or how things are made, they will be able to expand, improve or build on existing tools and knowledge. To make this possible, a shift is necessary, gearing education towards the curiosity for what is in that 'black box'. This same danger applies to the world of crafts. To build towards a sustainable society, knowledge of technology and technical devices is just as rewarding as knowledge of making, tinkering and crafts.

Initiatives like the FabSchool and those devised under the WEAVE European project are all based on the principle of 'learning by making'. They show that in combining various skills and knowledge, including older crafts and tools, and bridging formal and informal educational forms, new pathways to learning 21st century skills can be forged. These educational approaches are not meant as substitutes to the existing school systems and educational platforms. Rather, their role is to enrich the educational field and contribute to a skilled workforce suitable for new careers and the future job market. In the long term, the goal is for a wider number of Europe's citizens to be better equipped to explore their interests and skills and engage purposefully with the objects that support and populate their environments.

8.2. Impact

This report demonstrated the vital contribution that craft and craft skills can bring to Europe's creative economy. It has identified and examined two pathways for generating economic value and driving innovation: through integration of DT and through the transfer of skills to other economic contexts. Impacts upon employment and careers have been therefore mapped. This contribution adds up to the body of knowledge examining the relation between culture, employment and the economy, and between cultural and economic value. As such, it builds upon earlier studies which set out to demonstrate the economic value of culture, both direct and quantifiable, and indirect (e.g. KEA 2006). Moreover, the study looked at the transmission of old and new making skills in informal and experimental venues, arguing for the importance of these approaches as precursors of innovation. It opened up the question of maker education in 21st century curricula, which is something that deserves attention in future studies. As the 21st century progresses and new innovations in crafts and technology develop, a new skilled workforce will be required to fulfil the demands of a technological society. This report has highlighted some of the issues facing society and cultural heritage in meeting those demands in order to generate value and competitive advantage for the European creative economy.

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Appendix: Definitions of Terms and Abbreviations

AMPM. Association of Traditional Makers in Moldova (Asociaţia Meşterilor Populari din Moldova)

BRS. Blouse Roumaine Shop

CCI. Cultural and Creative Industries

CDPA. Copyright Designs and Patents Act

CGI. Computer-Generated Imagery

CI. Creative Industries

CoJ. Court of Justice of the European Union

CTM. Community Trade Mark

DCMS. Department of Culture, Media and Sport, UK

DMCA. US Digital Millennium Copyright Act 1998

DT. Digital Technology

DIY. Do It Yourself

EC. European Commission

ECIA. European Creative Industries Alliance

EU. European Union

GDP. Gross Domestic Product

GVA. Gross Value Added

IP. Intellectual Property

IPR. Intellectual Property Rights

NESTA. National Endowment for Science, Technology and the Arts

NMVW. National Museum of World Cultures, the Netherlands

NGO. Non-Governmental Organisations

OHIM. Office for the Harmonisation of the Internal Market

QR. Quick Response

RCD. Registered Community Design

TRIPS. Trade Related Aspects of Intellectual Property Rights 1994

UCD. Unregistered Community Design

UCECOM. Romanian National Union of Handicraft and Production Co-operatives (Uniunea Naţională a Cooperaţiei Meşteşugăreşti)

UK. United Kingdom

US/USA. United States. United States of America.